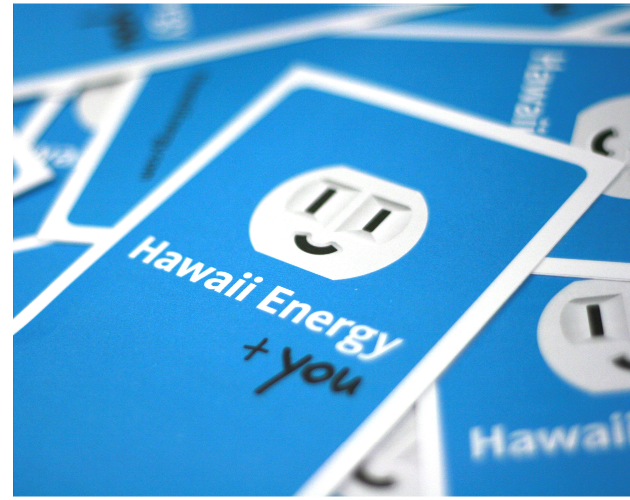
Hawaii Energy
YOUR CONSERVATION & EFFICIENCY PROGRAM



Annual Report

Program Year 2012

July 1, 2012 - June 30, 2013

Submitted to the Hawaii Public Utilities Commission
on November 7, 2013 by

Leidos Engineering, LLC*
Public Benefits Fee Administrator
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SAIC From Science to Solutions

leidos

**Formerly known as SAIC Energy, Environment & Infrastructure, LLC (prior to September 27, 2013).*

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by Leidos Engineering, LLC (formerly known as SAIC) under contract with the Hawaii Public Utilities Commission serving the islands of Hawaii, Lanai, Maui, Molokai and Oahu.

Full report with attachments available at www.hawaiienergy.com/information-reports

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A MESSAGE FROM THE PROGRAM DIRECTOR

On behalf of the entire Hawaii Energy Team, we are proud to submit our Program Year 2012 (PY12) Annual Report, covering July 1, 2012 through June 30, 2013 and highlighting our fourth year as Hawaii's Public Benefits Fee Administrator (PBFA).

This has been a very good year for energy efficiency in Hawaii. As detailed in this Report, Hawaii Energy's efficiency programs for PY12 will deliver 1.4 billion kWh in lifetime energy savings to the electric grid at a bargain total program cost of 2.3¢ per kWh. This, in turn, will save an estimated equivalent of 2.4 million barrels of oil and 1.2 million tons of greenhouse gas emissions. And, at an average electric utility price of 30.7¢ per kWh, customers will save approximately $405 million on their electric bills over the life of the installed efficiency measures. These figures show the exceptional cost-effectiveness of investing in energy efficiency and why efficiency is Hawaii's premier electric grid resource, over oil, gas, coal, PV, biomass, hydro, geothermal and wind.

In addition to meeting our PY12 kWh savings goals at a very attractive price for our customers, Hawaii Energy reorganized its internal structure to better facilitate the development and implementation of forward-looking strategies and innovative new measures. We also continued to enhance our customer engagement and build on existing collaborative relationships with our industry allies, Contract Manager, M&V Contractor, Hawaii Public Utilities Commission (PUC) and Government leaders. Together, these efforts will help ensure that Hawaii Energy continues to provide best-in-class energy conservation and efficiency programs for Hawaii's future.

Operationally in PY12, Hawaii Energy extended its aggressive engagement with residential and hard-to-reach business customers on neighbor islands; achieved significant success in getting condominium boards to adopt sub-metering; helped underserved small businesses participate with our Direct Install Lighting Program; established benchmarking and metering programs for Hawaii's large buildings; and developed multi-island opportunities to assist water and wastewater operations with energy efficiency upgrades and practices.

Most significantly this Program Year, Hawaii Energy (as PBFA) actively supported the PUC's bold On-Bill Financing (OBF) initiative, which is expected to be a catalyst for giving all Hawaii electricity consumers an equal opportunity to participate directly in the benefits of Hawaii's clean energy future. And at the end of our Program Year, we were quite pleased to be informed of the extension of our PBFA contract for another two years, with the addition of formal duties as the OBF Program Administrator. This convergence of our team's continued service and proven capability as PBFA, along with the PUC's new game-changing financing initiatives, an encouraging market potential study soon to be released and the strong working relationships we have established thus far promise exciting advances in Hawaii's clean energy progress going forward.

Finally, this Report represents the culmination of four years of evolutionary transition from the original legacy rebate program to an innovative, responsive and effective energy efficiency program today that is ready to lead the way into an accelerated clean energy future that Hawaii can and must own.

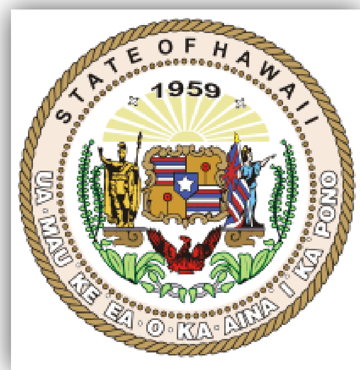
Respectfully submitted,

H. Ray Starling

H. Ray Starling
Program Director

BACKGROUND

Program Origins



In 2006, the Hawaii Legislature (see Hawaii Revised Statutes §269-121 through 269-124) authorized the PUC to transfer the existing demand-side management surcharge collected by Hawaii's electric utilities to a third-party administrator that would be contracted by the PUC. The transferred surcharge would be called the Public Benefits Fee and would be used by the contracted third-party administrator (the Public Benefits Fee Administrator or the PBFA) to manage and deliver energy-efficiency and demand-side management (DSM) programs and services under the oversight of the PUC.

By Decision & Order # 23258 (Docket No. 2005-0069) dated February 13, 2007, the PUC announced it would establish a Public Benefits Fund to promote the development of programs and services that increase energy efficiency, reduce electricity consumption and demand, and ultimately decrease Hawaii's dependence on imported fossil fuels. In 2008, the PUC took further actions to direct the Hawaiian Electric companies to begin collecting a Public Benefits Fee (PBF) surcharge.

On September 18, 2008, the PUC issued a competitive Request for Proposal (RFP) soliciting proposals and pricing for a Program Administrator for the Hawaii Energy Efficiency Program. Science Applications International Corporation (SAIC) submitted a proposal and was subsequently selected to negotiate a contract with the PUC. As a result of those negotiations, a contract was signed on March 3, 2009 between the PUC and SAIC whereby SAIC would become Hawaii's first PBFA and would operate the Hawaii Energy Efficiency Program until December 31, 2013 (with a possible extension until December 31, 2016 at the discretion of the PUC). The initial two-year budget of the contract was $38.4M, followed by a second two-year budget of $67.2M. For both contracts, 70% of the contract value was designated for direct incentives in the form of direct cash incentives or services.

BACKGROUND

Historical Summary

PY09 - Smooth Transition

On July 1, 2009, responsibility for the "demand-side management" programs was transferred from the electric utilities to a third-party Public Benefits Fee Administrator (PBFA) reporting directly to the Hawaii Public Utilities Commission (PUC). The scope and goals of the contract were developed to provide a focus to the energy efficiency and conservation efforts supporting the PUC's Legislative charge to meet the State of Hawaii's Energy Efficiency Portfolio Standard. The goal of the program in its first year was to provide a smooth and seamless transition of the programs to ensure that the obligations and commitments to customers and the efforts of trade ally businesses were supported during the transition.

The Hawaii Energy team

In the first year, the Program accomplished much, while acknowledging areas to improve, specifically:

Achievements

- Provided a smooth transition of responsibilities from the utilities.
- Developed an identity with a new name, logo and program website.
- Enlisted trade allies and community-based organizations to support the Program's education, outreach and marketing efforts.
- Discontinued window air conditioner (A/C) program.
- Expanded ENERGY STAR® Appliance programs across all Islands.
- Standardized Commercial Program requirements and incentive levels across all Islands.
- Delivered $11,900,000 in incentives driving customer bill savings of over $29,200,000 annually and over $255,000,000 over the life of the measures installed.
- Verified first year Program Level savings of 153.7 GWhs.

BACKGROUND

Lessons Learned

- Need for increased efforts and methods to meet Island Equity goals.
- Need for program to enhance "Hard-to-Reach" participation.
- Provide for the ability to overcome economic impacts of the 2008 financial crisis.

Significant Event

- State mandate for Residential Solar Water Heating in new construction single-family homes.

BACKGROUND

PY10 – Refinement and Additions

In its second year, Hawaii Energy sought to refine programs to increase cost effectiveness and impacts. One method was to best leverage existing contractor relationships and refine processes to expand participating manufacturers, distributors and retailers to provide more efficient products to more locations at prices that could drive purchases.

The Program moved quickly to help the State secure and implement Federal Stimulus Funding in 2011 while addressing the needs identified to help hard-to-reach and commercial projects.

Implementation

- Initiated American Recovery and Reinvestment Act (ARRA) - funded projects.
    - Direct Implementation
        - Refrigerator Recycling Program to address "garage" or second refrigerator
        - Commercial Project Catalyst – 25% project cost
        - Residential Peer Group Comparisons
        - Solar Water Heating Loan Interest Buy-Down Program – Leveraging local financial institutions
        - Solar Water Heating Bonus –Increased to $1,000 per system
    - Supported Activity
        - State of Hawaii Office of Community Services (OCS) Weatherization Program – Hawaii Energy provided solar water heating system inspections for low-income homes.
- Central plant optimization commissioning program to pursue operational and low-cost savings in air conditioning systems.
- Developed prescriptive commercial measure for Variable Refrigerant Flow installations to promote adoption of this technology.

Achievements

- Supported the delivery of 1,798,633 CFLs into homes (66% increase over PY09).
- Successfully reached Island Equity Goals.
- Hired dedicated representatives for Maui and Hawaii counties.
- Delivered over $13,700,000 in incentives driving customer bill savings of over $48,100,000 annually and $473,200,000 over the life of the measures installed.
- Verified first year Program Level savings of 106.5 GWhs.

BACKGROUND

Lesson Learned

- The need to provide long-term support for projects in the initial phases to allow for customers' engineering, design, procurement and budgeting cycles.

Significant Event

- Federal ARRA grants

BACKGROUND

PY11 – Focus on Hard-to-Reach

In its third year, the Program addressed the need to provide outreach and energy education through portfolio offerings such as "Sharing the Aloha", which presented workshops in hard-to-reach communities, training for grade school educators, who in turn would convey the knowledge to their students and training for professional energy certification.

The Program also initiated 100% granted incentives for small businesses and restaurants. This program overcame technical, financial and trust barriers to implement lighting projects for these underserved electric customers.

Hawaii Energy reached out to non-profit organizations in Hawaii and Maui counties for grant-based incentive opportunities in solar water heating. This effort resulted in over 50 "in-need" homes receiving solar water heating systems that for various reasons did not qualify for other funding opportunities (e.g., ARRA, Weatherization Assistance Program (WAP), etc.).

Implementation

- Introduced "Transformational" energy education and awareness programs
- Developed residential Solar Water Heater grant program
- Grassroots organization-supported CFL exchanges
- Small Business Direct Install Program

Achievements

- Greater program recognition through media efforts.
- First-implemented AOAO submetering project after two years of customer and program efforts.
- Responded quickly to market opportunities to create and execute Garage Active Ventilation Controls within the program year.
- Conclusion of offerings created and/or enhanced through the additional funding from ARRA grants provided through the State Energy Office
- Delivered over $17,083,253 in incentives driving customer bill savings of over $51,671,208 annually and over $407,587,061 over the life of the measures installed.
- Verified first year Program Level savings of 130.1 GWhs.

Lessons Learned

- Developed experience leveraging the great work and expertise of third-party organizations within their specific communities or professions.

The Annual Reports for PY09 to PY11 are available at www.hawaiienergy.com/information-reports.

PROGRAM OVERVIEW, OBJECTIVES & ORGANIZATION

Program Overview

PY12 – Beyond Rebates: Expertise, Market Identification and Scale

In the fourth year, the Program issued a record $21,814,052 in direct incentives and services to customers. Accomplishing this milestone was a result of the full implementation of prior efforts and execution of targeted pilot measures.

Completion of the Solar Water Heating Grant (100% incentive) offering with Hawaii Community Economic Opportunity Council (HCEOC) was fully realized this year with 169 systems installed for "in-need" homes. This effort was the result of a year-long collaboration between the Program and its trade allies.

The Direct Install programs hit full stride serving 583 small business and restaurants providing a lifetime energy cost reduction of $26,738,793. This effort was the result of a two year collaboration of the Program and its trade allies.

The Program extended the expertise gained over the past three years through market intelligence and data analysis of executed projects. By gaining a better understanding of current operational, physical conditions of energy-consuming systems and revealing non-technical barriers, the Program was able to overcome various barriers (e.g., funding gaps, job responsibilities, team capability or expertise in energy management) with offerings of training, equipment, targeted technical support and the traditional financial incentives to help specialized sectors realize their opportunities for energy savings.

Implementation

- The Transformational program reached 600 government employees, 262 educators, 473 professionals and 2,733 residents.
- At the request of the PUC, Hawaii Energy began a program to support energy efficiency within the water and wastewater treatment and distribution sector. Over 38 facilities in all counties were visited to identify opportunities for energy efficiency measures and to identify other technical support needs for management and operation personnel. The Program funded metering equipment and training to assist in the counties' water and wastewater agencies' efforts to optimize pump efficiency.
- Start of On-Bill Financing Program design.

PROGRAM OVERVIEW, OBJECTIVES & ORGANIZATION

Achievements

- The Program invested a total of $30,903,826 to deliver 1,458,535,502 kWh (system-level) over the measure lives resulting in a cost per kWh of $0.021.
- Delivered $21,814,052 in incentives driving customer bill savings of $45,054,796 annually and over $ 404,952,708 over the life of the measures installed. See **Table 1** for details.
- A first year Program Level savings of 140.1 GWhs.
- Diversified portfolio away from reliance on CFLs by 7%, while increasing LEDs by 124%.

Table 1
PY12 Customer Energy Cost Savings

Customer First Year Energy Cost Savings (July 2013 Effective Marginal kWh Rates)

Island	*R*	*G*	*J*	*P*	*DS*	*U*	*F*	*Total*	*kWh - 1st yr.*	*$/kWh*
Hawaii Island	$ 5,789,210	$ 532,688	$ 852,754	$ 725,928	$ -	$ -	$ -	$ 7,900,581	20,306,271	0.38907
Lanai	$ 276,679	$ 23,616	$ 2,069	$ -	$ -	$ -	$ -	$ 302,363	642,373	0.4707
Maui	$ 3,942,737	$ 254,588	$ 574,354	$ 1,221,290	$ -	$ -	$ 118	$ 5,993,087	16,961,421	0.35334
Molokai	$ 261,269	$ 2,831	$ 9,300	$ -	$ -	$ -	$ -	$ 273,401	594,362	0.45999
Oahu	$ 20,224, 548	$ 1,229,281	$ 3,550,448	$ 4,685,249	$ 895,239	$ 608	$ -	$ 30,585,373	101,580,731	0.30109
Total	**$ 30,493,258**	**$ 2,044,181**	**$ 4,988,925**	**$ 6,632,467**	**$ 895,239**	**$ 608**	**$ 118**	**$ 45,054,796**	**140,085,158**	**0.32162**

Customer Lifetime Energy Cost Savings (July 2013 Effective Marginal kWh Rates)

Island	*R*	*G*	*J*	*P*	*DS*	*U*	*F*	*Total*	*kWh - lifetime*	*$/kWh*
Hawaii Island	$ 36,949,097	$ 7,416,975	$ 11,485,941	$ 10,579,920	$ -	$ -	$ -	$ 66,431,933	176,270,811	0.37687
Lanai	$ 448,442	$ 334,974	$ 28,962	$ -	$ -	$ -	$ -	$ 812,378	1,720,086	0.47229
Maui	$ 25,608,053	$ 3,545,840	$ 7,901,727	$ 17,557,526	$ -	$ -	$ 590	$ 54,613,735	159,538,749	0.34232
Molokai	$ 305,357	$ 42,462	$ 115,943	$ -	$ -	$ -	$ -	$ 463,762	1,018,042	0.45554
Oahu	$ 146,524,919	$ 15,458,095	$ 42,629,676	$ 62,262,714	$ 15,749,420	$ 6,076	$ -	$ 282,630,900	978,656,092	0.28879
Total	**$ 209,835,868**	**$ 26,798,346**	**$ 62,162,248**	**$ 90,400,160**	**$ 15,749,420**	**$ 6,076**	**$ 590**	**$ 404,952,708**	**1,317,203,780**	**0.30743**

Lessons Learned

- Focus on industry segments is effective and should be continued.
- Better ways to gain valuable benchmarking and baseline energy consumption data and with this knowledge, transitioned from a more expensive and complex measure (Central Plant Optimization) to much more economical measure that will ultimately produce similar results.

Significant Events

- The PUC issued Decision & Order #30974 (Docket No. 2011-0186) in response to Hawaii Revised Statutes §269-125 establishing the criteria for on-bill financing program development and implementation.

PROGRAM OVERVIEW, OBJECTIVES & ORGANIZATION

Program Objectives

In addition to the PBFA Contract requirements and performance incentive goals, the Program's broader objectives for PY12 included:

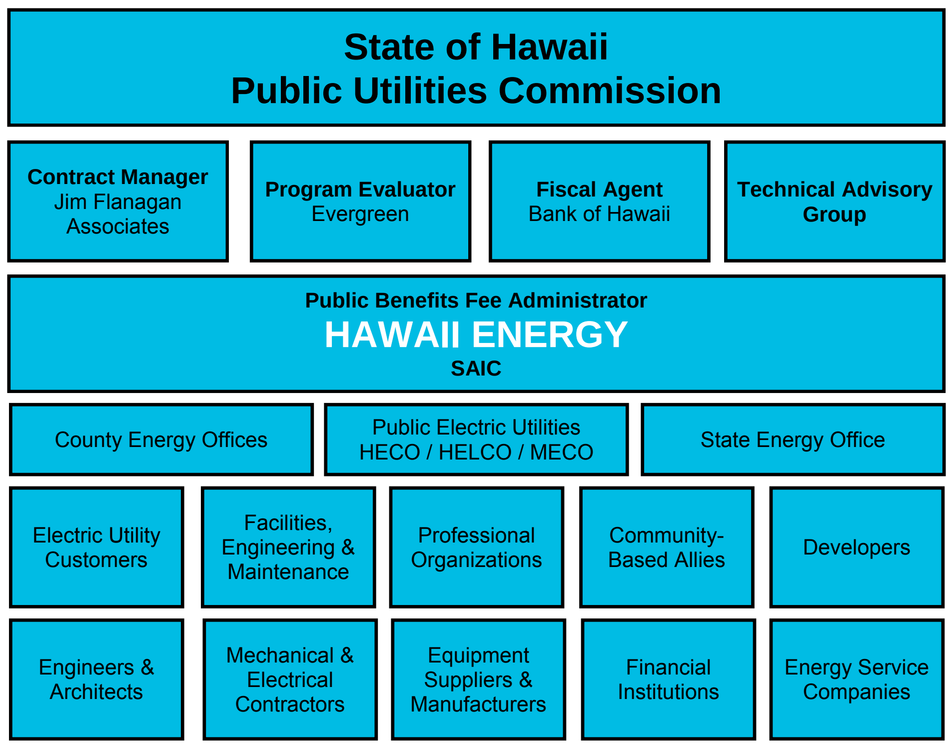
- Reduce the State's demand for electricity and by doing so, decrease the State's dependence on imported fuel.
- Expand the Program's outreach to the neighbor islands and other hard-to-reach constituents.
- Support the Hawaii Clean Energy Initiative and related efforts aimed at improving Hawaii's energy sustainability.
- Leverage strategic agencies and allies as "force multipliers" to extend the Program's outreach.
- Serve as one of the State's critical leaders, advocates and sources of information for energy conservation and efficiency efforts.
- Explore new innovative strategies in energy conservation and efficiency.
- Evolve the Program to affect behavior change through transformational programs, peer comparisons and enhanced information to increase personal awareness of energy consumption, as well as traditional cash incentives for implementing energy efficiency measures.
- Reach out to small businesses on a more individualized basis to enhance their viability as a going concern during the current economic downturn.

PROGRAM OVERVIEW, OBJECTIVES & ORGANIZATION

Program Organization – Oversight and Support

During PY12, the PBFA collaborated with a wide variety of support organizations and oversight entities. These oversight entities were comprised of the Hawaii Public Utilities Commission (PUC), Contract Manager (Jim Flanagan Associates), Program Evaluator (Evergreen Economics), Fiscal Agent (Bank of Hawaii) and a Technical Advisory Group (TAG). The TAG is made up of local energy stakeholders who provide their expertise, technical guidance and support to ensure success of the Program. Together with the Program's supportive trade allies and community groups, Hawaii Energy continually worked to improve the accountability, functionality, offerings, efficiency and cost-effectiveness of the Program. Program oversight and support operatives are shown in **Table 2.**

Table 2 – Program (PBFA) Oversight and Support Organizations



Program Organization

The foundation of the Program's organization is a core team of SAIC professionals in Honolulu, supported by off-site staff of uniquely skilled professionals throughout SAIC's organization nationwide. The Program has a number of key subcontractors that together round out the Hawaii Energy team. These key subcontractors are:

- **Blue Planet Foundation (55 Merchant Street, 17th Floor, Honolulu, Hawaii 96813)**
  Conducted Lanai Hui Up and prepared for upcoming Hui Up initiative on Molokai in PY13.

- **EEFG, Inc. (657 Mission St., Suite 200, San Francisco, California 94105)**
  Provided education, training, coaching and analysis to help energy users and service providers realize and express the true value of improving energy efficiency.

- **Helen N. Wai, LLC (P.O. Box 2524, Nanakuli, Hawaii 96792)**
  Provided training to assist communities and organizations in the areas of financial literacy and energy efficiency.

- **Home-Tech (P.O. Box 7305, Hilo, Hawaii 96720)**
  Provided solar water heating systems and commercial equipment inspections on Hawaii Island.

- **Honeywell (220 South King Street, Suite 1460, Honolulu, Hawaii 96813)**
  Provided customer service and administrative functions to support the residential programs and provides check processing services for both residential and business incentive programs.

- **JN Plumb Tech (102 Alaapapa Place, Makawao, Hawaii 96768)**
  Provided solar water heating systems and commercial equipment inspections on the islands of Lanai, Maui and Molokai.

- **Kanu Hawaii (1050 Bishop Street, #504, Honolulu, Hawaii 96813)**
  Local non-profit that organizes personal and community efforts in Hawaii to shape long-term sustainability and widespread compassion; supporting Transformational messaging and lending library.

- **Kupu (4211 Waialae Avenue, Honolulu, Hawaii 96816)**
  To empower youth to serve their communities through character-building, service-learning, and environmental stewardship opportunities that encourage integrity; supporting energy efficiency interns through Rewarding Internships for Sustainable Employment (RISE) program.

- **MVNP (999 Bishop Street, 21st Floor, Honolulu, Hawaii 96813)**
  Provided marketing and public relations strategy and support.

- **National Energy Education Development Project: NEED (8408 Kao Circle, Manassas, Virginia 20110)**
  Evolving to best meet the needs of teachers and students in the classroom to understand energy efficiency; supporting Transformational programs in K-12 schools.

- **Opower (1515 N Courthouse Road, 8th Floor, Arlington, Virginia 22201)**
  Supporting peer group comparison Home Energy Reports to residences in Maui County, Hawaii County and select parts of Honolulu County.

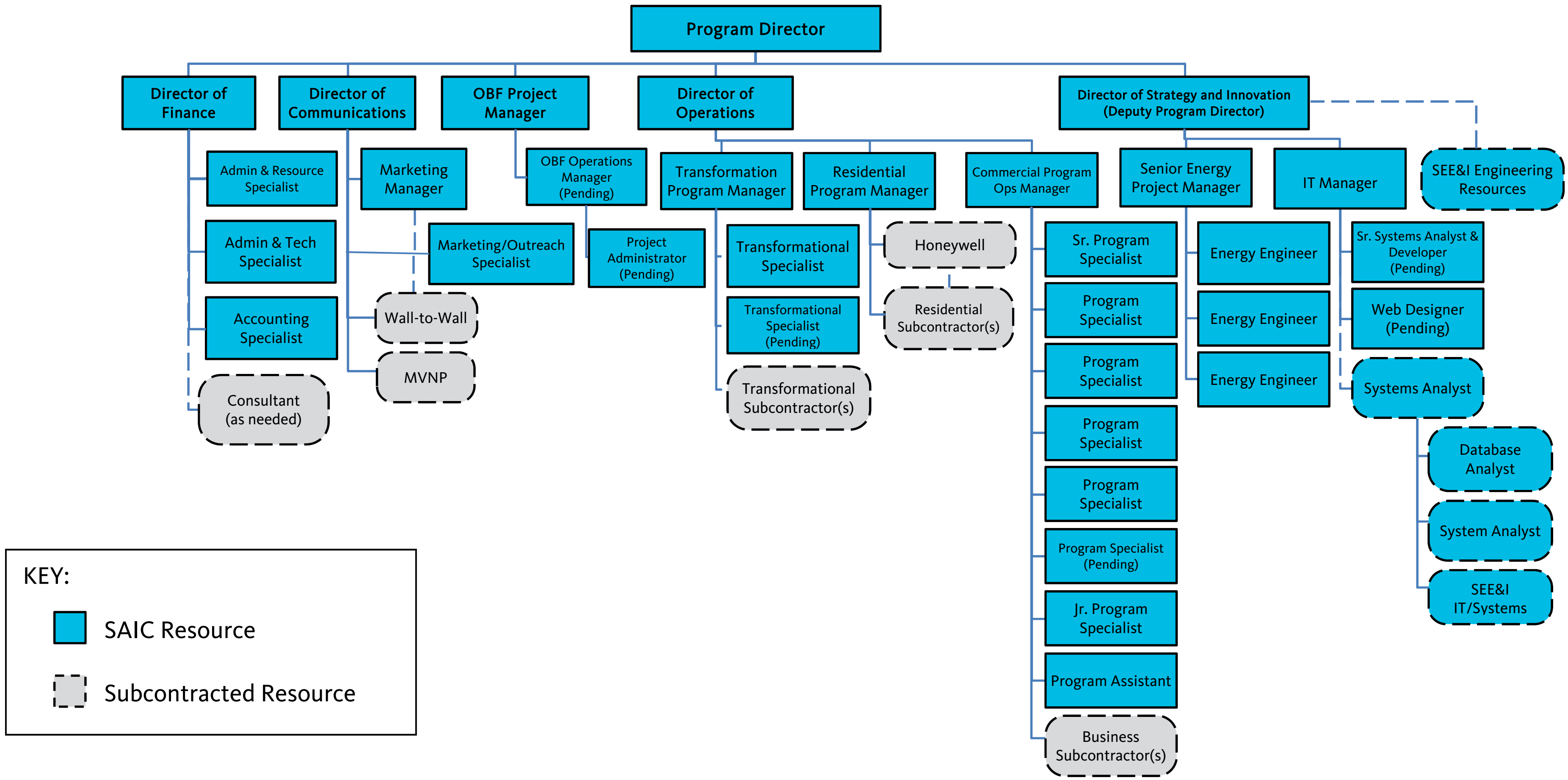
- **Smart Sustainability Consulting (2957 Kalakaua Ave, Honolulu, Hawaii 96815)**
  Educating and empowering businesses, organizations and institutions to achieve transformative systemic change; supported Transformational behavioral change programs.

- **Wall-to-Wall Studios (1128 Nuuanu Avenue, Suite 203, Honolulu, Hawaii 96817)**
  Provided online and advertising creative design services and media placement.

PROGRAM OVERVIEW, OBJECTIVES & ORGANIZATION

The Program's organization at the end of PY12 (including pending hires) is shown in the chart below:

PY12 Program Organizational Chart



PERFORMANCE INDICATOR RESULTS

Program Performance Indicators and Related Targets

Overview

The following Performance Indicators were established in the PBFA Contract in order to set measureable performance targets that meet the PUC's objectives and to provide the basis for financial incentives as a reward for superior performance in achieving explicit Program goals. The Performance Indicators for PY12 are:

1. Cumulative Annual Electric Energy Savings (Program Level)
2. Peak Demand (Program Level)
3. Total Resource Benefit (Program Level)
4. Market Transformation
5. Island Equity (Broad Participation)

Table 4 defines the minimum, target and maximum award levels for each Performance Indicator used to measure the Program's performance.

Details of each indicator and its related target follow.

Table 4
PY12 Performance Indicators

PY2012 Performance Indicators			
	Min	**Target**	**Max**
First Year Energy Reduction (kWh)	88,169,207	117,558,943 kWh/yr	129,314,837
Peak Demand Reduction (kW)	17,345	17,771 kW	25,439
Utility Cost Avoidance (TRB)	$ 100,747,807	$ 125,934,759	$ 151,121,711
Market Transformation	Substantially accomplish at least two Annual Plan Transformational Tasks in each of the four categories, including: Government, Business & Industry, Education and Residential.		
Island Equity	Honolulu	74%	+/- 20% of Target
	Hawaii	13%	+/- 20% of Target
	Maui	13%	+/- 20% of Target

PERFORMANCE INDICATOR RESULTS

Performance Indicator #1: Cumulative Annual Electric Energy Savings (Program Level)

Target: 117,558,943 kWh

Annual Electric Energy Savings directly benefit the State's goal of achieving energy independence by reducing the consumption of imported fossil fuels in proportion to the fossil-fueled units used to serve this load. The program participants directly benefit through lower electricity costs.

The Program Level Energy Savings Target of 117,558,943 kWh currently equates to 1,455,379 MMBTUs or avoided use of 239,478 bbls of liquid fossil fuels in Hawaii, see **Table 5.** This equates to enough energy to power 19,177 homes for a year.

Table 5

Estimation of Potential Fossil Fuel Avoidance

PY12 - Potential Barrels (BBLs) of Fossil Fuels Avoided					
Annual Program Level Energy Savings Target			117,558,943	kWh/Yr.	
Average Program Attribution to System Level Impact	÷		81%		
System Level Gross Generation Energy Impact			**145,134,498**	kWh/Yr.	
Est. 2012 Electrical Generation Source Distribution					
Renewable Energy Sold			969,490,000	kWh/Yr.	10.0%
Fossil-Fuel Energy Sold	+		8,725,410,000	kWh/Yr.	90.0%
Total Energy Sold			9,694,900,000	kWh/Yr.	
System Level Gross Generation Energy Impact			145,134,498	kWh/Yr.	
% System Average Fossil-Fuel Generation	x		90%		
Reduction Target Impact in Fossil Fuel-Generation			130,621,048	kWh	
Energy Avoided into Generators					
Fossil-Fuel Energy Generated			130,621,048		
Avg. System Generating Heat Rate	x		11,142	BTU/kWh	
Energy Required for Fossil-Fueled Electricity Production			1,455,379,714,340	BTU/Yr.	
Average System BTU/BBL					
Generation Liquid Fossil Fuel Mix					
Energy in BBL of Low Sulfur Fuel Oil			6,200,000	BTU/BBL	67.0%
Energy in BBL of #2 Fuel Oil (Diesel)			5,860,000	BTU/BBL	31.0%
Energy in BBL of Naptha			5,335,500	BTU/BBL	2.0%
Average System BTU/BBL			6,077,310	BTU/BBL	100.0%
Energy Required for Fossil-Fueled Electricity Production			1,455,379,714,340	BTU/Yr.	
Average System BTU/BBL	÷		6,077,310	BTU/BBL	
Number of Barrels of Fossil-Fuel Avoided			239,478	BBLs/Yr.	
Number of Barrels of Fossil-Fuel Avoided			239,478	BBLs/Yr.	
Potential Cost per BBL for Fossil Fuels	x	$	125	per BBL	
Potential Fossil Fuel Cost Savings to State		$	29,934,702	per year	

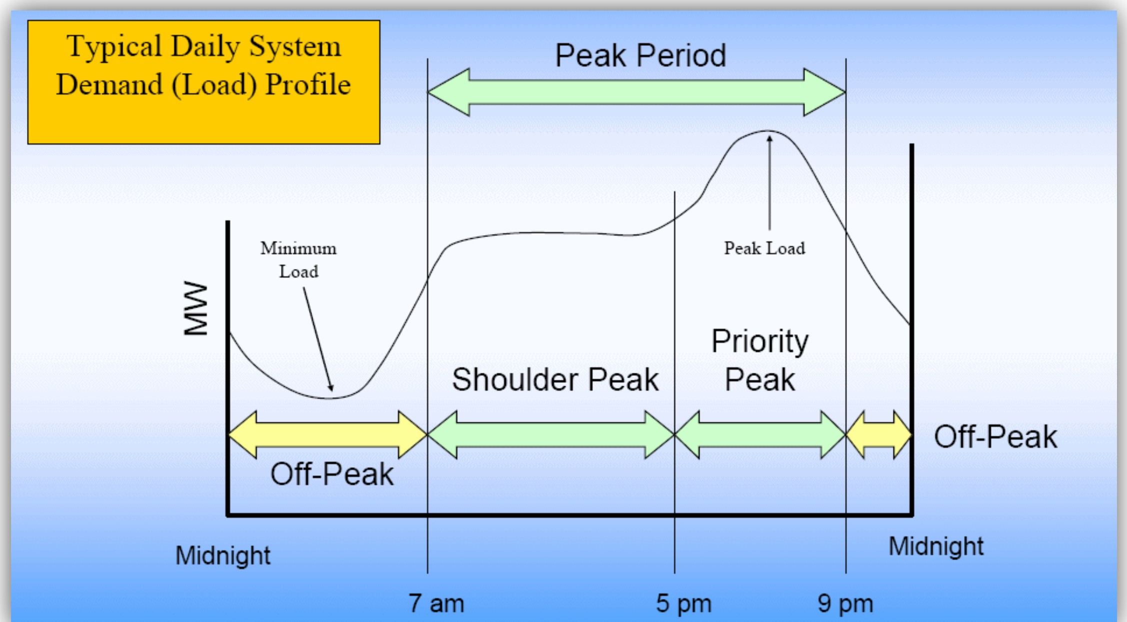
PERFORMANCE INDICATOR RESULTS

Performance Indicator #2: Peak Demand Savings

Target: **17,771 kW**

Peak Demand Reduction is focused on reducing the electrical load during the traditional peak demand period between 5 and 9 p.m. on weekdays. System Demand Load is typically highest when humid nights increase air conditioner usage in addition to the normal evening water heating loads. This system peak load is used to plan the requirements for additional generation capacity. Reducing the load reduces the cost to the utility customer by deferring the need for an additional unit of generation. Aggressive peak load reductions and load shifting technologies may allow for the retirement of less efficient generation units as more renewable generation is available.

Program participants benefit from lower electrical costs and all customers benefit from the avoided cost to provide additional units of generation to meet increasing electrical peak demand. The target of 17,771 kW is equivalent to the power required to operate 4,442 water heaters at 4 kW each.



PERFORMANCE INDICATOR RESULTS

Performance Indicator #3: Total Resource Benefit (TRB)

Target: **$125,934,759**

The Total Resource Benefit (TRB) is the estimated total net present value (NPV) of the avoided cost for the utility from the reduced lifetime demand (kW) and energy (kWh) from energy efficiency projects and measures. The utility costs were determined using average avoided cost data for installed capacity to meet demand and cost to produce energy that was provided by HECO IRP4 and adjusted under the advice of the Contract Manager. Average annual avoided cost for capacity and energy for calendar year 2012 escalated for a 20-year period was the basis for the analysis. The TRB incorporated avoided transmission and distribution costs into the avoided energy and capacity costs. The time value of money is represented by a discount rate of 6%. The discount rate is used to convert all costs and benefits to a "net present value" for comparing alternative costs and benefits in the same year's dollars.

Table 6 provides an example of the TRB calculation as if a hypothetical project consisted of a single measure with an eight (8) year life achieving the program demand (kW) and energy (kWh) targets. In the implementation of specific Program measures, individual calculations are done for each measure then summed together to determine the Program's TRB result.

Table 6
Example of TRB Look Up Table

Example of the TRB Calculation using Look Up Table

	Life									**kW Target**	**kWh Target**		**Project Cost**
	8	**Discount Rate**								**25.0**	**25,000.0**		**$ 45,000**
		6%	**Utility Avoided Cost**		**NPV for each Year**		**Cumulative NPV**			**TRB**			
Year	**Measure Life**	**NPV Multiplier**	**$/kW/yr.**	**$/kWh/yr.**	**$/kW/yr.**	**$/kWh/yr.**	**$/kW/yr.**	**$/kWh/yr.**		**Capacity Benefit**	**Energy Benefit**	**Total Resource Benefit**	**TRB/TRC Ratio**
2012	1	1.00	$ 339	$ 0.104	$ 339	$ 0.1040	$ 339	$ 0.1040		$ 8,466	$ 2,601	$ 11,067	0.25
2013	2	0.94	$ 353	$ 0.104	$ 333	$ 0.0978	$ 672	$ 0.2019		$ 16,796	$ 5,047	$ 21,843	0.49
2014	3	0.89	$ 371	$ 0.109	$ 330	$ 0.0969	$ 1,002	$ 0.2987		$ 25,042	$ 7,469	$ 32,510	0.72
2015	4	0.84	$ 383	$ 0.112	$ 321	$ 0.0943	$ 1,323	$ 0.3931		$ 33,071	$ 9,827	$ 42,898	0.95
2016	5	0.79	$ 386	$ 0.113	$ 306	$ 0.0899	$ 1,629	$ 0.4830		$ 40,719	$ 12,074	$ 52,793	1.17
2017	6	0.75	$ 388	$ 0.114	$ 290	$ 0.0851	$ 1,918	$ 0.5681		$ 47,962	$ 14,202	$ 62,164	1.38
2018	7	0.70	$ 389	$ 0.114	$ 274	$ 0.0806	$ 2,193	$ 0.6486		$ 54,820	$ 16,216	$ 71,036	1.58
2019	**8**	0.67	$ 392	$ 0.115	$ 261	$ 0.0766	$ 2,453	$ 0.7252		$ 61,336	$ 18,130	**$ 79,467**	**1.77**
2020	9	0.63	$ 391	$ 0.115	$ 245	$ 0.0720	$ 2,699	$ 0.7972		$ 67,464	$ 19,930	$ 87,395	1.94
2021	10	0.59	$ 395	$ 0.116	$ 234	$ 0.0686	$ 2,932	$ 0.8658		$ 73,304	$ 21,646	$ 94,949	2.11

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Performance Indicator #4: Market Transformation

Target: Two Tasks in each of the Four Categories

Transformational efforts are those that involve education, training and other legislative support activities that may not result in direct quantifiable energy savings. The focus of this year's target is to develop community partnerships to leverage their reach and expertise in delivering energy education to specific "hard-to-reach" communities and industries. These efforts contribute to development of an infrastructure and mindset that will result in societal changes and increased energy savings in the future. **Table 7** provides a summary of the Market Transformation task options for PY12.

Table 7 – Summary of Transformational Programs

Program	Topic	Category
Residential and Commercial Code Training Seminars		Government Support
Rebuild Hawaii Consortium		Government Support
Transforming End-Use Behavior: AEIM		Government Support
1st Annual Hawaii Sustainability in Higher Education Summit		Government Support
Green Classroom Professional Certificate Workshop & Toolkits		Government Support
Residential and Commercial Code Training Seminars	The Efficiency Sales Professional Boot Camp	Business & Industry Support
	Learning to S.E.E. (Sell Efficiency Effectively)	Business & Industry Support
	Financial Analysis of Energy Efficiency Projects	Business & Industry Support
Using Efficiency to Build Your Business	Finding Your Focus	Business & Industry Support
	Getting Efficiency Projects Approved	Business & Industry Support
Boosting Your Competitiveness	Taking Control of Your Energy Use	Business & Industry Support
	Making Efficiency Happen	Business & Industry Support
Fostering Sustainable Behavior through Community-Based Social Media Marketing		Business & Industry Support
Certified Energy Manager (CEM), Energy Manager in Training (EMIT)		Business & Industry Support
Business Lighting Workshops – "LED vs. Everything" workshop		Business & Industry Support
Energy Resource Center - Molokai		Business & Industry Support
Energy Education in the Schools - NEED	Basic Energy Workshop	Education Support
	Building Science Workshop	Education Support
	Teacher Advisory Board	Education Support
Transforming End-Use Behavior: SEAD		Education Support
Kupu – R.I.S.E. (Rewarding Internships for Sustainable Employment)		Education Support
Hui Up 3.0 – Green Workforce Development		Education Support
Hui Up 3.0 – Energy Literacy in Hard-to-Reach Communities		Residential Support
Energy Literacy in Hard-to-Reach Communities: Sharing the Aloha		Residential Support
Energy Efficiency Literacy at Scale – Energy-Saving Information		Residential Support
Energy Efficiency Literacy at Scale – Lending Library Pilot		Residential Support
Energy Efficiency Literacy at Scale – Video Training		Residential Support

PERFORMANCE INDICATOR RESULTS

Performance Indicator #5: Island Equity (Broad Participation)

Target: **+/- 20% of each County's contribution to the PBF**

The Island Equity target is intended to promote the equitable participation in the Program among the counties. For PY12, "equitable" would achieve the goal that for every dollar contributed to the PBF, a dollar would be returned to its county of origin through rebates, incentives, training and other Program initiatives.

Table 8 lists the results of the PY12 contributions to the PBF by county.

Table 8
PY12 PBF Contribution by County

County		***Contribution***	***%***
Honolulu	$	28,915,580	74%
Hawaii	$	5,029,636	13%
Maui	$	5,142,431	13%
Total	$	39,087,647	100%

PERFORMANCE INDICATOR RESULTS

Performance Incentive for Achieving Targets

Under the PBFA Contract, Program Performance Incentives are provided from a "performance pool" created through a holdback of $55,708 from each monthly invoice (prior to tax) for SAIC work performed. A total of $668,500 was withheld over the PY12, which equates to $700,000 once tax is applied. SAIC, as the PBFA, has the ability to earn the $700,000 by achieving 100% of the performance indicator targets, or a portion thereof based on the percentage of targets met. If the PBFA exceeds its targets, up to an additional $133,000 could be awarded.

The maximum performance bonus potential for PY12 is $833,001 as shown in **Table 9**.

Table 9
PY12 Potential Performance Incentive Awards

PBFA Performance Incentive Award Structure					
	Minimum	**Target**	**Maximum**	**Weight**	**Target**
Total Target Value				100%	$ 700,000
First Year Energy Reduction	75%	100%	110%		
	$ 183,750	$ 245,000	$ 303,188	35%	$ 245,000
Peak Demand Reduction	75%	100%	110%		
	$ 26,250	$ 35,000	$ 43,313	5%	$ 35,000
TRB NPV of Utility Cost Avoidance	80%	100%	120%		
	$ 224,000	$ 280,000	$ 346,500	40%	$ 280,000
Market Transformation	100%	100%	100%		
	$ 70,000	$ 70,000	$ 70,000	10%	$ 70,000
Broad Participation "Island Equity"	100%	100%	100%		
	$ 70,000	$ 70,000	$ 70,000	10%	$ 70,000
If all indicator metrics meet this level:	**Minimum**	**Target**	**Maximum**		
Performance Incentive Potential is:	$ 574,000	$ 700,000	$ 833,001		

PERFORMANCE INDICATOR RESULTS

Performance Award Claim Summary

During PY12, the Program Performance Award Claim is $595,407.07 (including tax) or 85% of the Program's potential target performance incentives.

The Program's Performance Award Claim Summary based on the Program's Net Savings Impacts (kWh, kW and TRB), Market Transformation and Island Equity results are contained in **Table 10**.

Table 10
PY12 Performance Claim Summary

PY2012 Performance Award Claim Summary				
	Target	**Results**	**% of Target**	**Award Claim**
First Year Energy Reduction	117,558,943 kWh	**113,198,801 kWh**	96%	$ 235,913.20
Peak Demand Reduction	17,771 kW	**15,145 kW**	85%	$ 29,827.12
TRB NPV of Utility Cost Reduction	$ 125,934,759	**$ 116,789,535**	93%	$ 259,666.75
Market Transformation	8	**21**	263%	$ 70,000.00
Island Equity				
C&C Honolulu	$ 19,352,231	**$ 14,053,368**	-13%	$ -
County of Hawaii	$ 3,366,167	**$ 4,933,056**	76%	
County of Maui	$ 3,441,657	**$ 2,827,628**	-1%	
Performance Award Claim				**$ 595,407.07**

The tables on the subsequent pages provide the detailed calculations for each metric following the guidelines in Attachment C in the PBFA Contract.

PERFORMANCE INDICATOR RESULTS

Cumulative Annual Electric Energy Savings (Program Level) Award Claim: $235,913.20

The Program Energy Reduction was 113,198 MWh, which was just shy (96.3%) of the target of 117,558 MWh in the award claim of $235,913.20. This award is calculated from $183,750 for meeting the minimum level and $52,163.20 for the remaining savings of 25,029,594 kWh awarded at a rate of $0.002084/kWh achieved beyond the minimum.

See calculations in **Table 11** for details.

Table 11

Energy Reduction Award Claim Calculation

ENERGY REDUCTION - PY2012 Administrators Performance vs. Performance Metrics Calculations							
Cumulative Annual Electric Energy Savings	**Min.**		**Target**	**Max.**			
Energy Award Potential	$ 183,750		$ 245,000	$ 303,188			
	75%		100%	110%			
Energy Reduction Goals	88,169,207		117,558,943	129,314,837	kWh		
Incentive Calculations	**Meet Min.**		**Min-Target**	**Target-Max**		**Total**	
Pool Award Potential	$ 183,750		$ 61,250	$ 58,188		$ 303,188	Max
Energy Goal Pools	88,169,207	÷	29,389,736	11,755,894		129,314,837	kWh
Award Amount / Rate	$ 183,750		$ 0.002084	$ 0.004950	/kWh		
Energy Achievement	88,169,207		25,029,594			113,198,801	kWh
Award Amount / Rate	183,750	x	$ 0.002084	$ 0.004950	/MWh		
Energy Achievement Award Claim	$ 183,750.00		$ 52,163.20	$ -		$ 235,913.20	Calculated
						$ 235,913.20	Claim

PERFORMANCE INDICATOR RESULTS

Peak Demand Savings Award Claim: $29,827.12

The Combined Peak Demand Reduction was 15,145 kW, which was 85.2% of the target savings level resulting in an award claim of $29,827.12. This award is calculated from $26,250 for meeting the minimum level and $3,577.12 for the remaining savings of 1,816 kW awarded at a rate of $1.97/kW achieved beyond the minimum.

See calculations in **Table 12** for details.

Table 12
Demand Reduction Award Claim Calculation

DEMAND REDUCTION - PY2012 Administrators Performance vs. Performance Metrics Calculations												
Combined Annual Electric Demand Savings	**Min.**			**Target**		**Max.**						
Demand Reduction Award Potential	$	26,250		$	35,000	$	43,313					
		75%			100%		110%					
Demand Reduction Goals		13,328			17,771		19,548	kW				
Incentive Calculations	**Meet Min.**			**Min-Target**		**Target-Max**			**Total**			
Pool Award Potential	$	26,250		$	8,750	$	8,313		$		43,313	Max
Demand Goal Pools		13,328	÷		4,443		1,777				19,548	kW
Award Amount / Rate	$	26,250		$	1.97	$	4.68	/kW				
Demand Savings Achievement		13,328			1,816						15,145	kW
Award Amount / Rate		26,250	x	$	1.97	$	4.68	/kW				
Demand Savings Achievement Calculation	$	26,250		$	3,577	$	-			$	29,827.12	Calculated
										$	**29,827.12**	**Claim**

PERFORMANCE INDICATOR RESULTS

Total Resource Benefit (TRB) Award Claim: $259,666.75

The TRB achievement of $116,789,535 NPV is 93% of the target amount between the minimum and target level. This award claim of $259,666.75 is calculated from $224,000 for meeting the minimum level and $35,667.75 for the remaining 13% awarded at a rate of $2,800/percent achieved beyond the minimum level.

See calculations in **Table 13** for details.

Table 13
TRB Award Claim Calculation

TOTAL RESOURCE BENEFIT - PY2012 Administrators Performance vs. Performance Metrics Calculations

TRB Target Metrics	**Min.**		**Target**	**Max.**				
TRB Award Potential	$ 224,000		$ 280,000	$ 346,500				
TRB Goal Pools in Metrics %	80%		100%	120%				
TRB Goals in $	100,747,807		$ 125,934,759	151,121,711	NPV of Utility Benefits			
Incentive Calculations	**Meet Min.**		**Min-Target**	**Target-Max**			**Total**	
Pool Award Potential	$ 224,000		$ 56,000	$ 66,500			$ 346,500	Max
TRB Goal Pools in Metrics %	80%	÷	20%	20%			120%	
Award Amount / Rate	$ 224,000		$ 2,800	$ 3,325	/ %			
TRB Achievement in $							$ 116,789,535	
TRB Goals in $						÷	$ 125,934,759	
TRB Achievement in Metrics %	80%		13%				93%	
Award Amount / Rate	224,000	x	$ 2,800.00	$ 3,325.00	/ %			
TRB Energy Achievement Award Claim	$ 224,000		$ 35,667	$ -			$ 259,666.75	Calculated
							$ 259,666.75	**Claim**

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Market Transformation Award Claim: $70,000

The Market Transformation claim of $70,000 is based on exceeding the target of at least two Annual Plan Transformational Tasks in each of the four categories, including: Government, Business & Industry, Education and Residential. See **Table 14** for details.

Table 14
Market Transformation Award Calculation

MARKET TRANSFORMATION - PY2012 Administrators Performance vs. Performance Metrics Calculations					
	Award Potential	**Target**	**Achievement**	**Target Met**	**Claim**
Tasks	$ 70,000	8	**21**	Yes	$ 70,000
					$ 70,000

Island Equity (Broad Participation) Award Claim: $0

The Program over-achieved the targeted percentages of island equity by spending in excess of the target maximum in the County of Hawaii. There were two projects that drove the additional spending, both of which were Direct Install 100% Project Cost Incentive grant programs, one for Residential Solar Water Heating and the other for Small Business/Restaurant lighting measures.

See calculations in **Table 15** for details.

In short, the entire Island Equity Award was forfeited because of the Program's substantial over-achievement on its directive to do more for the neighbor islands. (Note: the rules have been changed for future years so that this unintended penalty will not occur again.)

Table 15

Island Equity Award Claim Calculation

PY2012 Administrators Performance vs. Performance Metrics Calculations

	Target Range	**PBF Contribution**	**% PBF**	**Equity Targeted Incentives ($)**	**Achieved Incentives ($)**	**% PBF**	**+/- % of Target**	**Target Met**	**Award Potential**	**Claim**
Honolulu	+/- 20%	$ 28,915,580	74.0%	$ 19,352,231	**$ 14,053,368**	64.4%	-13%	Yes		
Hawaii	+/- 20%	$ 5,029,636	12.9%	$ 3,366,167	**$ 4,933,056**	22.6%	76%	Over		
Maui	+/- 20%	$ 5,142,431	13.2%	$ 3,441,657	**$ 2,827,628**	13.0%	-1%	Yes		
Total		$ 39,087,647	100%	$ 26,160,056	$ 21,814,052	100%			$ 70,000	$ -

BUDGET PROGRESSION & EXPENDITURES

PY12 Annual Plan Budget

Pursuant to the Program's approved PY12 Annual Plan dated July 12, 2012, the Program's initial budget for the program year was $34.8M, comprised of $21.6M in Incentives, $10.8M in Non-Incentives, and $2.4M in Transformational Incentives[1]. As detailed in **Table 16**, approximately 45% of the budget was allocated to Residential Programs and 55% to Business Programs, consistent with the prior program year.

Table 16

PY12 Annual Plan Budget

Activity	Non-Incentive	Incentive	Total
Residential Programs			
REEM	2,684,143	7,718,682	10,402,825
CESH	27,881	10,500	38,381
RESM	103,237	847,500	950,737
RHTR	103,238	1,159,991	1,263,229
Total Residential Programs	**2,918,499**	**9,736,673**	**12,655,172**
Residential Market Evaluation	**127,300**	**0**	**127,300**
Residential Outreach	**659,858**	**0**	**659,858**
Total Residential Services and Initiatives	**3,705,657**	**9,736,673**	**13,442,330**
Business Programs			
BEEM	1,311,945	6,222,730	7,534,675
CBEEM	760,957	974,000	1,734,957
BESM	551,575	3,513,647	4,065,222
BHTR	475,475	1,190,000	1,665,475
Total Business Programs	**3,099,952**	**11,900,377**	**15,000,329**
Business Market Evaluation	**255,550**	**0**	**255,550**
Business Outreach	**1,173,635**	**0**	**1,173,635**
Total Business Services and Initiatives	**4,529,137**	**11,900,377**	**16,429,514**
Total Residential and Business Services and Initiatives	**8,234,794**	**21,637,050**	**29,871,844**
Transformational Programs			
Residential Transformational Programs	0	1,069,797	1,069,797
Business Transformational Programs	0	1,307,529	1,307,529
Total Transformation Services and Initiatives	**0**	**2,377,326**	**2,377,326**
Total Supporting Services	**2,091,908**	**0**	**2,091,908**
Total Tax on Non-Incentive	**486,594**	**0**	**486,594**
Estimated Contractor Costs	**10,813,296**	**24,014,376**	**34,827,672**

Carryover from PY11

In February 2013, the PY12 budget was modified to carry over $2.8M of unspent PY11 funds, pursuant to contract terms. As set forth in **Table 17**, the amount was comprised of approximately $2M in Residential Incentives, $628,000 in Non-Incentive Operations and Management (O&M), and $148,000 in Transformational Incentives. Intended uses of the funds were as follow:

- Residential Incentive and O&M funds were primarily used to boost Solar Water Heating (SWH) participation through increased incentive amounts, direct install programs and complementary marketing efforts.
- Business O&M funds supported water and wastewater projects, as well as accelerated data acquisition and analysis for benchmark metering and central plant optimization work.
- Transformational Incentives helped fund development of a "pay-it-forward" energy-saving device lending library and an additional energy sales professional workshop.

[1] The Program did not spend any ARRA funds in PY12. The ARRA grant for energy efficiency measures administered on behalf of the State Energy Office ended on March 31, 2012.

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BUDGET PROGRESSION & EXPENDITURES

Budget Reallocations

There were two (2) reallocations during PY12 to meet changing operational needs and to allow continuous operations without exceeding individual budget categories. Specifics of the reallocations are detailed in **Table 17** and described below.

First Reallocation (R1)

The first reallocation in February 2013 was to shift funds within the Business Program incentive categories based on an updated operational forecast of PY12 spending at that point in the year. It reallocated $2,725,000 of BEEM incentives among the CBEEM, BESM and BHTR incentive budget categories as follows:

- Transferred $825,000 to the CBEEM incentive budget to address higher participation than anticipated at the beginning of PY12.
- Shifted $1.35M and $550,000, respectively, to the BESM and BHTR incentive budgets to continue funding the Small Business Direct Install ("SBDI") Program as the updated forecast showed the Program fully subscribed for the year.
- Funding came from BEEM because a significant amount of BEEM incentive payments to military participants were forecasted to be made in early PY13 rather than PY12.

Second Reallocation (R2)

The second reallocation in May 2013 was to reallocate funds within the Business Program incentive categories as well as Residential O&M. Changes included:

- $175,000 of Residential O&M was moved from REEM to Residential Outreach to continue boosted marketing and outreach efforts promoting enhanced PY12 Residential offerings, including an increased SWH rebate.
- $625,000 of Business incentives was returned to BEEM due to traditional energy efficiency projects such as commercial lighting and air conditioning remaining at a high subscription level throughout the year.
- $250,000 of Business incentives was shifted to CBEEM to keep the Program fully subscribed through Program Year-end with higher than anticipated participation throughout PY12.

Table 17

PY12 Budget Progression

	PY12 Annual Plan Budget	Carryover from PY11 (dated 2/15/13)	PY12 Budget with PY11 Carryover	R1 Reallocation (dated 2/20/13)	PY12 R1 Budget	R2 Reallocation (dated 5/10/13)	PY12 R2 Budget
Residential Programs							
Residential Program Ops and Management							
REEM	2,684,143		2,684,143		2,684,143	(175,000)	2,509,143
CESH	27,881		27,881		27,881		27,881
RESM	103,237		103,237		103,237		103,237
RHTR	103,238		103,238		103,238		103,238
Total Residential Programs	2,918,499	-	2,918,499	-	2,918,499	(175,000)	2,743,499
Residential Market Evaluation	127,300		127,300		127,300		127,300
Residential Outreach	659,858	233,743	893,601		893,601	175,000	1,068,601
Total Residential Ops & Management	3,705,657	233,743	3,939,400	-	3,939,400	-	3,939,400
Residential Incentives							
REEM	7,718,682	500,000	8,218,682		8,218,682		8,218,682
CESH	10,500		10,500		10,500		10,500
RESM	847,500		847,500		847,500		847,500
RHTR	1,159,991	1,497,442	2,657,433		2,657,433		2,657,433
Subtotal Residential Incentives	9,736,673	1,997,442	11,734,115	-	11,734,115	-	11,734,115
Residential Transformational	1,069,797	27,543	1,097,340		1,097,340		1,097,340
Total Residential Incentives	10,806,470	2,024,985	12,831,455	-	12,831,455	-	12,831,455
Total Residential Programs	**14,512,127**	**2,258,728**	**16,770,855**	**-**	**16,770,855**	**-**	**16,770,855**
Business (C&I) Programs							
Business Programs Ops and Management							
BEEM	1,311,945		1,311,945		1,311,945		1,311,945
CBEEM	760,957	104,721	865,678		865,678		865,678
BESM	551,575	104,721	656,296		656,296		656,296
BHTR	475,475	22,845	498,320		498,320		498,320
Total Business Programs	3,099,952	232,287	3,332,239	-	3,332,239	-	3,332,239
Business Market Evaluation	255,550		255,550		255,550		255,550
Business Outreach	1,173,635	151,260	1,324,895		1,324,895		1,324,895
Total Business Ops & Management	4,529,137	383,547	4,912,684	-	4,912,684	-	4,912,684
Business Incentives							
BEEM	6,222,730		6,222,730	(2,725,000)	3,497,730	625,000	4,122,730
CBEEM	974,000		974,000	825,000	1,799,000	250,000	2,049,000
BESM	3,513,647		3,513,647	1,350,000	4,863,647	(275,000)	4,588,647
BHTR	1,190,000		1,190,000	550,000	1,740,000	(600,000)	1,140,000
Subtotal Business Incentives	11,900,377	-	11,900,377	-	11,900,377	-	11,900,377
Business Transformational	1,307,529	120,695	1,428,224		1,428,224		1,428,224
Total Business Incentives	13,207,906	120,695	13,328,601	-	13,328,601	-	13,328,601
Total Business Programs	**17,737,043**	**504,242**	**18,241,285**	**-**	**18,241,285**	**-**	**18,241,285**
Supporting Services							
Supporting Services	2,091,908	11,186	2,103,094		2,103,094		2,103,094
Total Supporting Services	**2,091,908**	**11,186**	**2,103,094**	**-**	**2,103,094**	**-**	**2,103,094**
Subtotal Non-Incentive (Prior to Tax)	10,326,702	628,476	10,955,178		10,955,178		10,955,178
Less Performance Incentives (Prior to Tax)	(700,000)		(700,000)		(700,000)		(700,000)
Subtotal Non-Incentive Less Performance Incentives (PI)	9,626,702	628,476	10,255,178		10,255,178		10,255,178
Total Tax on Non-Incentive Without PI	486,594	29,614	516,208		516,208		516,208
Performance Incentive Award (Inclusive of Tax)	700,000		700,000		700,000		700,000
Subtotal Non-Incentives (excluding Performance Incentives)	***10,813,296***	***658,090***	***11,471,386***		***11,471,386***		***11,471,386***
Subtotal Residential and Business Customer Incentives	***21,637,050***	***1,997,442***	***23,634,492***		***23,634,492***		***23,634,492***
Subtotal Transformational Incentives	***2,377,326***	***148,238***	***2,525,564***		***2,525,564***		***2,525,564***
Sub-Total Estimated Contractor Costs	***34,827,672***	***2,803,770***	***37,631,442***	-	***37,631,442***	-	***37,631,442***
Performance Awards in Excess of Target Levels	133,000		133,000		133,000		133,000
Total Estimated Contractor Costs, including Performance Awards in Excess of Target Levels	**34,960,672**		**37,764,442**		**37,764,442**		**37,764,442**

On-Bill Financing Program Development

During PY12, the Program contract was amended granting the Program expanded responsibilities to develop, implement and administer the PUC's On-Bill Financing (OBF) Program. The Program was requested to utilize existing PY12 budget for preliminary phases of the OBF effort occurring prior to July 1, 2013, until the formal OBF program budget was established for PY13. Related effort and expenditures will be reported in further detail in PY13.

Portfolio Expenditures

The Program maintained a conservative approach in expending both Incentive and O&M resources throughout PY12. At year-end, the Program had utilized 82% of budgeted Incentives, 85% of budgeted O&M (including holdback amounts), and 95% of budgeted Transformational Incentives.

Details of final PY12 expenditures and unspent funds by program categories are shown in **Table 18.** Specific discussions related to each Residential and Business program are provided within those respective sections.

Table 18

PY12 Program Expenditures and Unspent Funds

		Total PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
Residential Programs						
Residential Program Ops and Management						
	REEM	$2,267,588.62	$2,509,143	90%	$241,554.38	10%
	CESH	$4,935.00	$27,881	18%	$22,946.00	82%
	RESM	$29,483.75	$103,237	29%	$73,753.25	71%
	RHTR	$92,764.34	$103,238	90%	$10,473.66	10%
	Total Residential Programs	$2,394,771.71	$2,743,499	87%	$348,727.29	13%
Residential Market Evaluation		$26,106.85	$127,300	21%	$101,193.15	79%
Residential Outreach		$878,530.86	$1,068,601	82%	$190,070.14	18%
Total Residential Non-Incentive		$3,299,409.42	$3,939,400	84%	$639,990.58	16%
Residential Incentives						
	REEM	$7,437,751.48	$8,218,682	90%	$780,930.52	10%
	CESH	$0.00	$10,500	0%	$10,500.00	100%
	RESM	$150,033.00	$847,500	18%	$697,467.00	82%
	RHTR	$1,450,748.05	$2,657,433	55%	$1,206,684.95	45%
Subtotal Residential Incentives		$9,038,532.53	$11,734,115	77%	$2,695,582.47	23%
Residential Transformational		$1,059,432.97	$1,097,340	97%	$37,907.03	3%
Total Residential Incentives		$10,097,965.50	$12,831,455	79%	$2,733,489.50	21%
Total Residential Programs		**$13,397,374.92**	**$16,770,855**	**80%**	**$3,373,480.08**	**20%**
Business (C&I) Programs						
Business Programs Ops and Management						
	BEEM	$1,062,925.22	$1,311,945	81%	$249,019.78	19%
	CBEEM	$851,357.70	$865,678	98%	$14,320.30	2%
	BESM	$651,976.28	$656,296	99%	$4,319.72	1%
	BHTR	$417,188.44	$498,320	84%	$81,131.56	16%
	Total Business Programs	$2,983,447.64	$3,332,239	90%	$348,791.36	10%
Business Market Evaluation		$116,463.75	$255,550	46%	$139,086.25	54%
Business Outreach		$1,084,114.96	$1,324,895	82%	$240,780.04	18%
Total Business Non-Incentive		$4,184,026.35	$4,912,684	85%	$728,657.65	15%
Business Incentives						
	BEEM	$4,005,628.00	$4,122,730	97%	$117,102.00	3%
	CBEEM	$2,012,703.59	$2,049,000	98%	$36,296.41	2%
	BESM	$3,879,032.04	$4,588,647	85%	$709,614.96	15%
	BHTR	$471,756.11	$1,140,000	41%	$668,243.89	59%
Subtotal Business Incentives		$10,369,119.74	$11,900,377	87%	$1,531,257.26	13%
Business Transformational		$1,346,967.20	$1,428,224	94%	$81,256.80	6%
Total Business Incentives		$11,716,086.94	$13,328,601	88%	$1,612,514.06	12%
Total Business Programs		**$15,900,113.29**	**$18,241,285**	**87%**	**$2,341,171.71**	**13%**
Total Services and Initiatives		**$29,297,488.21**	**$35,012,140**	**84%**	**$5,714,651.79**	**16%**
Supporting Services						
	Supporting Services	$1,865,802.63	$2,103,094	89%	$237,291.37	11%
Total Supporting Services		**$1,865,802.63**	**$2,103,094**	**89%**	**$237,291.37**	**11%**
Subtotal Non-Incentive (Prior to Tax)		$9,349,238.40	$10,955,178	85%	$1,605,939.60	15%
Less Performance Incentives (Prior to Tax)		(668,500.32)	($700,000)		(31,499.68)	
Subtotal Non-Incentive Less Performance Incentives (PI)		$8,680,738.08	$10,255,178		$1,574,439.92	
Total Tax on Non-Incentive Without PI		$409,036.38	$516,208		$107,171.62	
Performance Incentive Award (Inclusive of Tax)		$0.00	$700,000		$700,000.00	
Subtotal Non-Incentive Billed		$9,089,774.46	*$11,471,386*	79%	*$2,381,611.54*	21%
Subtotal Residential and Business Customer Incentives		$19,407,652.27	*$23,634,492*	82%	*$4,226,839.73*	18%
Subtotal Transformational Incentives		$2,406,400.17	*$2,525,564*	95%	*$119,163.83*	5%
Sub-Total Estimated Contractor Costs		***$30,903,826.90***	***$37,631,442***	**82%**	***$6,727,615.10***	**18%**
Performance Awards in Excess of Target Levels			$133,000			
Total Estimated Contractor Costs, including Performance Awards in Excess of Target Levels			**$37,764,442**			

PORTFOLIO FOURTH YEAR IMPACTS

Introduction: How Customer, System and Program Level Savings Are Related

There are three levels of energy and demand savings shown in this Report. The three levels are used to show how energy and demand savings are credited at the customer's meter (Customer Level Savings), at the utility system generation level (System Level Savings) and at the PBFA Contract level (Program Level Savings).

1. **Customer Level Savings (Gross at Meter)** – This savings figure is the gross change in energy consumption at the customer meter that results directly from Program-promoted actions taken by Program participants. The savings are determined by direct metering, engineering calculations, or measurement and verification of prior installations of the particular savings measure. This is the savings level defined in the Program's Technical Resource Manual (TRM).

2. **System Level Savings (Gross Generated)** – This savings figure is realized at the utility system level and includes the transmission, distribution and generation station energy losses between the end-use customer and the utility generating units. System Level Savings has been termed Gross Level Savings in previous reports.

3. **Program Level Savings (Net Generated)** – This savings figure shows the amount of energy reductions determined to be directly attributed to PBFA Program actions by separating out the impacts that are a result of other influences, such as consumer self-motivation or free-riders. Free-riders are ratepayers or participants who received an incentive and/or education from the Program, but the incentive and/or education did not play a role in their decision to purchase the savings measure. These ratepayers would have taken action or purchased the energy-efficient item regardless of the incentive and therefore, Program Level Savings removes their participation. The Net-to-Gross adjustment figure for PY12 operations across all programs and counties is 73%.

PORTFOLIO FOURTH YEAR IMPACTS

Portfolio Energy and Demand Savings

Program Energy Savings for PY12 were:

- **First Year** – 113,198,801 kWh
  (62.6% in Residential and 37.4% in Business programs)

- **Lifetime** – 1,064,730,916 kWh
  (46.3% in Residential and 53.7% for Business programs)

The difference in percentage contributions between first year and lifetime savings is due to the relative weight of CFLs and the Peer Group Comparison in the residential portfolio. These measures have relatively short measure lives (6 years and 1 year, respectively) as compared to longer lived measures in the business portfolio this year, bolstered by the LEDs having 15 year measure lives. Residential measures have an average measure life of 7 years, while business measures have an average measure life of 13.5 years.

Program Peak Demand reduction for PY12 was:

- **Peak Demand** – 15,145 kW (63.6% from Residential and 36.4% from Business)

The following tables provide a summary of the Residential and Business programs in the context of their level of activity, incentives, energy-saving impacts and cost effectiveness at the Program, System and Customer levels.

- **Table 19:** Cumulative Annual Electric Energy Savings (Program Level) by Budget Category

- **Table 20:** Cumulative Annual Electric Energy Savings (System Level) by Budget Category

- **Table 21:** Cumulative Annual Electric Energy Savings (Customer Level) by Budget Category

PORTFOLIO FOURTH YEAR IMPACTS

Table 19

Cumulative Annual Electric Savings (Program Level) by Budget Category

PY12 Hawaii Energy - Program Level Impact Summary by Program

Program	Apps Proccessed	Quantity of Energy Efficient Equipment (Units)	Incentives ($)	Demand Impact (kW)	First Year Energy Impact (kWh/1st yr.)	Lifetime Energy Impact (kWh/Life)	First Year Impact Cost $/kWh	Lifetime Impact Cost $/kWh
Business Program	**5,317**	**157,880**	**$ 10,356,475**	**5,512**	**42,391,766**	**571,695,706**	**$ 0.244**	**$ 0.018**
BEEM	2,012	119,795	$ 3,982,940	3,417	25,001,128	328,154,362	$ 0.159	$ 0.012
CBEEM	320	341	$ 2,041,590	1,720	12,844,300	179,827,666	$ 0.159	$ 0.011
BESM	2,501	31,406	$ 3,879,032	259	3,550,072	49,701,010	$ 1.093	$ 0.078
BHTR	484	6,338	$ 452,913	116	996,266	14,012,669	$ 0.455	$ 0.032
Residential Program	**42,848**	**1,957,014**	**$ 9,051,177**	**9,632**	**70,807,035**	**493,035,210**	**$ 0.128**	**$ 0.018**
REEM	42,549	1,954,603	$ 7,444,044	9,550	69,826,376	483,817,730	$ 0.107	$ 0.015
RESM	33	175	$ 151,183	9	594,523	4,331,660	$ 0.254	$ 0.035
CESH	1	-	$ -	-	-	-		
RHTR	265	2,236	$ 1,455,950	73	386,136	4,885,820	$ 3.771	$ 0.298
Total	**48,165**	**2,114,894**	**$ 19,407,652**	**15,145**	**113,198,801**	**1,064,730,916**	**$ 0.171**	**$ 0.018**

Program	Incentives ($)	Total Resource Benefit (TRB)	Total Resource Cost (TRC)	Driven Benefit Ratio (TRB/ Incentive $)	Driven Investment Ratio (TRC / Incentive $)	Benefit Test (TRB/TRC)
Business Program	**$ 10,356,475**	**$ 59,726,846**	**$ 29,831,600**	**5.8**	**2.9**	**2.0**
BEEM	$ 3,982,940	$ 33,839,141	$ 12,103,633	8.5	3.0	2.8
CBEEM	$ 2,041,590	$ 19,442,140	$ 13,109,157	9.5	6.4	1.5
BESM	$ 3,879,032	$ 4,902,114	$ 4,168,577	1.3	1.1	1.2
BHTR	$ 452,913	$ 1,543,451	$ 450,233	3.4	1.0	3.4
Residential Program	**$ 9,051,177**	**$ 57,062,689**	**$ 26,382,006**	**6.3**	**2.9**	**2.2**
REEM	$ 7,444,044	$ 56,108,200	$ 25,050,907	7.5	3.4	2.2
RESM	$ 151,183	$ 304,282	$ 157,517	2.0	1.0	1.9
CESH	$ -	$ -	$ -			
RHTR	$ 1,455,950	$ 650,207	$ 1,173,581	0.4	0.8	0.6
Total	**$ 19,407,652**	**$ 116,789,535**	**$ 56,213,606**	**6.0**	**2.9**	**2.1**

PORTFOLIO FOURTH YEAR IMPACTS

Table 20

Cumulative Annual Electric Savings (System Level) by Budget Category

PY12 Hawaii Energy - System Level Impact Summary by Program

Program	Apps Proccessed	Quantity of Energy Efficient Equipment (Units)	Incentives ($)	Demand Impact (kW)	First Year Energy Impact (kWh/1st yr.)	Lifetime Energy Impact (kWh/Life)	First Year Impact Cost $/kWh	Lifetime Impact Cost $/kWh
Business Program	**5,317**	**157,880**	**$ 10,356,475**	**7,551**	**58,070,913**	**783,144,803**	**$ 0.178**	**$ 0.013**
BEEM	2,012	119,795	$ 3,982,940	4,681	34,248,120	449,526,523	$ 0.116	$ 0.009
CBEEM	320	341	$ 2,041,590	2,357	17,594,932	246,339,268	$ 0.116	$ 0.008
BESM	2,501	31,406	$ 3,879,032	354	4,863,112	68,083,575	$ 0.798	$ 0.057
BHTR	484	6,338	$ 452,913	159	1,364,748	19,195,437	$ 0.332	$ 0.024
Residential Program	**42,848**	**1,957,014**	**$ 9,051,177**	**13,195**	**96,995,938**	**675,390,698**	**$ 0.093**	**$ 0.013**
REEM	42,549	1,954,603	$ 7,444,044	13,082	95,652,570	662,764,013	$ 0.078	$ 0.011
RESM	33	175	$ 151,183	13	814,415	5,933,781	$ 0.186	$ 0.025
CESH	1	-	$ -	-	-	-		
RHTR	265	2,236	$ 1,455,950	100	528,953	6,692,904	$ 2.753	$ 0.218
Total	**48,165**	**2,114,894**	**$ 19,407,652**	**20,746**	**155,066,850**	**1,458,535,502**	**$ 0.125**	**$ 0.013**

Program	Incentives ($)	Total Resource Benefit (TRB)	Total Resource Cost (TRC)	Driven Benefit Ratio (TRB/ Incentive $)	Driven Investment Ratio (TRC / Incentive $)	Benefit Test (TRB/TRC)
Business Program	**$ 10,356,475**	**$ 81,816,519**	**$ 29,831,600**	**7.9**	**2.9**	**2.7**
BEEM	$ 3,982,940	$ 46,354,541	$ 12,103,633	11.6	3.0	3.8
CBEEM	$ 2,041,590	$ 26,633,020	$ 13,109,157	13.0	6.4	2.0
BESM	$ 3,879,032	$ 6,714,722	$ 4,168,577	1.7	1.1	1.6
BHTR	$ 452,913	$ 2,114,236	$ 450,233	4.7	1.0	4.7
Residential Program	**$ 9,051,177**	**$ 78,159,208**	**$ 26,382,006**	**8.6**	**2.9**	**3.0**
REEM	$ 7,444,044	$ 76,851,707	$ 25,050,907	10.3	3.4	3.1
RESM	$ 151,183	$ 416,822	$ 157,517	2.8	1.0	2.6
CESH	$ -	$ -	$ -			
RHTR	$ 1,455,950	$ 890,679	$ 1,173,581	0.6	0.8	0.8
Total	**$ 19,407,652**	**$ 159,975,727**	**$ 56,213,606**	**8.2**	**2.9**	**2.8**

PORTFOLIO FOURTH YEAR IMPACTS

Table 21
Cumulative Annual Electric Savings (Customer Level) by Budget Category

PY12 Hawaii Energy - Customer Level Impact Summary by Program

Program	Apps Proccessed	Quantity of Energy Efficient Equipment (Units)	Incentives ($)	Demand Impact (kW)	First Year Energy Impact (kWh/1st yr.)	Lifetime Energy Impact (kWh/Life)	First Year Impact Cost $/kWh	Lifetime Impact Cost $/kWh
Business Program	**5,317**	**157,880**	**$ 10,356,475**	**6,816**	**52,427,121**	**707,139,849**	**$ 0.198**	**$ 0.015**
BEEM	2,012	119,795	$ 3,982,940	4,228	30,924,773	406,071,853	$ 0.129	$ 0.010
CBEEM	320	341	$ 2,041,590	2,125	15,862,988	222,035,335	$ 0.129	$ 0.009
BESM	2,501	31,406	$ 3,879,032	320	4,403,514	61,649,194	$ 0.881	$ 0.063
BHTR	484	6,338	$ 452,913	144	1,235,846	17,383,467	$ 0.366	$ 0.026
Residential Program	**42,848**	**1,957,014**	**$ 9,051,177**	**11,924**	**87,658,038**	**610,063,931**	**$ 0.103**	**$ 0.015**
REEM	42,549	1,954,603	$ 7,444,044	11,821	86,441,466	598,596,322	$ 0.086	$ 0.012
RESM	33	175	$ 151,183	12	732,947	5,337,694	$ 0.206	$ 0.028
CESH	1	-	$ -	-	-	-		
RHTR	265	2,236	$ 1,455,950	91	483,625	6,129,915	$ 3.010	$ 0.238
Total	**48,165**	**2,114,894**	**$ 19,407,652**	**18,740**	**140,085,158**	**1,317,203,780**	**$ 0.139**	**$ 0.015**

Program	Incentives ($)	Total Resource Benefit (TRB)	Total Resource Cost (TRC)	Driven Benefit Ratio (TRB/ Incentive $)	Driven Investment Ratio (TRC / Incentive $)	Benefit Test (TRB/TRC)
Business Program	**$ 10,356,475**	**$ 73,865,916**	**$ 29,831,600**	**7.1**	**2.9**	**2.5**
BEEM	$ 3,982,940	$ 41,866,825	$ 12,103,633	10.5	3.0	3.5
CBEEM	$ 2,041,590	$ 24,008,097	$ 13,109,157	11.8	6.4	1.8
BESM	$ 3,879,032	$ 6,077,131	$ 4,168,577	1.6	1.1	1.5
BHTR	$ 452,913	$ 1,913,863	$ 450,233	4.2	1.0	4.3
Residential Program	**$ 9,051,177**	**$ 70,562,872**	**$ 26,382,006**	**7.8**	**2.9**	**2.7**
REEM	$ 7,444,044	$ 69,372,183	$ 25,050,907	9.3	3.4	2.8
RESM	$ 151,183	$ 374,960	$ 157,517	2.5	1.0	2.4
CESH	$ -	$ -	$ -			
RHTR	$ 1,455,950	$ 815,729	$ 1,173,581	0.6	0.8	0.7
Total	**$ 19,407,652**	**$ 144,428,787**	**$ 56,213,606**	**7.4**	**2.9**	**2.6**

PORTFOLIO FOURTH YEAR IMPACTS

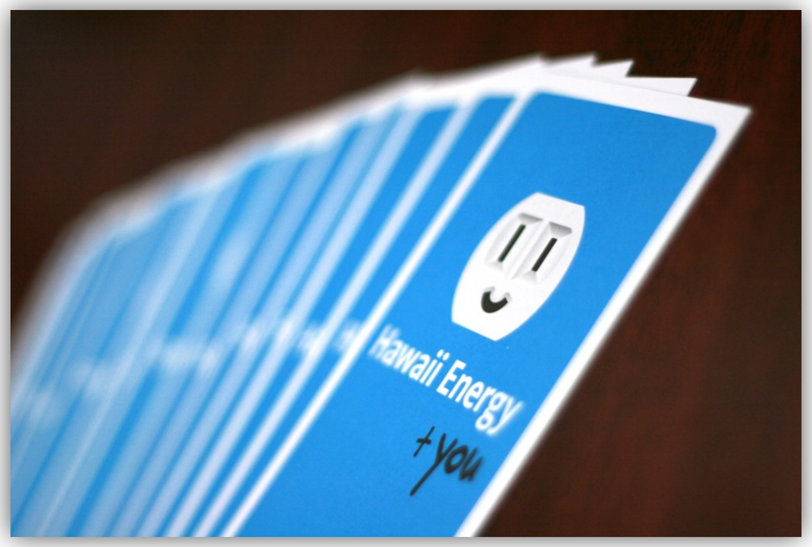
Savings at Customer and Program Levels

Program Level Savings translate from Program participants (customers) achieving first-year savings based upon the energy efficiency measures they purchased or otherwise installed.

First-year Customer Energy Savings was 140,085,158 kWh per year (1.5% of 2012 utility sales), while Customer Peak Demand Savings was 18,740 kW (1.2% of 2012 utility sales). This does not reflect Peak Demand Savings for the customer as it may not coincide with their actual measured peak demand used for billing purposes.

The following tables provide summaries of cumulative energy savings and peak demand savings in the context of program budget categories and island, specifically:

- **Table 22:** PY12 Energy (kWh) Reduction by Impact Level and by Island
- **Table 23:** PY12 Demand (kW) Reduction by Impact Level and by Island
- **Table 24:** PY12 Energy (kWh) Reduction by Impact Level and by Program
- **Table 25:** PY12 Demand (kW) Reduction by Impact Level and by Program



PORTFOLIO FOURTH YEAR IMPACTS

Table 22

Energy (kWh) Reduction by Impact Level and by Island

PY12 Energy (kWh) Reduction by Impact Level and by Island					
	Customer Level Savings	**System Losses**	**System Level Savings**	**Net-to-Gross Ratio**	**Program Level Savings**
Hawaii Island	20,306,271	9.0%	22,133,835	73.0%	16,157,700
Lanai	642,373	9.6%	703,783	73.0%	513,762
Maui	16,961,421	10.0%	18,650,779	73.0%	13,615,068
Molokai	594,362	9.6%	651,183	73.0%	475,364
Oahu	101,580,731	11.2%	112,927,270	73.0%	82,436,907
Total	**140,085,158**	**10.7%**	**155,066,850**	**73.0%**	**113,198,801**
% of Customer Level Savings			111%		81%

Table 23

PY12 Demand (kW) Reduction by Impact Level and by Island

PY12 Demand (kW) Reduction by Impact Level and by Island					
	Customer Level Savings	**System Losses**	**System Level Savings**	**Net-to-Gross Ratio**	**Program Level Savings**
Hawaii Island	2,585	9.0%	2,818	73.0%	2,057
Lanai	68	9.6%	75	73.0%	54
Maui	2,424	10.0%	2,665	73.0%	1,946
Molokai	68	9.6%	74	73.0%	54
Oahu	13,595	11.2%	15,114	73.0%	11,033
Total	**18,740**	**10.7%**	**20,746**	**73.0%**	**15,145**
% of Customer Level Savings			111%		81%

PORTFOLIO FOURTH YEAR IMPACTS

Table 24

Energy (kWh) Reduction by Impact Level and by Program

PY12 Energy (kWh) Reduction by Impact Level and by Program

	Customer Level Savings	System Losses	System Level Savings	Net-to-Gross Ratio	Program Level Savings
Business	**52,441,774**	**10.8%**	**58,087,153**	**73.0%**	**42,403,621**
BEEM	30,939,426	10.7%	34,264,360	73.0%	25,012,983
CBEEM	15,862,988	10.9%	17,594,932	73.0%	12,844,300
BESM	4,403,514	10.4%	4,863,112	73.0%	3,550,072
BHTR	1,235,846	10.4%	1,364,748	73.0%	996,266
Residential	**87,643,385**	**10.7%**	**96,979,698**	**73.0%**	**70,795,179**
REEM	86,426,813	10.7%	95,636,330	73.0%	69,814,521
CESH	-	-	-	-	-
RESM	732,947	11.1%	814,415	73.0%	594,523
RHTR	483,625	9.4%	528,953	73.0%	386,136
Total	**140,085,158**	**10.7%**	**155,066,850**	**73.0%**	**113,198,801**
% of Customer Level Savings			111%		81%

Table 25

PY12 Demand (kW) Reduction by Impact Level and by Program

PY12 Demand (kW) Reduction by Impact Level and by Program

	Customer Level Savings	System Losses	System Level Savings	Net-to-Gross Ratio	Program Level Savings
Business	**6,818**	**10.8%**	**7,552**	**73.0%**	**5,513**
BEEM	4,229	10.7%	4,683	73.0%	3,418
CBEEM	2,125	10.9%	2,357	73.0%	1,720
BESM	320	10.6%	354	73.0%	259
BHTR	144	10.5%	159	73.0%	116
Residential	**11,923**	**10.7%**	**13,193**	**73.0%**	**9,631**
REEM	11,819	10.7%	13,081	73.0%	9,549
CESH	-	-	-	-	-
RESM	12	9.3%	13	73.0%	9
RHTR	91	9.2%	100	73.0%	73
Total	**18,740**	**10.7%**	**20,746**	**73.0%**	**15,145**
% of Customer Level Savings			111%		81%

CFLs & LEDs – Market Shift towards LEDs

The Program reduced its dependency on CFLs in PY12. There were 1,775,226 Residential and Business CFLs incentivized, lower than PY10 and PY11 levels. CFL and LED savings remain a significant contributing measure to the Program as shown in **Table 26.** The combined Residential and Business CFL and LED impact was 57% of the energy reduction achieved and 58% of the demand.

Table 26

PY12 CFL & LED Statistics

CFL County Comparison	**Business**	**Residential**	**Total**	**%**
C&C of Honolulu	10,833	1,347,915	1,358,748 bulbs	76.5%
Hawaii County	947	233,110	234,057 bulbs	13.2%
Maui County	118	182,303	182,421 bulbs	10.3%
Total	11,898	1,763,328	1,775,226 bulbs	100%

LED County Comparison	**Business**	**Residential**	**Total**	**%**
C&C of Honolulu	22,318	55,906	78,224 bulbs	63.7%
Hawaii County	3,245	18,775	22,020 bulbs	17.9%
Maui County	5,571	16,914	22,485 bulbs	18.3%
Total	31,134	91,595	122,729 bulbs	100%

CFL Cost Effectiveness	**Business**	**Residential**	**Total**
CFL Incentives	$ 29,031	$ 2,363,644	$ 2,392,675
CFL Program kWh - First Year	$ 1,784,176	51,753,273	53,537,449
First Year $/kWh	$ 0.016 /kWh	$ 0.046 /kWh	$ 0.045 /kWh
CFL Program kWh - Life	5,352,528	310,506,448	315,858,976
First Year $/kWh	$ 0.005 /kWh	$ 0.008 /kWh	$ 0.008 /kWh

LED Effectiveness	**Business**	**Residential**	**Total**
LED Incentives	$ 1,145,895	$ 648,318	$ 1,794,213
LED Program kWh - First Year	9,294,306	1,261,249	10,555,555
First Year $/kWh	$ 0.123 /kWh	$ 0.514 /kWh	$ 0.170 /kWh
LED Program kWh - Life	121,271,395	18,314,224	139,585,619
First Year $/kWh	$ 0.009 /kWh	$ 0.035 /kWh	$ 0.013 /kWh

Energy Comparison	**Business**	**Residential**	**Total**
CFL Program kWh	1,784,176	51,753,273	53,537,449 kWh
LED Program kWh	9,294,306	1,261,249	10,555,555 kWh
Portfolio kWh	42,403,621	70,795,179	113,198,801 kWh
CFL % of Energy	4%	73%	47%
LED % of Energy	22%	2%	9%

Demand Comparison	**Business**	**Residential**	**Total**
CFL Program kW	185	7,129	7,314 kW
LED Program kW	1,226	225	1,451 kW
Portfolio kW	5,513	9,631	15,145 kW
CFL % of Energy	3%	74%	48%
LED % of Energy	22%	2%	10%

Energy Comparison	**Business**	**Residential**	**Total**
CFL Incentives	$ 29,031	$ 2,363,644	$ 2,392,675
LED Incentives	$ 1,145,895	$ 648,318	$ 1,794,213
Portfolio Incentives	$ 10,359,590	$ 9,048,062	$19,407,652
CFL % of Incentives	0%	26%	12%
LED % of Incentives	11%	7%	9%

PORTFOLIO FOURTH YEAR IMPACTS

CFL counts dropped by 7%, compared to PY11 participation numbers whereas LEDs have increased 124%. LEDs will continue to increase their role in the Program-achieved savings. See **Table 27** for details.

Table 27
PY12 Impact of Change in CFL Savings Values

CFL Program Impact - PY12 versus PY09/10/11				
Lamp Count	**Business**	**Residential**	**Total**	
PY09	77,100	1,004,830	1,081,930	Lamps
PY10	60,080	1,738,553	1,798,633	Lamps
PY11	81,235	1,841,842	1,923,077	Lamps
PY12	**11,898**	**1,763,328**	**1,775,226**	**Lamps**
1st Year Energy	**Business**	**Residential**	**Total**	
PY09	4,099,193	52,054,220	56,153,413	kWh
PY10	4,985,218	45,779,857	50,765,075	kWh
PY11*	12,892,740	53,790,929	66,683,669	kWh
PY12*	**1,784,176**	**51,753,273**	**53,537,449**	kWh
Savings per Lamp	**Business**	**Residential**	**Average**	
PY09	53	52	52	kWh/Lamp
PY10	83	26	28	kWh/Lamp
PY11*	159	29	35	kWh/Lamp
PY12*	**150**	**29**	**30**	kWh/Lamp
* Note: Includes all Commercial CFLs not just Residential under Commercial Meters				

PORTFOLIO FOURTH YEAR IMPACTS

Measure Contribution toward Savings Impacts

In PY12, the Program incentivized over 68 measures in 22 different measure categories. As in prior years, High Efficiency Lighting and Customized Project Measures accounted for the greatest savings impact and High Efficiency HVAC remained as the third most impactful measure category. **Table 28** provides a summary of all measure categories and their respective energy impact for PY12.

- **#1 Contributor - High Efficiency Lighting** - 61% first year (down from 64% in PY11) and 50% lifetime energy savings (up from 42.8% in PY11). CFLs and T8/T8LW lighting contributed the most toward the Program as they are the most cost-effective measures a customer can implement. LEDs have increased to the fourth largest measure.

- **#2 Contributor - Customized Project Measures** - 11% first year (down from 18% in PY11) and 17% lifetime energy savings (down from 30% in PY11). This measure was dominated this year by customized lighting projects, predominantly LED.

- **#3 Contributor - High Efficiency HVAC -** 4% first year and 7% lifetime energy savings. Chillers, Package/Split AC and VFDs in pumping applications contributed nearly 90% of this category.

See **Table 28** for details.

PORTFOLIO FOURTH YEAR IMPACTS

Table 28

PY12 Contribution by Measure Category in Order of Lifetime Energy Impact

PY12 Contribution by Category in Order of Lifetime Energy Impact

Rank	Category	Apps	%	Measure Quantity	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Incentives ($)	%	Lifetime Cost ($/kWh)
1	High Efficiency Lighting	24,547	51%	1,975,044	9,139	60%	69,287,594	61%	534,923,112	50%	$ 4,860,782	25%	$ 0.009
2	Customized Project Measures	319	1%	340	1,716	11%	12,804,135	11%	179,626,838	17%	$ 2,036,933	10%	$ 0.011
3	High Efficiency HVAC	291	1%	1,258	997	7%	4,789,378	4%	76,534,199	7%	$ 1,232,087	6%	$ 0.016
4	High Efficiency Appliances	12,733	26%	12,726	303	2%	5,374,349	5%	72,860,309	7%	$ 1,104,045	6%	$ 0.015
5	High Efficiency Water Heating	2,820	6%	2,821	993	7%	4,837,137	4%	69,198,256	6%	$ 2,239,721	12%	$ 0.032
6	Business Direct Installation	2,441	5%	31,346	259	2%	3,523,159	3%	49,324,225	5%	$ 2,359,042	12%	$ 0.048
7	Energy Efficiency Equipment Grants	748	2%	8,604	240	2%	1,430,244	1%	19,616,122	2%	$ 1,923,335	10%	$ 0.098
8	Energy Awareness, Measurement and Control Systems	102	0%	76,993	811	5%	6,987,603	6%	15,430,407	1%	$ 1,164,358	6%	$ 0.075
9	Building Envelope Improvements	59	0%	58	297	2%	1,109,701	1%	11,100,805	1%	$ 297,465	2%	$ 0.027
10	High Efficiency Air Conditioning	3,101	6%	3,889	222	1%	876,389	1%	8,933,376	1%	$ 227,377	1%	$ 0.025
11	High Efficiency Water Pumping	30	0%	39	57	0%	578,821	1%	8,682,311	1%	$ 96,350	0%	$ 0.011
12	MM - High Efficiency Appliances	816	2%	1,172	28	0%	510,053	0%	6,773,774	1%	$ 83,890	0%	$ 0.012
13	Residential Design and Audits	6	0%	150	-	0%	574,462	1%	4,319,151	0%	$ 147,000	1%	$ 0.034
14	Commercial Industrial Processes	7	0%	8	40	0%	231,687	0%	3,475,311	0%	$ 76,200	0%	$ 0.022
15	High Efficiency Motors	47	0%	353	34	0%	230,791	0%	3,461,859	0%	$ 32,520	0%	$ 0.009
16	Business Design, Audits and Commissioning	60	0%	60	-	0%	26,913	0%	376,785	0%	$ 1,519,990	8%	$ 4.034
17	MM - High Efficiency Water Heating	2	0%	2	1	0%	3,286	0%	49,294	0%	$ 1,900	0%	$ 0.039
18	MM - High Efficiency Air Conditioning	5	0%	6	1	0%	3,038	0%	32,275	0%	$ 475	0%	$ 0.015
19	Target Cost Request for Proposals	3	0%	2	8	0%	14,057	0%	6,506	0%	$ 3,033	0%	$ 0.466
20	Residential System Tune-Ups	24	0%	23	1	0%	6,003	0%	6,003	0%	$ 1,150	0%	$ 0.192
21	Residential Direct Installation	-	0%	-	-	0%	-	0%	-	0%	$ -	0%	-
22	Landlord, Tenant, AOAO Measures	-	0%	-	-	0%	-	0%	-	0%	$ -	0%	-
	Grand Total	**48,165**	**100%**	**2,114,894**	**15,145**	**100%**	**113,198,801**	**100%**	**1,064,730,916**	**100%**	**$ 19,407,652**	**100%**	**$ 0.018**

Hawaii Energy
YOUR CONSERVATION & EFFICIENCY PROGRAM

PORTFOLIO FOURTH YEAR IMPACTS

Energy Impacts by Rate Schedule

Program Level impacts (first year) were greatest in the Residential Rate Schedule "R" with 70,053,553 kWh or 61.9% of savings, of which 70% was realized on Oahu. The Oahu Residential rate class provided the greatest savings of 49,410,537 kWh per year of all the rate schedules (43% of PY12 total kWh). A summary of Program energy impacts by rate schedule is provided in **Table 29**.

Table 29
PY12 Program Energy Impact by Rate Schedule

PY12 Portfolio Energy (kWh) Program Level Impacts by Rate Schedule

Island	R	G	J	P	DS	U	F	Total	%
Hawaii Island	11,275,428	1,024,829	1,985,992	1,871,450	-	-	-	16,157,700 kWh	14.3%
Lanai	470,490	39,721	3,552	-	-	-	-	513,762 kWh	0.5%
Maui	8,443,614	551,909	1,382,467	3,236,810	-	-	268	13,615,068 kWh	12.0%
Molokai	453,483	4,514	17,367	-	-	-	-	475,364 kWh	0.4%
Oahu	49,410,537	3,220,181	10,886,681	15,752,545	3,164,990	1,972	-	82,436,907 kWh	72.8%
Total	70,053,553	4,841,154	14,276,058	20,860,805	3,164,990	1,972	268	113,198,801 kWh	100.0%
%	61.9%	4.3%	12.6%	18.4%	2.8%	0.0%	0.0%	100.0%	

Demand impact had similar results with the Residential Rate schedule customers providing 9,590 kW or 63.3% of the demand savings. Oahu Residential Rate Customers provided the greatest savings of 6,823 kW per year of all the rate schedules (45% of PY12 total kW). A summary of Program Level demand impacts by rate schedule is provided in **Table 30**.

Table 30
PY12 Program Demand Impact by Rate Schedule

PY12 Portfolio Demand (kW) Program Level Impacts by Rate Schedule

Island	R	G	J	P	DS	U	F	Total	%
Hawaii Island	1,524	55	214	264	-	-	-	2,057 kW	13.6%
Lanai	52	2	1	-	-	-	-	54 kW	0.4%
Maui	1,138	99	191	518	-	-	0	1,946 kW	12.8%
Molokai	52	1	1	-	-	-	-	54 kW	0.4%
Oahu	6,823	338	1,274	2,188	409	1	-	11,033 kW	72.9%
Total	9,590	494	1,681	2,970	409	1	0	15,145 kW	100.0%
%	63.3%	3.3%	11.1%	19.6%	2.7%	0.0%	0.0%	100.0%	

PORTFOLIO FOURTH YEAR IMPACTS

Program Level Energy Impacts by Program and Rate Class

Table 31 shows Business and Residential program energy contributions by rate class.

- **# 1 Contributor - Residential Energy Efficiency Measures (REEM) within the Residential Rate Schedule "R"**

  69,617,912 kWh (61.5% of total program)
  The top three contributors toward this value were residential CFLs, Solar Water Heating and Refrigerator with Recycling.

- **# 2 Contributor - Business Energy Efficiency Measures (BEEM) within the Business Large Customer Rate Schedule "P"**
  13,424,226 kWh (11.9% of total program)
  Schedule "P" Customers are the biggest energy consumers and they undertake the largest energy-savings projects. Schedule "P" savings were dominated by high performance lighting at 52% of savings in the category.

Table 31
PY12 Program Energy Impacts by Rate Class

PY12 Portfolio Energy (kWh) Program Level Impacts by Program by Rate Schedule

Program	R	G	J	P	DS	U	F	Total	%
Business Program	**34,374**	**4,280,922**	**14,050,431**	**20,858,808**	**3,164,990**	**1,972**	**268**	**42,391,766 kWh**	**37.4%**
BEEM	31,329	733,401	9,061,410	13,424,226	1,748,522	1,972	268	25,001,128 kWh	22.1%
CBEEM	-	859,733	3,483,429	7,084,670	1,416,469	-	-	12,844,300 kWh	11.3%
BESM	2,069	2,479,667	782,686	285,650	-	-	-	3,550,072 kWh	3.1%
BHTR	976	208,121	722,907	64,262	-	-	-	996,266 kWh	0.9%
Residential Program	**70,019,179**	**560,232**	**225,627**	**1,996**	**-**	**-**	**-**	**70,807,035 kWh**	**62.6%**
REEM	69,617,912	206,468	-	1,996	-	-	-	69,826,376 kWh	61.7%
RESM	20,060	348,835	225,627	-	-	-	-	594,523 kWh	0.5%
RHTR	381,207	4,929	-	-	-	-	-	386,136 kWh	0.3%
Total	**70,053,553**	**4,841,154**	**14,276,058**	**20,860,805**	**3,164,990**	**1,972**	**268**	**113,198,801 kWh**	**100.0%**
%	61.9%	4.3%	12.6%	18.4%	2.8%	0.0%	0.0%	100.0%	

PORTFOLIO FOURTH YEAR IMPACTS

Program Level Demand Impacts by Program and Rate Class

Table 32 shows Business and Residential program demand contributions by rate class.

- **# 1 Contributor - Residential Energy Efficiency Measures (REEM) within the Residential Rate Schedule "R"**

  9,505 kW (62.8% of total program)
  The top three contributors toward this value were Residential CFLs, Solar Water Heating and Peer Group Comparisons.

- **# 2 Contributor - Business Energy Efficiency Measures (BEEM) within the Business Large Customer Rate Schedule "P"**

  1,936 kWh (12.8% of total program)
  Schedule "P" Customers are the biggest energy consumers and they undertake the largest energy-savings projects. LED, T8 and VFD Pumps were the top contributors to this category.

Table 32
PY12 Program Demand Impacts by Rate Class

PY12 Portfolio Energy (kW) Program Level Impacts by Program by Rate Schedule

Program	R	G	J	P	DS	U	F	Total	%
Business Program	**5**	**447**	**1,681**	**2,970**	**409**	**1**	**0**	**5,512 kW**	**36.4%**
BEEM	5	140	1,116	1,936	220	1	0	3,417 kW	22.6%
CBEEM	-	113	439	980	189	-	-	1,720 kW	11.4%
BESM	-	170	47	41	-	-	-	259 kW	1.7%
BHTR	-	23	79	13	-	-	-	116 kW	0.8%
Residential Program	**9,586**	**46**	**-**	**0**	**-**	**-**	**-**	**9,632 kW**	**63.6%**
REEM	9,505	45	-	0	-	-	-	9,550 kW	63.1%
RESM	9	-	-	-	-	-	-	9 kW	0.1%
RHTR	72	1	-	-	-	-	-	73 kW	0.5%
Total	**9,590**	**493**	**1,681**	**2,970**	**409**	**1**	**0**	**15,145 kW**	**100.0%**
%	63.3%	3.3%	11.1%	19.6%	2.7%	0.0%	0.0%	100.0%	

PORTFOLIO FOURTH YEAR IMPACTS

Customer Level Energy Impacts by Program and Rate Class

Table 33 shows Business and Residential program energy contributions by rate class.

- **# 1 Contributor - Residential Energy Efficiency Measures (REEM) within the Residential Rate Schedule "R"**

  86,184,575 kWh (61.5% of total program)
  The top three contributors toward this value were Residential CFLs, Solar Water Heating and Peer Group Comparisons.

- **# 2 Contributor - Business Energy Efficiency Measures (BEEM) within the Business Large Customer Rate Schedule "P"**

  16,604,226 kWh (11.9% of total program)
  Schedule "P" Customers are the biggest energy consumers and they undertake the largest energy-savings projects. LED, T8 and CFLs were the top contributors to this category.

Table 33
PY12 Customer Energy Impacts by Rate Class

PY12 Portfolio Energy (kWh) Customer Level Impacts by Program by Rate Schedule

Program	R	G	J	P	DS	U	F	Total	%
Business Program	**42,402**	**5,308,341**	**17,381,117**	**25,792,521**	**3,899,976**	**2,430**	**334**	**52,427,121 kWh**	**37.4%**
BEEM	38,605	909,549	11,215,059	16,604,226	2,154,570	2,430	334	30,924,773 kWh	22.1%
CBEEM	-	1,061,696	4,300,168	8,755,718	1,745,406	-	-	15,862,988 kWh	11.3%
BESM	2,577	3,079,163	968,381	353,392	-	-	-	4,403,514 kWh	3.1%
BHTR	1,220	257,932	897,508	79,185	-	-	-	1,235,846 kWh	0.9%
Residential Program	**86,687,086**	**690,469**	**278,023**	**2,460**	**-**	**-**	**-**	**87,658,038 kWh**	**62.6%**
REEM	86,184,575	254,431	-	2,460	-	-	-	86,441,466 kWh	61.7%
RESM	25,081	429,843	278,023	-	-	-	-	732,947 kWh	0.5%
RHTR	477,430	6,195	-	-	-	-	-	483,625 kWh	0.3%
Total	**86,729,488**	**5,998,810**	**17,659,140**	**25,794,981**	**3,899,976**	**2,430**	**334**	**140,085,158 kWh**	**100.0%**
%	61.9%	4.3%	12.6%	18.4%	2.8%	0.0%	0.0%	100.0%	

PORTFOLIO FOURTH YEAR IMPACTS

Customer Level Demand Impacts by Program and Rate Class

Table 34 shows Business and Residential program demand contributions by rate class.

- **# 1 Contributor – Residential Energy Efficiency Measures (REEM) within the Residential Rate Schedule "R"**

  11,765 kW (62.7% of total program)
  The top three contributors toward this value were Residential CFLs, Solar Water Heating and Peer Group Comparisons.

- **# 2 Contributor – Business Energy Efficiency Measures (BEEM) within the Business Large Customer Rate Schedule "P"**

  2,395 kWh (12.8% of total program)
  Schedule "P" Customers are the biggest energy consumers and they undertake the largest energy-savings projects. LED, T8 and VFD Pumps were the top contributors to this category.

Table 34
PY12 Customer Demand Impacts by Rate Class

PY12 Portfolio Energy (kW) Customer Level Impacts by Program by Rate Schedule									
Program	**R**	**G**	**J**	**P**	**DS**	**U**	**F**	**Total**	**%**
Business Program	**6**	**553**	**2,079**	**3,673**	**504**	**1**	**0**	**6,818 kW**	**36.4%**
BEEM	6	173	1,381	2,395	272	1	0	4,228 kW	22.6%
CBEEM	-	140	542	1,211	233	-	-	2,125 kW	11.3%
BESM	-	211	58	51	-	-	-	320 kW	1.7%
BHTR	-	29	98	16	-	-	-	144 kW	0.8%
Residential Program	**11,867**	**57**	**-**	**0**	**-**	**-**	**-**	**11,924 kW**	**63.6%**
REEM	11,765	56	-	0	-	-	-	11,821 kW	63.1%
RESM	12	-	-	-	-	-	-	12 kW	0.1%
RHTR	90	1	-	-	-	-	-	91 kW	0.5%
Total	**11,872**	**611**	**2,079**	**3,673**	**504**	**1**	**0**	**18,740 kW**	**100.0%**
%	63.4%	3.3%	11.1%	19.6%	2.7%	0.0%	0.0%	100.0%	

PORTFOLIO FOURTH YEAR IMPACTS

Energy Efficiency Portfolio Standard (EEPS) Impacts

Application of Fourth Year Energy Savings towards EEPS Goal

The targeted goal of the Energy Efficiency Portfolio Standard is a 4,300 GWh reduction from the expected usage in year 2030. This "slice of savings" in the year 2030 will be the result of many actions taken from 2009 to2030. These actions include Building Codes, Appliance Standards, Manufacturer Product Improvements, and Behavior Change etc. Hawaii Energy will capture a majority of these actions through our programs and services.

As measures and actions are put into place, each will start to provide an annual energy savings. These savings will be provided each year until the device or action is replaced with a new one.

There are two ways to look at the savings "stream" that will be provided:

1) Assume first year savings last forever.
   This would be where at end of life or even before that, the measure will be replaced with a device or action that provides the same energy reduction.

2) First year savings only lasts as long as the measure life.
   This is where each measure's savings ends at the end of its useful life.

Table 35 shows what would happen in both scenarios listed above taking into account the yearly "demand-side management impacts" from 1996 through 2012 and then adding the current PY12 impacts as if they will be achieved each year into the future.

The results are:

- First Year Savings Last Forever – 3,506 GWh, or 82% of the 4,300 GWh 2030 energy efficiency goal, is potentially achieved (purple line on right).
- First Year Savings Only Lasts as Long as Measure Life – 1,400 GWh, or 32% of the 4,300 GWh 2030 energy efficiency goal, is potentially achieved (green line on right).

Hawaii Energy believes the first scenario, where the PBFA potentially participates in at least 82% of the HCEI goal, is more likely than the second scenario because future energy efficiency measures will be better than current measures and therefore maintain the current program's trajectory.

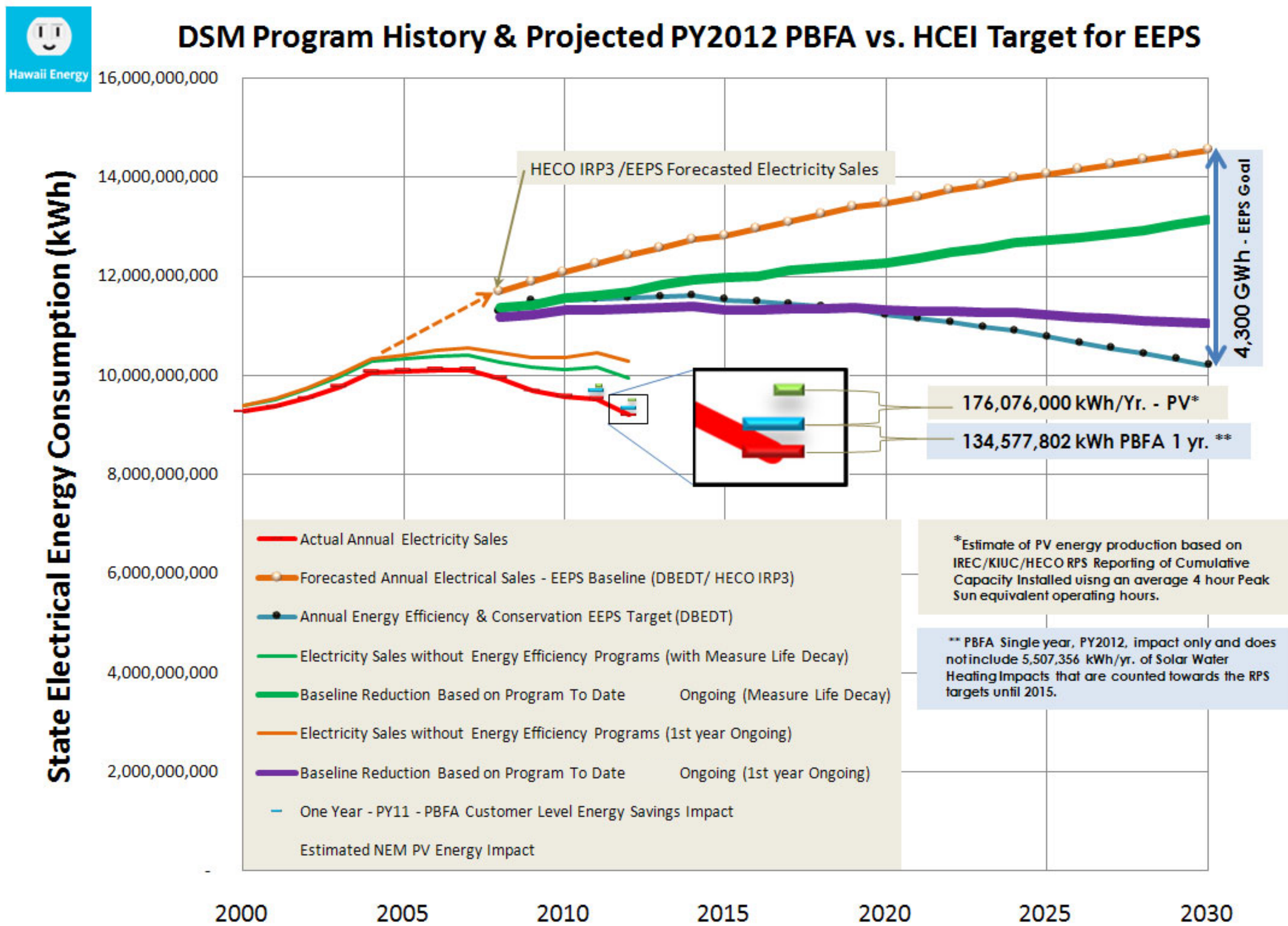
These two methods are illustrated in **Table 35**.

PORTFOLIO FOURTH YEAR IMPACTS

Table Assumptions

Table 35 projects the current program portfolio being achieved each year from 2010 to 2030. Solar water heaters are defined in the Renewable Portfolio Standard (RPS) rules as an "offset" technology and are removed from the savings until 2015.

Table 35



PORTFOLIO FOURTH YEAR IMPACTS

Portfolio Impacts Relative to Load

The next few tables show the Program and Customer Level Impacts as compared to PY12 electricity sales.

Customer Level Savings were equivalent to 1.5% of the 2012 annual energy usage and 1.2% of the peak demand for the utility customers.

Oahu had both the largest energy and demand reductions and the largest percentage of load with energy at 1.4% and demand at 1.2%.

Since PV and EE both have a role in achieving the HCEI goals, Hawaii Energy took a rough cut to compare the impacts of both actions on HECO sales (see **Table 36a**). The cumulative impact of PV was also included on the graph in **Table 35**.

Table 36
PY12 Energy Impacts vs. Sales

PY12 - Customer and Program Level Energy (kWh) Impacts vs. Generation					
Island	**2012 kWh Generated***	**Customer Level Savings**	**% of Sales**	**Program Level Savings**	**% of Sales**
Hawaii	1,170,400,000	20,306,271	1.7%	16,157,700	1.4%
Lanai	26,100,000	642,373	2.5%	513,762	2.0%
Maui	1,154,400,000	16,961,421	1.5%	13,615,068	1.2%
Molokai	33,000,000	594,362	1.8%	475,364	1.4%
Oahu	7,311,000,000	101,580,731	1.4%	82,436,907	1.1%
Total	9,694,900,000	140,085,158	1.4%	113,198,801	1.2%
	kWh Sales**				
Total	9,206,000,000	140,085,158	1.5%	113,198,801	1.2%

* HEI 2012 10K Report - net generated and purchased power
** Total Sales in 10K reported only for Total

Taking the reported cumulative installed PV values at the end of 2012, there was a non-utility installed capacity of roughly 120MW-AC (143MW-DC) of PV. Using an average production estimate of a four hour per day peak sun equivalent day, the PV systems are offsetting/producing 176,076,000 kWh in 2012. If the lifetime of the PV systems are put at 25 years, the systems will generate 4,401,900,000 kWh or just under half a year of 2012 energy sales.

There are two costs for PV and EE actions. The first cost is the customer level cost and second is the cost of State programs to support the implementation of the actions. The table shows that both customer and program investments in EE and PV are more cost effective than the current costs to generate or purchase electricity.

Combined in 2012, the one year EE efforts and the cumulative PV installations decreased energy generation by 3.4% of sales for a combined lifetime cost to the customers of $0.14/kWh and a total of $0.05/kWh for the State incentive programs to support them.

PORTFOLIO FOURTH YEAR IMPACTS

Table 36a Energy Efficiency and PV Impact on Energy Sales and Cost of Achievement						
Item	**2012 HECO Sales**		**EE (PBFA Only) One Year Impact**		**PV (State) Cumulative Impact**	**Total Reduction**
Daytime Capacity (kW)			Not Available*		120,600	
On-Peak Capacity (kW)			18,750		Unknown	
Single Year Customer Level Energy (kWh-Annual)**	9,206,000,000		140,085,158		176,076,000	316,161,158
Impact on Annual Sales (% of Sales)			1.5%		1.9%	3.4%
Estimated Useful Lifetime			9.4		25.0	
Measure Life Customer Level Energy (kWh-Life)			1,317,203,780		4,401,900,000	5,719,103,780
Customer Cost to Implement ($)***		$	56,213,606	$	723,600,000	
Per kW cost to Customer (for review only not comparable)		$	2,998		$6,000	
Customer lifetime Unit Cost ($/kWh)		$	0.04	$	0.16	
State Incentives Cost to Support Actions ($)****		$	30,903,827	$	253,260,000	
Incentives per kW cost		$	1,648	$	2,100	
Incentives Lifetime Unit Cost ($/kWh)		$	0.02	$	0.06	

* - Can be determined. Not availiable at time of report generation.
** - EE Includes Solar Water Heating that is not in Table 35. This figure is from Table 1.
*** - TRC - Incremental Costs - Table 19, Estimated Average PV installed Cost $6/Watt.
**** - PBFA Total Contract Cost. Estimated 35% State Tax Incentive for all installations

Table 37 PY12 Demand Impacts vs. Sales					
PY12 - Customer and Program Level Demand (kW) Impacts vs. Generation					
Island	**2012 kW Peak***	**Customer Level Reduction**	**% of Peak**	**Program Level Reduction**	**% of Peak**
Hawaii	189,300	2,585	1.4%	2,057	1.1%
Lanai	4,600	68	1.5%	54	1.2%
Maui	194,800	2,424	1.2%	1,946	1.0%
Molokai	5,500	68	1.2%	54	1.0%
Oahu	1,141,000	13,595	1.2%	11,033	1.0%
Total	1,535,200	18,740	1.2%	15,145	1.0%

* Reported HEI 2012 10K Report (noncoincident and nonintegrated)

PORTFOLIO FOURTH YEAR IMPACTS

Portfolio Total Resource Benefit (TRB) and Total Resource Cost (TRC)

TRB

The utilities' total avoided cost of all saved energy and capacity avoided is called the Total Resource Benefit (TRB). The total Program portfolio had a net TRB of $116,768,535. **Table 38** shows the measures and their relative contributions. The top three measures provided 73% of the TRB value. They are: High Efficiency Lighting, Customized Project Measures and High Efficiency HVAC.

- *High Efficiency Lighting* – The largest contributor to the TRB at $56,508,522 (48.4%) down from $59,461,367 (46.5%) in PY11. Residential CFLs alone had a 47.5% first year energy impact contribution to the Program, despite a short six (6) year useful life and low unit savings number. CFLs were the greatest contributor to the TRB at $38,071,739 (32.6%).

- *Customized Project Measures* – The second largest contributor with $19,415,339 (17%) down from $34,250,642 (26.8%) in PY11. Customized Project measures represent 11.0% of the first year energy contribution; however, the 14.0 year average useful life of these measures provided a significant TRB value.

- *High Efficiency HVAC* – The third measure to offer significant contribution at $9,369,317 (8.0%) was High Efficiency HVAC. The measure has a 4,789,378 kWh first year energy savings and a 16.0 year useful life.

TRC

Total Resource Cost is the customer's project or incremental cost to purchase and install the energy-efficient equipment or make operational changes above what would have been done anyway. PY12 Program Savings were achieved with an estimated TRC of $56,213,606, which is lower than the PY11 reported figure of $81,662,835. This lower number is due to more accurate use of incremental costs supported by incentives versus the total project/measure costs. If the same methodology used in PY11 was used, then Total Project/Measure costs would be $76,331,990 in PY12.

The largest customer investment was in Solar Water Heaters at $17,610,159 (31.3%) of TRC, followed by Customized Measures – Over 5 year Life at $12,379,401 (22.0%). See **Table 38** for details.

PORTFOLIO FOURTH YEAR IMPACTS

Table 38

Measure Portfolio Total Resource Benefit and Costs (TRB & TRC)

PY12 Contribution by Category in Order of Lifetime Energy Impact

Rank	Category	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB / TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
1	High Efficiency Lighting	9,139	60%	69,287,594	61%	534,923,112	50%	7.7	4.8	$ 56,508,522	48%	$ 11,680,026	21%	$ 4,860,782	25%
2	Customized Project Measures	1,716	11%	12,804,135	11%	179,626,838	17%	14.0	1.5	$ 19,415,339	17%	$ 13,054,647	23%	$ 2,036,933	10%
3	High Efficiency HVAC	997	7%	4,789,378	4%	76,534,199	7%	16.0	3.8	$ 9,369,317	8%	$ 2,469,480	4%	$ 1,232,087	6%
4	High Efficiency Appliances	304	2%	5,383,981	5%	72,958,124	7%	13.6	2.4	$ 6,915,988	6%	$ 2,907,468	5%	$ 1,106,760	6%
5	High Efficiency Water Heating	993	7%	4,837,137	4%	69,198,256	6%	14.3	0.5	$ 9,258,909	8%	$ 17,089,312	30%	$ 2,239,721	12%
6	Business Direct Installation	259	2%	3,523,159	3%	49,324,225	5%	14.0	2.1	$ 4,872,317	4%	$ 2,359,042	4%	$ 2,359,042	12%
7	Energy Efficiency Equipment Grants	240	2%	1,430,244	1%	19,616,122	2%	13.7	1.5	$ 2,451,018	2%	$ 1,637,014	3%	$ 1,923,335	10%
8	Energy Awareness, Measurement and Control Systems	811	5%	6,987,603	6%	15,430,407	1%	2.2	1.6	$ 2,448,057	2%	$ 1,537,702	3%	$ 1,164,358	6%
9	Building Envelope Improvements	297	2%	1,109,701	1%	11,100,805	1%	10.0	4.9	$ 1,846,714	2%	$ 380,762	1%	$ 297,465	2%
10	High Efficiency Air Conditioning	223	1%	878,612	1%	8,949,371	1%	10.2	2.8	$ 1,086,012	1%	$ 385,428	1%	$ 227,777	1%
11	High Efficiency Water Pumping	57	0%	578,821	1%	8,682,311	1%	15.0	2.6	$ 826,877	1%	$ 312,600	1%	$ 96,350	0%
12	MM - High Efficiency Appliances	27	0%	500,421	0%	6,675,958	1%	13.3	4.0	$ 623,756	1%	$ 157,622	0%	$ 81,175	0%
13	Residential Design and Audits	-	0%	574,462	1%	4,319,151	0%	7.5	2.0	$ 301,111	0%	$ 147,000	0%	$ 147,000	1%
14	Commercial Industrial Processes	40	0%	231,687	0%	3,475,311	0%	15.0	2.2	$ 424,637	0%	$ 195,750	0%	$ 76,200	0%
15	High Efficiency Motors	34	0%	230,791	0%	3,461,859	0%	15.0	6.0	$ 400,244	0%	$ 66,381	0%	$ 32,520	0%
16	Business Design, Audits and Commissioning	-	0%	26,913	0%	376,785	0%	14.0	0.0	$ 29,797	0%	$ 1,809,535	3%	$ 1,519,990	8%
17	MM - High Efficiency Water Heating	1	0%	3,286	0%	49,294	0%	15.0	0.5	$ 6,694	0%	$ 13,200	0%	$ 1,900	0%
18	MM - High Efficiency Air Conditioning	0	0%	814	0%	16,280	0%	20.0	8.8	$ 1,055	0%	$ 120	0%	$ 75	0%
19	Target Cost Request for Proposals	8	0%	14,057	0%	6,506	0%	0.5	0.6	$ 2,067	0%	$ 3,617	0%	$ 3,033	0%
20	Residential System Tune-Ups	1	0%	6,003	0%	6,003	0%	1.0	0.2	$ 1,104	0%	$ 6,900	0%	$ 1,150	0%
21	Residential Direct Installation	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
22	Landlord, Tenant, AOAO Measures	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
	Grand Total	**15,145**	**100%**	**113,198,801**	**100%**	**1,064,730,916**	**100%**	**9.4**	**2.1**	**$ 116,789,535**	**100%**	**$ 56,213,606**	**100%**	**$ 19,407,652**	**100%**

PORTFOLIO FOURTH YEAR IMPACTS

TRC Test

The societal cost test of the TRB/TRC provides a metric of how much "return on investment" is provided by:

- Saving energy versus creating it (kWh reductions)
- Avoiding the need for increased power plant capacity (Peak kW reductions)

The TRB/TRC ratio of 2.1 indicates that society is getting a 2.1 times return (or 210%) on their investment. Currently this does not include the benefits of avoided transmission and distribution costs or any "externalities" that bring benefit to society, such as reductions in air and water emissions.

Refer to **Tables 39 - 40** for details under TRB/TRC.

Table 39a

PY12 TRC Measure Values - over 1% TRB Contribution

PY12 Contribution by Measure in Order of Lifetime Energy Impact - Part 1

Rank	Category	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
1	CFL	7,343	48.5%	53,748,751	47.5%	317,126,792	29.8%	5.9	14.2	$ 38,071,739	32.6%	$ 2,672,221	4.8%	$ 2,408,691	12.4%
2	Customized Measures - Over 5 year Life	1,664	11.0%	12,467,766	11.0%	175,931,784	16.5%	14.1	1.5	$ 18,956,515	16.2%	$ 12,379,401	22.0%	$ 1,987,096	10.2%
3	T8 /T8LW	690	4.6%	6,457,585	5.7%	90,400,263	8.5%	14.0	1.5	$ 9,737,705	8.3%	$ 6,488,609	11.5%	$ 944,899	4.9%
4	LED	802	5.3%	5,711,746	5.0%	85,410,599	8.0%	15.0	2.7	$ 4,260,155	3.6%	$ 1,553,045	2.8%	$ 1,137,708	5.9%
5	Solar Water Heating Incentive - Contractor	895	5.9%	4,019,307	3.6%	60,289,603	5.7%	15.0	0.5	$ 8,188,050	7.0%	$ 15,899,400	28.3%	$ 2,050,500	10.6%
6	Refrigerator with Recycling	174	1.1%	4,208,859	3.7%	58,924,026	5.5%	14.0	2.4	$ 5,317,506	4.6%	$ 2,179,440	3.9%	$ 770,090	4.0%
7	SBDI - Lighting Retrofits	259	1.7%	3,523,159	3.1%	49,324,225	4.6%	14.0	2.1	$ 4,872,317	4.2%	$ 2,359,042	4.2%	$ 2,359,042	12.2%
8	Chillers	284	1.9%	1,432,943	1.3%	28,658,861	2.7%	20.0	2.1	$ 3,343,658	2.9%	$ 1,624,644	2.9%	$ 322,145	1.7%
9	HVAC - Packaged/Split	209	1.4%	1,385,188	1.2%	20,777,818	2.0%	15.0	12.5	$ 2,429,043	2.1%	$ 195,099	0.3%	$ 563,956	2.9%
10	Delamping	126	0.8%	1,385,780	1.2%	19,400,914	1.8%	14.0	22.7	$ 2,008,973	1.7%	$ 88,400	0.2%	$ 76,270	0.4%
11	VFD - Pump	377	2.5%	1,390,718	1.2%	18,791,231	1.8%	13.5	15.2	$ 2,464,458	2.1%	$ 162,138	0.3%	$ 152,600	0.8%
12	Delamp/Reflector	107	0.7%	1,068,743	0.9%	14,962,400	1.4%	14.0	7.3	$ 1,583,707	1.4%	$ 216,760	0.4%	$ 118,045	0.6%
13	SBDI - Restaurant Lighting	105	0.7%	931,318	0.8%	13,038,458	1.2%	14.0	3.6	$ 1,424,413	1.2%	$ 394,433	0.7%	$ 394,433	2.0%
14	Window Tinting	289	1.9%	1,088,902	1.0%	10,889,020	1.0%	10.0	6.4	$ 1,789,843	1.5%	$ 278,246	0.5%	$ 276,962	1.4%
15	Clothes Washer (Tier II/III) + (Tier I GF)	123	0.8%	903,190	0.8%	10,651,346	1.0%	11.8	2.2	$ 1,295,658	1.1%	$ 596,750	1.1%	$ 299,150	1.5%
16	Condominium Submetering	143	0.9%	1,134,484	1.0%	9,530,628	0.9%	8.4	2.5	$ 1,606,630	1.4%	$ 640,725	1.1%	$ 269,250	1.4%

PORTFOLIO FOURTH YEAR IMPACTS

Table 39b

PY12 TRC Measure Values - Continued

PY12 Contribution by Measure in Order of Lifetime Energy Impact - Part 2

Rank	Category	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kW Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
17	Garage Refrigerator / Freezer Bounty	23	0.2%	585,766	0.5%	8,200,727	0.8%	14.0	7.9	$ 736,062	0.6%	$ 92,625	0.2%	$ 50,885	0.3%
18	Peer Group Comparison	667	4.4%	5,841,701	5.2%	5,841,701	0.5%	1.0	0.9	$ 833,676	0.7%	$ 891,460	1.6%	$ 891,460	4.6%
19	VFD Domestic Water Booster Packages	41	0.3%	381,392	0.3%	5,720,877	0.5%	15.0	2.8	$ 602,707	0.5%	$ 214,500	0.4%	$ 50,200	0.3%
20	Sensors	24	0.2%	584,435	0.5%	4,675,479	0.4%	8.0	1.5	$ 482,423	0.4%	$ 318,353	0.6%	$ 87,220	0.4%
21	VFR - Variable Refrigerant Flow AC	29	0.2%	306,712	0.3%	4,600,682	0.4%	15.0	1.2	$ 470,745	0.4%	$ 387,838	0.7%	$ 160,179	0.8%
22	Kitchen Exhaust Hood Demand Ventilation	51	0.3%	296,635	0.3%	4,449,522	0.4%	15.0	2.2	$ 543,675	0.5%	$ 251,550	0.4%	$ 134,680	0.7%
23	Efficiency Inside Home Design	-	0.0%	574,462	0.5%	4,319,151	0.4%	7.5	2.0	$ 301,111	0.3%	$ 147,000	0.3%	$ 147,000	0.8%
24	Solar Water Heater - Grant	62	0.4%	277,763	0.2%	4,166,452	0.4%	15.0	0.5	$ 565,800	0.5%	$1,123,359	2.0%	$ 1,412,359	7.3%
25	Heat Pumps	54	0.4%	387,755	0.3%	3,877,545	0.4%	10.0	0.9	$ 494,662	0.4%	$ 574,200	1.0%	$ 63,800	0.3%
26	Customized Project Measures - Under 5 Year Life	52	0.3%	330,672	0.3%	3,609,601	0.3%	10.9	0.8	$ 452,213	0.4%	$ 584,824	1.0%	$ 48,560	0.3%
27	Whole House Fan	90	0.6%	179,721	0.2%	3,594,417	0.3%	20.0	10.8	$ 286,929	0.2%	$ 26,520	0.0%	$ 16,575	0.1%
28	VFD - AHU	92	0.6%	233,652	0.2%	3,504,779	0.3%	15.0	14.0	$ 634,612	0.5%	$ 45,252	0.1%	$ 28,550	0.1%
29	VFD Pool Pump Packages	16	0.1%	197,429	0.2%	2,961,434	0.3%	15.0	2.3	$ 224,170	0.2%	$ 98,100	0.2%	$ 46,150	0.2%
30	Heat Pump - Upgrade	9	0.1%	284,006	0.3%	2,840,062	0.3%	10.0	7.2	$ 272,393	0.2%	$ 37,762	0.1%	$ 37,762	0.2%
31	VFR Split System AC	83	0.5%	192,365	0.2%	2,834,528	0.3%	14.7	1.5	$ 471,174	0.4%	$ 306,960	0.5%	$ 77,177	0.4%
32	ECM	20	0.1%	182,994	0.2%	2,744,906	0.3%	15.0	5.8	$ 289,736	0.2%	$ 50,298	0.1%	$ 21,165	0.1%
33	Ceiling Fans	51	0.3%	448,044	0.4%	2,240,221	0.2%	5.0	13.3	$ 300,520	0.3%	$ 22,563	0.0%	$ 132,960	0.7%
34	Solar Water Heating Incentive - Lender	33	0.2%	147,488	0.1%	2,212,319	0.2%	15.0	0.5	$ 300,448	0.3%	$ 587,400	1.0%	$ 89,000	0.5%
35	HID Pulse Start	20	0.1%	152,604	0.1%	2,136,458	0.2%	14.0	13.4	$ 243,875	0.2%	$ 18,133	0.0%	$ 30,600	0.2%
36	VFD Controlled Pool Pumps	1	0.0%	119,241	0.1%	1,192,407	0.1%	10.0	0.7	$ 106,842	0.1%	$ 147,450	0.3%	$ 37,050	0.2%
37	LED - Refrigerated Case Lighting	24	0.2%	151,436	0.1%	757,179	0.1%	5.0	0.4	$ 112,783	0.1%	$ 318,440	0.6%	$ 52,050	0.3%
38	Solar Water Heating - Commercial	51	0.3%	47,842	0.0%	717,633	0.1%	15.0	19.5	$ 257,360	0.2%	$ 13,200	0.0%	$ 14,472	0.1%
39	Refrigerator (<$600)	6	0.0%	36,497	0.0%	510,959	0.0%	14.0	1.3	$ 62,936	0.1%	$ 47,300	0.1%	$ 21,500	0.1%
40	Energy Hero Gift Packs - Akamai PowerStrips	11	0.1%	96,752	0.1%	483,761	0.0%	5.0	1.8	$ 64,946	0.1%	$ 37,026	0.1%	$ 37,445	0.2%
41	Solar Attic Fans	3	0.0%	90,092	0.1%	450,461	0.0%	5.0	1.6	$ 49,090	0.0%	$ 30,900	0.1%	$ 10,300	0.1%
42	Energy Study Assistance	-	0.0%	26,913	0.0%	376,785	0.0%	14.0	0.1	$ 29,797	0.0%	$ 335,949	0.6%	$ 302,610	1.6%
43	CEE Tier 1 - Premium Efficiency Motors	11	0.1%	23,917	0.0%	358,757	0.0%	15.0	10.7	$ 72,694	0.1%	$ 6,791	0.0%	$ 5,745	0.0%
44	ECM - Evaporator Fans	3	0.0%	23,880	0.0%	358,196	0.0%	15.0	4.1	$ 37,814	0.0%	$ 9,292	0.0%	$ 5,610	0.0%
45	Garage Active Ventilation Control	5	0.0%	45,862	0.0%	286,280	0.0%	6.2	0.2	$ 33,412	0.0%	$ 144,932	0.3%	$ 5,934	0.0%

Table 39c

PY12 TRC Measure Values - Continued

PY12 Contribution by Measure in Order of Lifetime Energy Impact - Part 3

Rank	Category	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kW Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
47	Cool Roof Technologies	8	0.1%	20,799	0.0%	211,785	0.0%	10.2	0.6	$ 56,871	0.0%	$ 102,516	0.2%	$ 20,503	0.1%
48	Induction	3	0.0%	26,514	0.0%	53,028	0.0%	2.0	1.2	$ 7,162	0.0%	$ 6,065	0.0%	$ 5,300	0.0%
49	Commercial Solar Water Heating	2	0.0%	1,868	0.0%	28,022	0.0%	15.0	2.7	$ 10,050	0.0%	$ 3,750	0.0%	$ 559	0.0%
50	Whole House Energy Metering	0	0.0%	2,545	0.0%	11,406	0.0%	4.5	0.6	$ 1,330	0.0%	$ 2,200	0.0%	$ 892	0.0%
51	Custom Packaged Proposals	8	0.1%	14,057	0.0%	6,506	0.0%	0.5	0.6	$ 2,067	0.0%	$ 3,617	0.0%	$ 3,033	0.0%
52	Room Occupancy Sensors	0	0.0%	770	0.0%	6,159	0.0%	8.0	1.1	$ 982	0.0%	$ 920	0.0%	$ 359	0.0%
53	Central AC Maintenance	1	0.0%	6,003	0.0%	6,003	0.0%	1.0	0.2	$ 1,104	0.0%	$ 6,900	0.0%	$ 1,150	0.0%
54	Dishwasher (GF)	0	0.0%	53	0.0%	640	0.0%	12.0	1.2	$ 94	0.0%	$ 80	0.0%	$ 50	0.0%
55	Custom SWH Proposals	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
56	TBD	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
57	AC Bounty (GF)	-	0.0%	-	0.0%	-	0.0%		-	$ -	0.0%	$ 50	0.0%	$ 50	0.0%
58	Central Plant Performance - Benchmark Metering	-	0.0%	-	0.0%	-	0.0%		-	$ -	0.0%	$ 749,682	1.3%	$ 536,160	2.8%
59	Central Plant Performance - Commissioning	-	0.0%	-	0.0%	-	0.0%		-	$ -	0.0%	$ 693,472	1.2%	$ 663,354	3.4%
60	CFL Exchange	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
61	Energy Hero Gift Packs	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
62	Cofunded Leveraged Project Assistance	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
63	Design Assistance - 50%	-	0.0%	-	0.0%	-	0.0%		-	$ -	0.0%	$ 25,131	0.0%	$ 12,565	0.1%
64	Solar Inspections (WAP)	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
65	Energy Project Catalyst	-	0.0%	-	0.0%	-	0.0%		-	$ -	0.0%	$ 5,301	0.0%	$ 5,301	0.0%
66	Hawaii Energy Hero Landlord Program	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
67	Solar Water Heater Tune-Ups	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
68	Hawaii Energy Hero Audits	-	0.0%	-	0.0%	-	0.0%			$ -	0.0%	$ -	0.0%	$ -	0.0%
69	**Grand Total**	**15,145**	**100%**	**113,198,801**	**100%**	**1,064,730,916**	**100%**	**9.4**	**2.1**	**$116,789,535**	**100%**	**$ 56,213,606**	**100%**	**$19,407,652**	**100%**

Table 40a
Total vs. Incremental Measure Cost - Part 1 of 2

Total and Incremental Measure Costs by Measure Sorted by Total Measure Cost - Part 1 of 2

Measure	Measure Total Cost ($)	Measure Incremental Cost ($)	Difference ($)
Solar Water Heating Incentive - Contractor	$ 15,899,400	$ 15,899,400	$ -
Customized Measures - Over 5 year Life	$ 12,379,401	$ 12,379,401	$ -
Chillers	$ 8,123,220	$ 1,624,644	$ 6,498,576
Refrigerator with Recycling	$ 7,264,800	$ 2,179,440	$ 5,085,360
T8 /T8LW	$ 6,621,040	$ 6,488,609	$ 132,431
CFL	$ 3,560,884	$ 2,672,221	$ 888,663
Clothes Washer (Tier II/III) + (Tier l GF)	$ 2,983,750	$ 596,750	$ 2,387,000
LED	$ 2,389,300	$ 1,553,045	$ 836,255
SBDI - Lighting Retrofits	$ 2,359,042	$ 2,359,042	$ -
Solar Water Heater - Grant	$ 1,123,359	$ 1,123,359	$ -
Window Tinting	$ 1,112,982	$ 278,246	$ 834,737
HVAC - Packaged/Split	$ 975,494	$ 195,099	$ 780,395
Customized Project Measures - Under 5 Year Life	$ 937,207	$ 584,824	$ 352,383
Peer Group Comparison	$ 891,460	$ 891,460	$ -
VFR - Variable Refrigerant Flow AC	$ 775,675	$ 387,838	$ 387,838
Central Plant Performance - Benchmark Metering	$ 749,682	$ 749,682	$ -
Central Plant Performance - Commissioning	$ 693,472	$ 693,472	$ -
VFD - Pump	$ 648,550	$ 162,138	$ 486,413
Condominium Submetering	$ 640,725	$ 640,725	$ -
VFR Split System AC	$ 613,919	$ 306,960	$ 306,960
Solar Water Heating Incentive - Lender	$ 587,400	$ 587,400	$ -
Heat Pumps	$ 574,200	$ 574,200	$ -
Cool Roof Technologies	$ 410,064	$ 102,516	$ 307,548
SBDI - Restaurant Lighting	$ 394,433	$ 394,433	$ -
Energy Study Assistance	$ 335,949	$ 335,949	$ -
LED - Refrigerated Case Lighting	$ 318,440	$ 318,440	$ -
Sensors	$ 318,353	$ 318,353	$ -
VFD Domestic Water Booster Packages	$ 285,000	$ 214,500	$ 70,500
Kitchen Exhaust Hood Demand Ventilation	$ 251,550	$ 251,550	$ -
Refrigerator (<$600)	$ 236,500	$ 47,300	$ 189,200
Delamp/Reflector	$ 216,760	$ 216,760	$ -
VFD Controlled Pool Pumps	$ 183,750	$ 147,450	$ 36,300
HID Pulse Start	$ 181,332	$ 18,133	$ 163,199

PORTFOLIO FOURTH YEAR IMPACTS

Table 40b

Total vs. Incremental Measure Cost - Part 2 of 2

Total and Incremental Measure Costs by Measure Sorted by Total Measure Cost - Part 2 of 2

Measure	Measure Total Cost ($)	Measure Incremental Cost ($)	Difference ($)
VFD - AHU	$ 181,007	$ 45,252	$ 135,755
Efficiency Inside Home Design	$ 147,000	$ 147,000	$ -
Ceiling Fans	$ 112,815	$ 22,563	$ 90,252
VFD Pool Pump Packages	$ 98,100	$ 98,100	$ -
Garage Refrigerator / Freezer Bounty	$ 92,625	$ 92,625	$ -
High Efficiency HVAC	$ 90,422	$ 90,422	$ -
Delamping	$ 88,400	$ 88,400	$ -
Garage Active Ventilation Control	$ 54,510	$ 54,510	$ -
ECM	$ 50,298	$ 50,298	$ -
Design Assistance - 50%	$ 50,262	$ 25,131	$ 25,131
Lanai Hui Up	$ 40,794	$ 15,594	$ 25,200
Induction	$ 40,434	$ 6,065	$ 34,369
Heat Pump - Upgrade	$ 37,762	$ 37,762	$ -
Energy Hero Gift Packs - Akamai PowerStrips	$ 37,026	$ 37,026	$ -
Solar Attic Fans	$ 30,900	$ 30,900	$ -
Whole House Fan	$ 26,520	$ 26,520	$ -
Solar Water Heating - Commercial	$ 13,200	$ 13,200	$ -
ECM - Evaporator Fans	$ 9,292	$ 9,292	$ -
Central AC Maintenance	$ 6,900	$ 6,900	$ -
CEE Tier 1 - Premium Efficiency Motors	$ 6,791	$ 6,791	$ -
Energy Project Catalyst	$ 5,301	$ 5,301	$ -
Commercial Solar Water Heating	$ 3,750	$ 3,750	$ -
Custom Packaged Proposals	$ 3,617	$ 3,617	$ -
Whole House Energy Metering	$ 2,200	$ 2,200	$ -
Room Occupancy Sensors	$ 920	$ 920	$ -
Dishwasher (GF)	$ 400	$ 80	$ 320
AC Bounty (GF)	$ 50	$ 50	$ -
Custom SWH Proposals	$ -	$ -	$ -
Solar Inspections (WAP)	$ -	$ -	$ -
Solar Water Heater Tune-Ups	$ -	$ -	$ -
Energy Hero Gift Packs	$ -	$ -	$ -
Hawaii Energy Hero Audits	$ -	$ -	$ -
Cofunded Leveraged Project Assistance	$ -	$ -	$ -
CFL Exchange	$ -	$ -	$ -
Hawaii Energy Hero Landlord Program	$ -	$ -	$ -
TBD	**$ -**	**$ -**	**$ -**

PORTFOLIO FOURTH YEAR IMPACTS

Island Equity

The Island Equity target is based on incentive dollars spent as compared to the contribution of each County towards the Public Benefits fund.

In PY12, the Program heavily invested in the County of Hawaii in two direct install programs:

- Hard-to-Reach Residential Solar Water Heating, a partnership with the Hawaii Community Economic Opportunity Council (HCEOC).
- Direct Installation Lighting Program in small businesses and restaurants.

The impact of the actual incentive distributed within each County are as follows:

- PY11 = 66% of incentive funds in Honolulu, 16% in Hawaii and 18% in Maui counties.
- PY12 = 64% of incentive funds in Honolulu, 23% in Hawaii and 13% in Maui counties as shown in **Table 41**.

Table 41
PY12 Island Equity by Business and Residential

PY12 Island Program Level Energy Savings by Business and Residential % of Total

County	Island	2012 kWh Sales*	%	Business Energy Reduction	% of Business Savings	% of Sales	Residential Energy Reduction	% of Residential Savings	% of Sales	Total Energy Reduction	% of Total Savings	% of Sales
Hawaii	Hawaii	1,085,171,000	11.8%	4,876,658	11.5%	0.4%	11,281,041	15.9%	1.0%	16,157,700	14.3%	1.5%
Honolulu	Oahu	6,975,996,000	75.8%	32,275,456	76.1%	0.5%	50,161,451	70.8%	0.7%	82,436,907	72.8%	1.2%
Maui		1,144,833,000	12.4%	5,239,652	12.4%	0.5%	9,364,543	13.2%	0.8%	14,604,194	12.9%	1.3%
	Lanai	24,857,143	0.3%	44,248	0.1%	0.2%	469,514	0.7%	1.9%	513,762	0.5%	2.1%
	Maui	1,088,547,286	11.8%	5,173,523	12.2%	0.5%	8,441,545	11.9%	0.8%	13,615,068	12.0%	1.3%
	Molokai	31,428,571	0.3%	21,881	0.1%	0.1%	453,483	0.6%	1.4%	475,364	0.4%	1.5%
Total		**9,206,000,000**	**100.0%**	**42,391,766**	**100.0%**	**0.5%**	**70,807,035**	**100.0%**	**0.8%**	**113,198,801**	**100.0%**	**1.2%**

PY12 Island Customer Level Energy Savings by Business and Residential % of Total

County	Island	2012 kWh Sales*	%	Business Energy Reduction	% of Business Savings	% of Sales	Residential Energy Reduction	% of Residential Savings	% of Sales	Total Energy Reduction	% of Total Savings	% of Sales
Hawaii	Hawaii	1,085,171,000	11.8%	6,128,765	11.7%	0.6%	14,177,506	16.2%	1.3%	20,306,271	14.5%	1.9%
Honolulu	Oahu	6,975,996,000	75.8%	39,770,586	75.9%	0.6%	61,810,146	70.5%	0.9%	101,580,731	72.5%	1.5%
Maui		1,144,833,000	12.4%	6,527,770	12.5%	0.6%	11,670,386	13.3%	1.0%	18,198,156	13.0%	1.6%
	Lanai	24,857,143	0.3%	55,324	0.1%	0.2%	587,048	0.7%	2.4%	642,373	0.5%	2.6%
	Maui	1,088,547,286	11.8%	6,445,087	12.3%	0.6%	10,516,334	12.0%	1.0%	16,961,421	12.1%	1.6%
	Molokai	31,428,571	0.3%	27,358	0.1%	0.1%	567,004	0.6%	1.8%	594,362	0.4%	1.9%
Total		**9,206,000,000**	**100.0%**	**52,427,121**	**100.0%**	**0.6%**	**87,658,038**	**100.0%**	**1.0%**	**140,085,158**	**100.0%**	**1.5%**

*Reported total sales by county in HEI's 2012 10k Annual Report filed with the Securities and Exchange Commission.

PORTFOLIO FOURTH YEAR IMPACTS

Table 42 **Island Incentive Spending by Island and Rate Schedule**									
PY12 Portfolio Incentives by Rate Schedule									
Island	**R**	**G**	**J**	**P**	**DS**	**U**	**F**	**Total**	**%**
Hawaii Island	$ 2,716,455	$ 599,727	$ 525,434	$ 504,933	$ -	$ -	$ -	$ 4,346,548	22.4%
Lanai	$ 73,080	$ 22,588	$ 1,319	$ -	$ -	$ -	$ -	$ 96,987	0.5%
Maui	$ 1,098,801	$ 174,079	$ 235,485	$ 605,311	$ -	$ -	$ 80	$ 2,113,755	10.9%
Molokai	$ 71,040	$ 279	$ 2,848	$ -	$ -	$ -	$ -	$ 74,167	0.4%
Oahu	$ 4,831,637	$ 1,235,409	$ 2,344,597	$ 3,682,861	$ 681,195	$ 496	$ -	$ 12,776,194	65.8%
Total	$ 8,791,013	$ 2,032,082	$ 3,109,681	$ 4,793,105	$ 681,195	$ 496	$ 80	$ 19,407,652	100.0%
%	45.3%	10.5%	16.0%	24.7%	3.5%	0.0%	0.0%	100.0%	

Table 43 shows the island equity by program budget category. In total, energy-saving achievement was distributed as follows:

- PY11 = 78.9% in Honolulu, 11.4% in Hawaii and 9.7% in Maui counties.
- PY12 = 72.8% in Honolulu, 14.3% in Hawaii and 12.9% in Maui counties.

Table 43 **Island Equity by Program**							
PY12 Island Equity by Program Level Savings by Program (First Year kWh Savings)							
Program	**Hawaii Island**	**Lanai**	**Maui**	**Molokai**	**Oahu**	**Total**	**%**
Business Program	**4,876,658**	**44,248**	**5,173,523**	**21,881**	**32,275,456**	**42,391,766**	**37.4%**
BEEM	2,871,960	-	3,467,574	17,367	18,644,228	25,001,128	22.1%
CBEEM	772,829	7,324	1,236,412	4,514	10,823,221	12,844,300	11.3%
BESM	973,760	18,114	355,132	-	2,203,066	3,550,072	3.1%
BHTR	258,109	18,809	114,405	-	604,942	996,266	0.9%
Residential Program	**11,281,041**	**469,514**	**8,441,545**	**453,483**	**50,161,451**	**70,807,035**	**62.6%**
REEM	10,983,951	449,791	8,402,008	453,483	49,537,143	69,826,376	61.7%
CESH	-	-	-	-	-	-	0.0%
RESM	12,756	-	3,635	-	578,132	594,523	0.5%
RHTR	284,335	19,723	35,903	-	46,176	386,136	0.3%
Grand Total	**16,157,700**	**513,762**	**13,615,068**	**475,364**	**82,436,907**	**113,198,801**	**100.0%**
%	**14.3%**	**0.5%**	**12.0%**	**0.4%**	**72.8%**	**100.0%**	
Program	**Hawaii Island**	**Lanai**	**Maui**	**Molokai**	**Oahu**	**Total**	**%**
Business	4,876,658	44,248	5,173,523	21,881	32,275,456	42,391,766	37.4%
Residential	11,281,041	469,514	8,441,545	453,483	50,161,451	70,807,035	62.6%
Total	**16,157,700**	**513,762**	**13,615,068**	**475,364**	**82,436,907**	**113,198,801**	**100.0%**
%	**14.3%**	**0.5%**	**12.0%**	**0.4%**	**72.8%**	**100.0%**	

PORTFOLIO FOURTH YEAR IMPACTS

Table 44 shows island equity by incentive dollars spent and the resulting customer bill savings. In aggregate, ratepayers realized a $45,054,796 reduction in their bills in PY12.

Table 44
Incentive Equity by Program and Customer Bill Savings

PY12 Island Equity by Incentive by Program (Incentive Dollars Spent)

Program	Hawaii Island	Lanai	Maui	Molokai	Oahu	Total	%
Business Program	**$ 1,603,529**	**$ 24,432**	**$ 1,015,716**	**$ 3,127**	**$ 7,709,672**	**$ 10,356,475**	**53.4%**
BEEM	$ 505,013	-	$ 608,807	$ 2,848	$ 2,866,272	$ 3,982,940	20.5%
CBEEM	$ 119,383	$ 741	$ 182,828	$ 279	$ 1,738,360	$ 2,041,590	10.5%
BESM	$ 833,202	$ 12,464	$ 176,149	-	$ 2,857,217	$ 3,879,032	20.0%
BHTR	$ 145,930	$ 11,228	$ 47,932	-	247,823	$ 452,913	2.3%
Residential Program	**$ 2,743,020**	**$ 72,555**	**$ 1,098,039**	**$ 71,040**	**$ 5,066,523**	**$ 9,051,177**	**46.6%**
REEM	$ 1,354,799	$ 68,805	$ 1,060,775	$ 71,040	$ 4,888,625	$ 7,444,044	38.4%
CESH	-	-	-	-	-	-	0.0%
RESM	$ 2,733	-	$ 750	-	$ 147,700	$ 151,183	0.8%
RHTR	$ 1,385,488	$ 3,750	$ 36,514	-	$ 30,198	$ 1,455,950	7.5%
Total	**$ 4,346,548**	**$ 96,987**	**$ 2,113,755**	**$ 74,167**	**$ 12,776,194**	**$ 19,407,652**	**100.0%**
%	**22.4%**	**0.5%**	**10.9%**	**0.4%**	**65.8%**	**100.0%**	

Program	Hawaii Island	Lanai	Maui	Molokai	Oahu	Total	%
Business	$ 1,603,529	$ 24,432	$ 1,015,716	$ 3,127	$ 7,709,672	$ 10,356,475	53.4%
Residential	$ 2,743,020	$ 72,555	$ 1,098,039	$ 71,040	$ 5,066,523	$ 9,051,177	46.6%
Total	**$ 4,346,548**	**$ 96,987**	**$ 2,113,755**	**$ 74,167**	**$ 12,776,194**	**$ 19,407,652**	**100.0%**

Customer Bill Reduction (July 2013 effective marginal kWh rates)*

Island	Hawaii Island	Lanai	Maui	Molokai	Oahu	Total	
First Year Bill Savings	$ 7,900,581	$ 302,363	$ 5,993,087	$ 273,401	$ 30,585,373	$ 45,054,796	
Lifetime Bill Savings	$ 66,431,933	$ 812,378	$ 54,613,735	$ 463,762	$ 282,630,900	$ 404,952,708	

*Reference **Table 1** PY12 Customer Energy Cost Savings (page10)

BUSINESS PROGRAM PERFORMANCE

Business Program Impacts

For PY12, Hawaii Energy's Business program achieved savings of 42,391,766 kWh (first year) and 5,512 kW savings with $10,356,475 in incentives. In relative terms, 53.4% of Hawaii Energy's incentives captured 37.4% of kWh (first year) and 36.4% of kW demand first year savings, respectively, with a Total Resource Benefit to Cost ratio of 2.0.

Table 45 provides a detailed breakdown by program with a closer look at each program to follow.

The University of Hawaii Community College System adopted energy efficiency measures for their campuses which will save them more than $3.7 million dollars over the next 14 years. This savings will allow the colleges to reinvest money back into the students. The project included low wattage T8 fluorescent lamps, LED parking lot lighting, HVAC upgrades and vending machine controls.

Table 45
Business Program Impacts

PY12 Business Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
BEEM	119,795	3,417	62%	25,001,128	59%	328,154,362	57%	13.1	2.8	$ 33,839,141	57%	$ 12,103,633	41%	$ 3,982,940	38%
CBEEM	341	1,720	31%	12,844,300	30%	179,827,666	31%	14.0	1.5	$ 19,442,140	33%	$ 13,109,157	44%	$ 2,041,590	20%
BESM	31,406	259	5%	3,550,072	8%	49,701,010	9%	14.0	1.2	$ 4,902,114	8%	$ 4,168,577	14%	$ 3,879,032	37%
BHTR	6,338	116	2%	996,266	2%	14,012,669	2%	14.1	3.4	$ 1,543,451	3%	$ 450,233	2%	$ 452,913	4%
Total	**157,880**	**5,512**	**100%**	**42,391,766**	**100%**	**571,695,706**	**100%**	**13.5**	**2.0**	**$ 59,726,846**	**100%**	**$ 29,831,600**	**100%**	**$ 10,356,475**	**100%**

BUSINESS PROGRAM PERFORMANCE

For PY12, Hawaii Energy's Business program realized results by continuing to offer programs, services, measures and related incentives to address opportunities in the marketplace and accelerate the adoption of energy-efficient technologies.

A number of the Program's offers are highlighted below as examples of driving energy efficiency projects through productive collaboration with customers, manufacturers, facility management firms, consultants and contractors that produced impressive results.

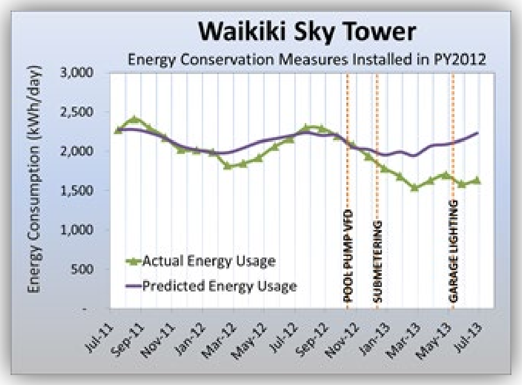
- **Central Plant Optimization Program**

  This complex offer was phased out in PY12 due to relatively low cost-effectiveness and mixed results and replaced with our benchmarking offer. Before phase out, the program incentivized the completion of six projects. These projects show potential for significant savings. Hawaii Energy, in coordination with the customers, is currently in the data collection phase and anticipates final reports in PY13. Significant hurdles regarding information technology, customer contracting procedures, contractor business models, cost and quality control, and metering and sensor technology had to be overcome to bring six central plants online with permanent kW/ton data, as well as detailed energy data to the component level. Along with this data collection was a chiller plant retro-commissioning effort, which was the optimization component of this offering. The initial savings projections from the first project are very encouraging and achieved 687,022 kWh savings in the eight months since project completion. These savings will be permanent and will likely improve with operational refinements and future capital investment. Although initial savings projections are considerable, they will not be claimed until PY13.

  For businesses with a central chiller plant, this program sought to install a central chiller plant metering and data logging system at no cost to the customer. Such systems provide actual tons of cooling and measured efficiency (i.e., kW per ton) in real-time and historical trends, while providing the capacity for businesses to take next steps in improving their energy efficiency. This offering provided an incentive of $663,354 for six projects in PY12. Due to the length of time to optimize the central plant operation, energy savings will be realized in PY13.

- **Condominium Submetering**

  Requiring significant effort by Program specialists to assist condominium boards and condominium and apartment residents to save energy, the continuation of this program in PY12 saw eight additional successful installations of submetering at major condominium or apartment complexes. In total, Hawaii Energy paid out $269,250 in incentives for the installation of submeters on 1,795 individual units. These facilities are expected to save more than 143 kW in demand reductions and approximately 1.1 million kWh in annual tenant energy usage.



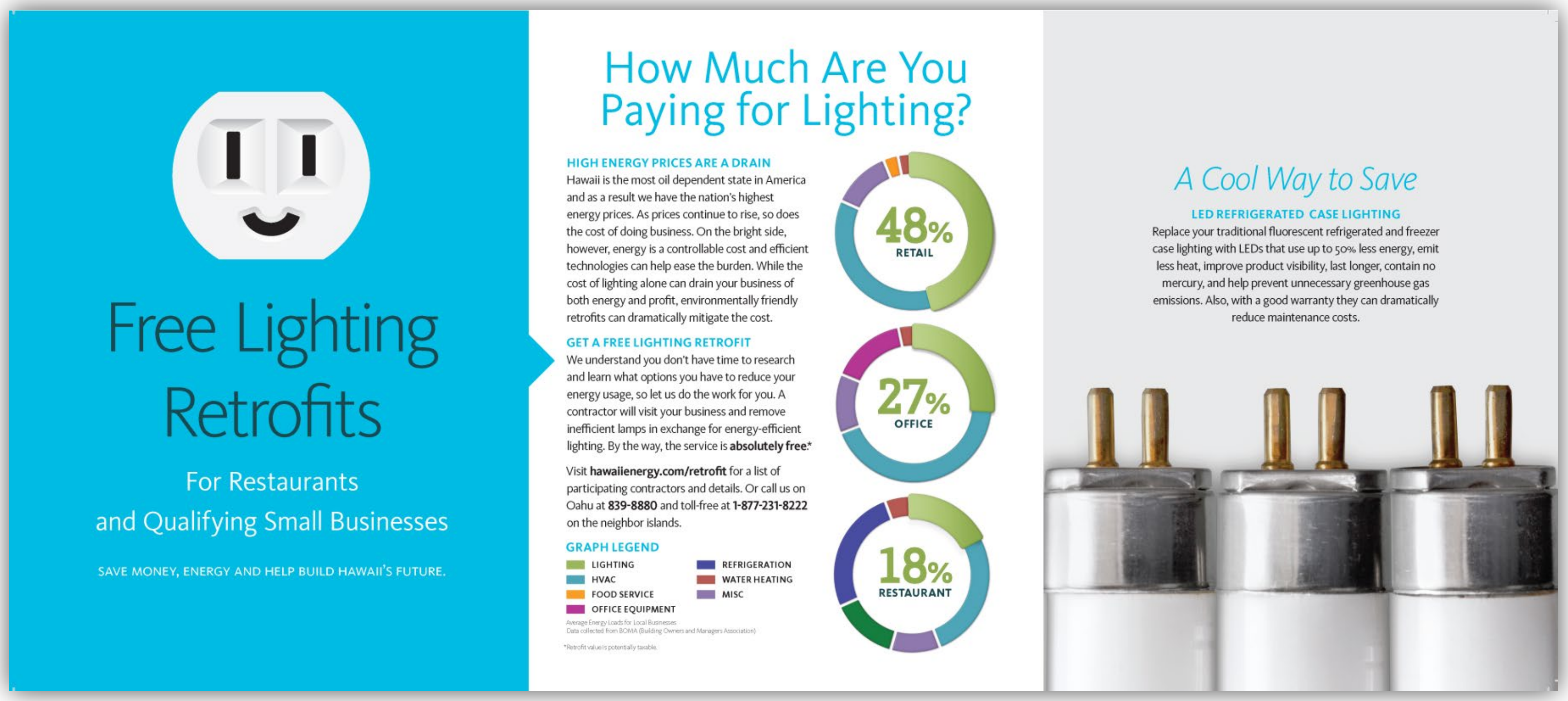
Waikiki Sky Tower is a 30-story condominium building in the Waikiki area of Honolulu. The average daily energy usage in the month of July 2012 was 2,194 kWh. During PY12, the management at Waikiki Sky Tower installed several new energy conservation measures, including a new VFD on the pool pump, residential unit submetering, and reduced wattage garage lighting. By July 2013, the average daily energy usage had dropped to 1,636 kWh, a reduction of 25%. As illustrated by the graph, submetering accounted for a large portion of this decline in energy usage. This declining pattern is very common with condominium associations when residents change their behavior because they are now financially responsible for their own energy usage.

- **Central Chiller Plant Benchmarking Program**

  In PY11, the Central Plant Optimization Program was introduced. One of the findings of this program was that many large commercial facilities did not have sufficient operational and performance data of their central plants to make informed decisions regarding plant optimization. In response to this and other obstacles, the Central Chiller Plant Benchmarking Program was established in PY12. This program, which was not originally included in the PY12 Annual Plan, would eventually replace the Central Plant Optimization Program. The intent of the program is to incentivize certain large local facility operators to install the metering necessary to monitor performance of their chilled water plants. With accurate, real-time operational and efficiency information, building engineers and managers are able to make smarter decisions related to operations, maintenance and capital investment in their facility. For example, a large resort on Hawaii Island installed benchmark metering and was able to determine that their newly-purchased chiller was not performing as efficiently as expected. As a result, they are collaborating with the chiller contractor and Hawaii Energy to resolve the problem. For engineers at Hawaii Energy, having access to real-time and trend data for a variety of applications is an invaluable resource.

- **Small Business Direct Install Lighting (SBDIL)**

  This offer provided full-cost lighting retrofits to 583 small businesses and restaurants to achieve 77,338,924 kWh/Life in customer level savings. The $2,753,475 of PBFA funds invested into these projects are now producing over $1,909,914 in annual savings for these businesses. This is a 69% annual Internal Rate of Return (IRR) and will achieve over $26.7 M in lifetime cost savings.



BUSINESS PROGRAM PERFORMANCE

Business Program Expenditures

The Hawaii Energy commercial team broadened its focus beyond the BEEM and CBEEM Program in PY12, with particular attention to the hard-to-reach sector (BHTR) and energy service and maintenance (BESM). Notable this year was the $4,350,788 spent in customer incentives in the BHTR and BESM programs, an increase of over 430% over the $1,010,674 spent on customer incentives for these two programs in the previous program year.

See **Table 46** for the detailed expenditures and unspent funds.

Table 46
Business Program Expenditures

	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
Business (C&I) Programs					
Business Programs Ops and Management					
BEEM	$ 1,062,925.22	$ 1,311,945	81%	$ 249,019.78	19%
CBEEM	$ 851,357.70	$ 865,678	98%	$ 14,320.30	2%
BESM	$ 651,976.28	$ 656,296	99%	$ 4,319.72	1%
BHTR	$ 417,188.44	$ 498,320	84%	$ 81,131.56	16%
Total Business Programs	$ 2,983,447.64	$ 3,332,239	90%	$ 348,791.36	10%
Business Market Evaluation	$ 116,463.75	$ 255,550	46%	$ 139,086.25	54%
Business Outreach	$ 1,084,114.96	$ 1,324,895	82%	$ 240,780.04	18%
Total Business Non-Incentive	$ 4,184,026.35	$ 4,912,684	85%	$ 728,657.65	15%
Business Incentives					
BEEM	$ 4,005,628.00	$ 4,122,730	97%	$ 117,102.00	3%
CBEEM	$ 2,012,703.59	$ 2,049,000	98%	$ 36,296.41	2%
BESM	$ 3,879,032.04	$ 4,588,647	85%	$ 709,614.96	15%
BHTR	$ 471,756.11	$ 1,140,000	41%	$ 668,243.89	59%
Subtotal Business Incentives	$ 10,369,119.74	$ 11,900,377	87%	$ 1,531,257.26	13%
Business Transformational	$ 1,346,967.20	$ 1,428,224	94%	$ 81,256.80	6%
Total Business Incentives	$ 11,716,086.94	$ 13,328,601	88%	$ 1,612,514.06	12%
Total Business Programs	**$ 15,900,113.29**	**$ 18,241,285**	87%	**$ 2,341,171.71**	13%

BUSINESS PROGRAM PERFORMANCE

Business Trade Allies

Background

Trade allies include product manufacturers, wholesale and retail suppliers, equipment contractors, architects, engineers and electricians. These individuals and companies are those on the front lines directly responsible for energy efficiency measures being sold, designed, financed, installed, commissioned and maintained. By working with them, the Program is successful in uncovering opportunities for partnerships with trade allies that leverage resources to promote energy conservation and efficiency.

Trade Ally Program Feedback

Hawaii Energy incorporates trade ally perspectives and concerns in the program planning process to establish well-supported, effective strategies. Developing a successful relationship with these industry leaders attracts other groups over time. Industry groups are one way Hawaii Energy incorporates the views of representatives of key trade groups. By sharing insights and experiences on different technology and equipment performance with the trade allies, the Program's knowledge and awareness of different market segments are enhanced, thus helping to influence customer's energy-saving decisions. See **Table 47** for details.

Ongoing Training

To be on the cutting edge of the conservation and efficiency field, Hawaii Energy provides ongoing training and support for the trade allies. Hawaii Energy has developed a strong training program for lighting and HVAC contractors, mechanical contractors, architects and engineers participating in its business incentive program. Educational and promotional workshops are conducted to influence commercial purchase decisions.

Table 47 **Business Trade Ally Projects**							
	Trade Allies	**Measures**	**Customer Level Demand Savings (kW)**	**Customer Level Energy Savings (kWh - 1st yr.)**	**Customer Level Energy Savings (kWh - Life)**	**Cumulative Customer Level Energy Savings (%)**	**Incentives**
1	Participant Driven	574	2,111	15,928,505	203,556,815	28.8%	$ 2,002,895
2	Noresco	34	367	3,280,451	44,934,411	6.4%	$ 309,408
3	Energy Industries	585	408	3,184,818	44,034,811	6.2%	$ 634,004
4	Pono Energy Solutions	1,840	142	3,068,536	42,995,694	6.1%	$ 1,855,924
5	EMCC	174	263	2,506,516	34,874,832	4.9%	$ 473,777
6	Johnson Controls	45	382	1,883,351	27,740,383	3.9%	$ 258,461
7	Island Palm Communities (Actus)	30	145	1,283,351	25,854,639	3.7%	$ 253,969
8	Hawaii Energy Systems	5	219	1,638,750	24,565,500	3.5%	$ 218,500
9	Gon LED	19	216	1,717,368	24,428,576	3.5%	$ 170,965
10	Hawaii Energy - Program Grants	148	177	1,508,869	22,633,040	3.2%	$ 163,759
11	Norman Wright	6	178	817,870	14,742,692	2.1%	$ 155,659
12	Kobayashi Group	8	131	1,102,185	14,685,802	2.1%	$ 97,365
13	Lighting Services Inc.	314	137	1,000,066	13,753,083	1.9%	$ 260,652
14	Forest City	7	53	471,322	11,621,564	1.6%	$ 137,120
15	Quality Mechanical Design, Llc	1	51	448,517	11,212,925	1.6%	$ 73,678
16	Paradise Lighting	155	83	688,962	9,347,637	1.3%	$ 175,971
17	21st Century Lighting	64	85	654,460	8,851,158	1.3%	$ 64,669
18	Sylvania Lighting Services	29	96	629,871	8,579,681	1.2%	$ 45,860
19	Energy Metering And Monitoring Systems	1	117	995,070	7,960,560	1.1%	$ 153,750
20	Dial Electric Supply	27	96	945,295	6,642,679	0.9%	$ 53,834
21	Dorvin D Leis	4	54	299,224	5,773,860	0.8%	$ 59,600
22	Al&E	21	69	487,322	5,585,004	0.8%	$ 61,719
23	T & T Tinting Specialists	17	138	518,441	5,184,409	0.7%	$ 109,066
24	Mattos Electric Llc	106	37	305,778	4,308,534	0.6%	$ 126,844
25	Melink Corporation	2	44	259,351	3,890,258	0.6%	$ 69,375
26	Grainger - Hawaii	9	34	249,613	3,688,677	0.5%	$ 26,255
27	Trane	3	36	186,496	3,565,483	0.5%	$ 25,500
28	King'S Kustom Tinting	7	94	354,866	3,548,661	0.5%	$ 72,422
29	Servco Appliance	21	11	251,528	3,521,392	0.5%	$ 16,450
30	Light Bulb Source	10	40	355,101	3,508,372	0.5%	$ 39,846
	Remaining Balance of Projects	1,051	803	5,405,268	61,548,719	8.7%	$ 2,189,181
	Total Business Programs	**5,317**	**6,816**	**52,427,121**	**707,139,849**	**100.0%**	**$ 10,356,475**

BUSINESS PROGRAM PERFORMANCE

Business Energy Efficiency Measures (BEEM) Program

BEEM Program Objective

The objective of this program is to acquire electric energy and demand savings through customer installations of standard, known energy efficiency technologies by applying prescriptive incentives in a streamlined application process.

Measures incentivized through BEEM include:

- High Efficiency Lighting
- High Efficiency HVAC such as water-cooled chiller, variable refrigerant flows (VRF) and packaged & split systems
- CEE Premium Efficiency Motors
- High Efficiency Water Heating
- Variable Frequency Drives (VFDs) connecting to pool pumps, chilled water pumps, condenser water pumps and air handling units
- Window Tinting
- Cool Roof Technology
- ENERGY STAR® Refrigerator

Located in the heart of Waikiki, the Hilton Hawaiian Village Waikiki Beach Resort utilized our incentive offers by installing variable frequency drives (VFD) to the motors of chilled water pumps and chilled water pump returns, as well as replacing three old booster pumps. Through these measures, it is estimated that the hotel will save over 397,000 kWh per year, which equates to approximately $107,190 in energy costs per year.

BEEM Program Accomplishments

ENERGY STAR® LED

The number of approved ENERGY STAR® LED lamps continued to increase in Program Year 2012, allowing Hawaii Energy to continue offering a prescriptive incentive for ENERGY STAR® LED lamps. This LED offering achieved energy savings of 4,514,505 kWh this past year or 18% of the total BEEM program energy savings. In addition to increasing the usage of LEDs, the offering encouraged customers to upgrade their lighting controls by providing higher incentives for dimmable LED lamps. With dimmable LED lamps customers can achieve even more energy savings.

Condominium Submetering

The offering was designed to ensure fairness when allocating energy costs among dwellings, as well as to encourage energy conservation through direct feedback and financial responsibility for personal energy use. For AOAOs, submetering presented a great opportunity to eliminate their largest variable cost: energy. This program was initially developed in PY10 and the first projects were completed in PY11, but this year the program generated a number of successful installations. In total, 1,795 submeters were installed on individual apartments and condominium units in PY12 resulting in 1,134,484 kWh first year energy savings. This was an increase in savings from this measure by more than ten times over the previous year.

Lahaina Printsellers located on Maui installed energy-efficient LED lighting and an inverter variable refrigerant flow air conditioning system to help save their retail store money and energy.

BEEM Program Impacts

For PY12, the BEEM Program achieved savings of 25,001,128 kWh (first year) and 3,417 kW savings with $3,982,940 in incentives. In relative terms, 20.5% of Hawaii Energy's incentives captured 22.1% kWh (first year) and 22.6% kW of the demand first year savings for PY12.

Table 48 provides further details.

- # 1 Contributor to BEEM – T8/T8LW High Efficiency Lighting (26%)

  T8 to T8 low wattage lighting was the largest contributor to the BEEM Program savings with energy (first year) and demand savings of 6,457,585 kWh and 690 kW, respectively.

- # 2 Contributor to BEEM – LED Lamps (18%)

  LED lamps were the second largest contributor to the BEEM Program savings with energy (first year) and demand savings of 4,514,505 kWh and 586 kW, respectively.

Ala Moana Hotel installed energy management systems to the air conditioners in each of their guestrooms. Through the use of occupancy sensors, these controls set back the air conditioners to a preset temperature when the room is empty.

BUSINESS PROGRAM PERFORMANCE

Table 48
BEEM Program Impacts

PY12 BEEM - Business Energy Efficiency Measures Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB /TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
T8 /T8LW	52,512	690	20%	6,457,585	26%	90,400,263	28%	14	1.5	$ 9,737,705	29%	$ 6,488,609	54%	$ 944,899	24%
Chillers	26	284	8%	1,432,943	6%	28,658,861	9%	20	2.1	$ 3,343,658	10%	$ 1,624,644	13%	$ 322,145	8%
LED	30,045	586	17%	4,514,505	18%	67,480,423	21%	14.9	8.5	$ 3,322,140	10%	$ 390,585	3%	$ 503,968	13%
VFD - Pump	58	377	11%	1,390,718	6%	18,791,231	6%	13.5	15.2	$ 2,464,458	7%	$ 162,138	1%	$ 152,600	4%
HVAC - Packaged/Split	969	209	6%	1,385,188	6%	20,777,818	6%	15	12.5	$ 2,429,043	7%	$ 195,099	2%	$ 563,956	14%
Delamping	7,922	126	4%	1,385,780	6%	19,400,914	6%	14	22.7	$ 2,008,973	6%	$ 88,400	1%	$ 76,270	2%
Window Tinting	52	289	8%	1,088,902	4%	10,889,020	3%	10	6.4	$ 1,789,843	5%	$ 278,246	2%	$ 276,962	7%
Condominium Submetering	1,795	143	4%	1,134,484	5%	9,530,628	3%	8.4	2.5	$ 1,606,630	5%	$ 640,725	5%	$ 269,250	7%
Delamp/Reflector	6,786	107	3%	1,068,743	4%	14,962,400	5%	14	7.3	$ 1,583,707	5%	$ 216,760	2%	$ 118,045	3%
CFL	11,898	185	5%	1,784,176	7%	5,352,528	2%	3	40.3	$ 718,365	2%	$ 17,846	0%	$ 29,031	1%
VFD - AHU	41	92	3%	233,652	1%	3,504,779	1%	15	14	$ 634,612	2%	$ 45,252	0%	$ 28,550	1%
VFD Domestic Water Booster Packages	13	41	1%	381,392	2%	5,720,877	2%	15	2.8	$ 602,707	2%	$ 214,500	2%	$ 50,200	1%
Refrigerator with Recycling	630	17	1%	419,633	2%	5,874,860	2%	14	4.2	$ 530,000	2%	$ 125,280	1%	$ 57,340	1%
Sensors	4,361	24	1%	584,435	2%	4,675,479	1%	8	1.5	$ 482,423	1%	$ 318,353	3%	$ 87,220	2%
VFR - Variable Refrigerant Flow AC	163	29	1%	306,712	1%	4,600,682	1%	15	1.2	$ 470,745	1%	$ 387,838	3%	$ 160,179	4%
Kitchen Exhaust Hood Demand Ventilation	8	40	1%	231,687	1%	3,475,311	1%	15	2.2	$ 424,637	1%	$ 195,750	2%	$ 76,200	2%
ECM	249	20	1%	182,994	1%	2,744,906	1%	15	5.8	$ 289,736	1%	$ 50,298	0%	$ 21,165	1%
Heat Pump - Upgrade	5	9	0%	284,006	1%	2,840,062	1%	10	7.2	$ 272,393	1%	$ 37,762	0%	$ 37,762	1%
Solar Water Heating - Commercial	30	51	2%	47,842	0%	717,633	0%	15	19.5	$ 257,360	1%	$ 13,200	0%	$ 14,472	0%
HID Pulse Start	621	20	1%	152,604	1%	2,136,458	1%	14	13.4	$ 243,875	1%	$ 18,133	0%	$ 30,600	1%
VFD Pool Pump Packages	26	16	0%	197,429	1%	2,961,434	1%	15	2.3	$ 224,170	1%	$ 98,100	1%	$ 46,150	1%
LED - Refrigerated Case Lighting	838	24	1%	151,436	1%	757,179	0%	5	0.4	$ 112,783	0%	$ 318,440	3%	$ 52,050	1%
CEE Tier 1 - Premium Efficiency Motors	38	11	0%	23,917	0%	358,757	0%	15	10.7	$ 72,694	0%	$ 6,791	0%	$ 5,745	0%
Cool Roof Technologies	6	8	0%	20,799	0%	211,785	0%	10.2	0.6	$ 56,871	0%	$ 102,516	1%	$ 20,503	1%
Clothes Washer (Tier II/III) + (Tier I GF)	222	5	0%	37,055	0%	435,641	0%	11.8	2.2	$ 53,044	0%	$ 24,420	0%	$ 12,450	0%
ECM - Evaporator Fans	66	3	0%	23,880	0%	358,196	0%	15	4.1	$ 37,814	0%	$ 9,292	0%	$ 5,610	0%
Ceiling Fans	204	3	0%	27,424	0%	137,119	0%	5	14.3	$ 18,388	0%	$ 1,287	0%	$ 8,160	0%
Garage Refrigerator / Freezer Bounty	21	0	0%	12,404	0%	173,661	0%	14	9.9	$ 15,588	0%	$ 1,575	0%	$ 925	0%
Commercial Solar Water Heating	1	2	0%	1,868	0%	28,022	0%	15	2.7	$ 10,050	0%	$ 3,750	0%	$ 559	0%
Induction	138	3	0%	26,514	0%	53,028	0%	2	1.2	$ 7,162	0%	$ 6,065	0%	$ 5,300	0%
Refrigerator (<$600)	46	1	0%	3,906	0%	54,677	0%	14	1.3	$ 6,736	0%	$ 5,060	0%	$ 2,300	0%
Solar Water Heating Incentive - Contractor	2	1	0%	3,286	0%	49,294	0%	15	0.5	$ 6,694	0%	$ 13,200	0%	$ 1,900	0%
Heat Pumps	2	0	0%	2,416	0%	24,157	0%	10	0.9	$ 3,082	0%	$ 3,600	0%	$ 400	0%
Whole House Fan	1	0	0%	814	0%	16,280	0%	20	8.8	$ 1,055	0%	$ 120	0%	$ 75	0%
Grand Total	**119,795**	**3,417**	**100%**	**25,001,128**	**100%**	**328,154,362**	**100%**	**13.1**	**2.8**	**$33,839,141**	**100%**	**$ 2,103,633**	**100%**	**$3,982,940**	**100%**

BEEM Program Expenditures

The Program distributed nearly all BEEM operation and incentive budgets due to the popularity and demand for the program's offerings. During the Program's year-end reconciliation process, a discrepancy of ($22,688) was discovered, bringing the total BEEM expenditure down to $3,982,940 from an invoiced amount of $4,005,628 in incentives.

See **Table 49** for details.

Table 49
BEEM Program Expenditures

	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
BEEM Operations	$ 1,062,925.22	$ 1,311,945	81%	$ 249,019.78	19%
BEEM Incentives	$ 4,005,628.00	$ 4,122,730	97%	$ 117,102.00	3%
Total BEEM	$ 5,068,553.22	$ 5,434,675	93%	$ 366,121.78	7%

BUSINESS PROGRAM PERFORMANCE

Customized Business Energy Efficiency Measures (CBEEM) Program

CBEEM Program Objective

The objective of this program is to provide a custom application and approval process for participants to receive incentives for installing non-standard energy efficiency technologies. The commercial and industrial custom incentives enable customers to invest in energy efficiency opportunities related to manufacturing processes and other technology measures that may require calculations of energy savings on a case-by-case basis for specific, unique applications.

Custom incentives are available for all energy-savings opportunities that are not already covered by the prescribed incentives and are not limited to a certain list of measures. Some examples of custom technologies include, but are not limited to, energy management systems, exhaust ventilation control systems, high performance lighting, low emissivity glass and HVAC controls.

CBEEM Program Accomplishments

Garage Active Ventilation Control

The offering targeted parking garages that are mechanically ventilated 24 hours a day, 7 days a week. Since ventilation systems are designed for maximum capacity conditions, there were opportunities to reduce the operating speeds and runtimes during times of lower traffic periods. The incentive for energy savings was 14 cents/kWh (not to exceed project cost), but no demand savings incentive was given. Energy savings of 45,862 kWh and demand savings of 5 kW were achieved in PY12.

Y. Hata & Co., a Hawaii food service distributor, saved over 340,000 kWh per year, which equates to approximately a $91,800 savings in energy costs per year by replacing the lighting in their warehouse to LED fixtures and utilizing motion detectors.

BUSINESS PROGRAM PERFORMANCE

CBEEM Program Impacts

For PY12, the CBEEM Program achieved savings of 12,844,300 kWh (first year) and 1,720 kW savings with $2,041,590 in incentives. In relative terms, 10.5% of Hawaii Energy's incentives captured 11.4% kWh (first year) and 11.3 % kW of the demand first year savings for PY12. **Table 50** provides a detailed breakout of the program.

- **#1 Contributor to CBEEM – Customized Measures – Over 5 Year Life (97%)**

  A variety of measures with life expectancies of greater than 5 years were the largest contributor to CBEEM Program savings with energy (first year) and demand savings of 12,467,766 kWh and 1,664 kW, respectively.

- **#2 Contributor to CBEEM – Customized Measures – Under 5 Year Life (3%)**

  Customized measure with life expectancies of less than 5 years, primarily custom applications of LED technologies were the second largest contributor to CBEEM Program savings with energy (first year) and demand savings of 330,672 kWh and 52 kW, respectively.

Table 50
CBEEM Program Impacts

PY12 CBEEM - Customized Business Energy Efficiency Measures Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
Customized Measures - Over 5 year Life	330	1,664	97%	12,467,766	97%	175,931,784	98%	14.1	1.5	$ 18,956,515	98%	$ 12,379,401	94%	$ 1,987,096	97%
Customized Project Measures - Under 5 Year Life	9	52	3%	330,672	3%	3,609,601	2%	10.9	0.8	$ 452,213	2%	$ 584,824	4%	$ 48,560	2%
Garage Active Ventilation Control	1	5	0%	40,166	0%	200,828	0%	5.0	0.5	$ 26,801	0%	$ 54,510	0%	$ 4,657	0%
High Efficiency HVAC	1	-	0%	5,697	0%	85,452	0%	15.0	0.1	$ 6,611	0%	$ 90,422	1%	$ 1,277	0%
Co-funded Leveraged Project Assistance	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Total	**341**	**1,720**	**100%**	**12,844,300**	**100%**	**179,827,666**	**100%**	**14.0**	**1.5**	**$ 19,442,140**	**100%**	**$ 13,109,157**	**100%**	**$ 2,041,590**	**100%**

CBEEM Program Expenditures

The Program distributed nearly all CBEEM operation and incentive budgets due to the popularity and demand for the Program offerings. During the Program's year-end reconciliation process, a discrepancy of $28,886.41 was discovered, bringing the total CBEEM expenditure up to $2,041,590 from an invoiced amount of $2,012,703.59 in incentives.

See **Table 51** for details.

Table 51
CBEEM Program Expenditures

	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
CBEEM Operations	$ 851,357.70	$ 865,678	98%	$ 14,320.30	2%
CBEEM Incentives	$ 2,012,703.59	$ 2,049,000	98%	$ 36,296.41	2%
Total CBEEM	$ 2,864,061.29	$ 2,914,678	98%	$ 50,616.71	2%

BUSINESS PROGRAM PERFORMANCE

Business Energy Service and Maintenance (BESM) Program

BESM Program Objective

The objective of this program was to help target sectors that are currently underserved such as retail and small businesses. Additionally, this program conducted a more aggressive outreach effort to lighting and electrical contractors by offering training, education, promotional materials and frequent communications on program updates.

Through their participation in our Small Business Direct Install Lighting offer, The Mike Carroll Gallery located on Lanai experienced a 40% energy drop.

BESM Program Accomplishments

Small Business Direct Install Lighting (SBDIL)

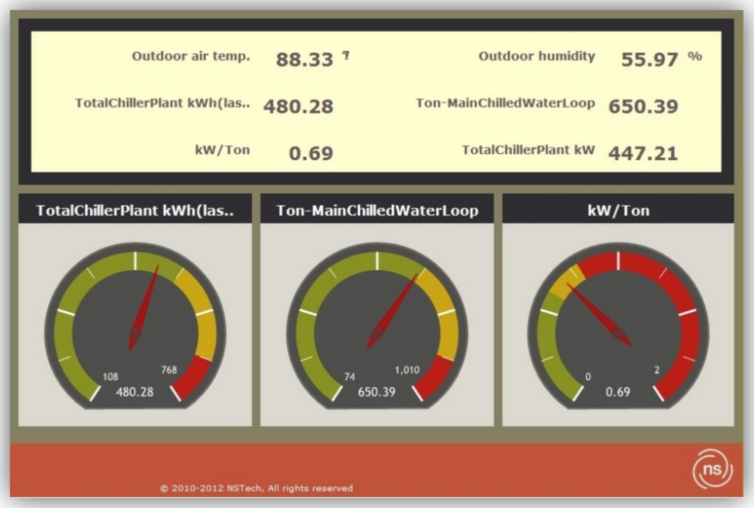
This offering targeted small businesses that have limited time and expertise to research lighting technology options, secure financing and hire contractors to replace their older, less efficient lighting technologies. This offering provided full energy-efficient lighting retrofits to small businesses in Hawaii, Honolulu and Maui counties. Small business customers that were either (1) a Schedule "G" rate class or (2) under master-metered accounts were eligible for this offer. However, in delivering this program Hawaii Energy discovered a number of customers that were actually small business but were either miscoded as residential customers (schedule R) within the utilities' records or were previous residences that were converted to businesses. Since site visits are required for participation in the program, it is easy enough to determine if a particular location is actually a residence or a business. Since it would be counter-productive and unfair to deny participation to these businesses, just because of an account classification error, Hawaii Energy allowed these installations in this program and provided this information to the respective utility for them to update their records.

In the SBDIL program, Trade Allies recruited small businesses to participate, performed audits and executed the retrofits. This direct installation grant approach achieved first year customer level energy savings of 3,523,159 kWh in PY12, excluding the impacts from the SBDIL specifically for restaurants. This level of energy savings was more than double the previous year's energy savings for this program. Demand savings from this program in PY12 was 259 kW.

BUSINESS PROGRAM PERFORMANCE

Central Plant Optimization Program

This complex offer was phased out in PY12 due to cost effectiveness and mixed results and replaced with our benchmarking offer. Before phase out, the program incentivized the completion of six projects. These projects show potential for significant savings. We are in the data collection phase currently and anticipate final reports in PY13. Significant hurdles regarding information technology, customer contracting procedures, contractor business models, cost and quality control and metering and sensor technology had to be overcome to bring six central plants online with permanent kW/ton data, as well as detailed energy data to the component level. Along with this data collection was a chiller plant retro or re-commissioning effort, which was the optimization component of this offering. Initial savings projections from the first project are very encouraging and achieved 687,022 kWh savings in the eight months since project completion. These savings will be permanent and will likely improve with operational refinements and future capital investment. Although initial savings projections are considerable, they will not be claimed until PY13.



Our benchmarking initiative is providing building engineers and decision-makers with real-time, actionable Chiller Plant performance information, which will lead to more operational changes and capital investments that will increase performance and save energy.

Central Chiller Plant Benchmarking Program

The Central Chiller Plant Benchmarking Incentive was new to the Hawaii Energy portfolio in PY12. It was designed to encourage business customers to install a central chiller plant metering and data logging system that will provide real-time data and trend data. This data reflects actual tons of cooling and measured efficiency in kW per ton. Many large commercial facilities, such as hotels and multi-level office buildings, lack information to determine whether their chiller plant is running efficiently or not. The new metering equipment makes it possible for the customer to understand the current operational and performance metrics of their Chiller plants and allows them to set meaningful energy efficiency goals and track progress towards those goals. Real-time and trend data is also available to engineers at Hawaii Energy via web interface, so that Hawaii Energy may increase its knowledge base and benchmark data related to typical chiller performance for various businesses on Oahu and the neighbor islands. Hawaii Energy incentivizes 100% of the equipment and installation and in turn has access to the data for five years after the project is complete. This will allow Hawaii Energy to not only benchmark performance but also track energy efficiency improvements directly influenced by data received from this program. A total of eighteen projects were started and completed in PY12, with a total incentive expenditure of $536,160.

BESM Program Impacts

For PY12, the BESM Program achieved energy savings of 3,550,072 kWh (first year), an increase of over 70% from the previous program year. Demand savings for the program in PY12 was 259 kW with $3,879,032 in incentives. In relative terms, 20.0% of Hawaii Energy's incentives captured 3.1% kWh (first year) and 1.7% kW of the demand first year savings for PY12, but this program reached customers that would not otherwise have participated in the energy efficiency programs.

Table 52 provides a detailed breakout of the program.

#1 Contributor to BESM – Small Business Direct Install Lighting (99%)

Small Business Direct Install Lighting offer was comprised of T8/T8LW, LED, CFL and Custom Lighting incentives and was the largest contributor to the BESM Program with energy (first year) and demand savings of 3,523,159 kWh and 259 kW, respectively.

Table 52
BESM Program Impacts

PY12 BESM - Business Energy Services and Maintenance Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
SBDI - Lighting Retrofits	31,346	259	100%	3,523,159	99%	49,324,225	99%	14.0	2.1	$ 4,872,317	99%	$ 2,359,042	57%	$ 2,359,042	61%
Energy Study Assistance	22	-	0%	26,913	1%	376,785	1%	14.0	0.1	$ 29,797	1%	$ 335,949	8%	$ 302,610	8%
Energy Project Catalyst	1	-	0%	-	0%	-	0%		-	$ -	0%	$ 5,301	0%	$ 5,301	0%
Central Plant Performance – Commissioning	18	-	0%	-	0%	-	0%		-	$ -	0%	$ 693,472	17%	$ 663,354	17%
Central Plant Performance – Benchmark Metering	18	-	0%	-	0%	-	0%		-	$ -	0%	$ 749,682	18%	$ 536,160	14%
Design Assistance - 50%	1	-	0%	-	0%	-	0%		-	$ -	0%	$ 25,131	1%	$ 12,565	0%
Total	**31,406**	**259**	**100%**	**3,550,072**	**100%**	**49,701,010**	**100%**	**14.0**	**1.2**	**$ 4,902,114**	**100%**	**$ 4,168,577**	**100%**	**$ 3,879,032**	**100%**

BESM Program Expenditures

The Program had a material surplus in the BESM incentive budgets due to a significant backlog of committed projects in the Small Business Direct Install Lighting projects on all islands.

See **Table 53** for details.

Table 53
BESM Program Expenditures

	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
BESM Operations	$ 651,976.28	$ 656,296	99%	$ 4,319.72	1%
BESM Incentives	$ 3,879,032.04	$ 4,588,647	85%	$ 709,614.96	15%
Total BESM	$ 4,531,008.32	$ 5,244,943	86%	$ 713,934.68	14%

BUSINESS PROGRAM PERFORMANCE

Business Hard-To-Reach (BHTR) Program

BHTR Program Objective

The objective of this program was to help targeted geographies and demographics that have been traditionally underserved such as retail, restaurants and other small businesses. Additionally, this program conducted more aggressive outreach to lighting and electrical contractors with training, promotional materials and frequent communications on program updates.

BHTR Program Accomplishments

Direct Install Restaurant Lighting Retrofit

This offering targeted restaurants that have limited time and expertise to research lighting technology options, secure financing and hire contractors to replace their older, less efficient lighting technologies. This offering provided full energy-efficient lighting retrofits to restaurants in Hawaii, Honolulu and Maui counties at no cost to the customer. Trade allies recruited small businesses to participate, performed audits and executed the retrofits. This direct installation approach achieved first year customer level energy of 931,318 kWh, more than three times the previous year's savings. Demand savings for the program for PY12 was 105 kW.

Small Business Direct Install Kitchen Exhaust Hood Demand Ventilation Control

This offering resulted in demand ventilation controls installed on four (4) kitchen hoods, achieving energy and demand savings of 64,947 kWh, first year and 11 kW, respectively.

BHTR Program Impacts

For PY12, the BHTR Program achieved savings of 996,266 kWh (first year) and 116 kW savings with $452,913 in incentives. In relative terms, 2.3% of the PBFA's incentives captured 0.9% kWh (first year) and 0.8% kW of the demand first year savings for PY12. **Table 54** provides the detailed measures contributing to this program.

- **#1 Contributor to BHTR – Direct Install Restaurant Lighting Retrofit (93%)**

  Direct Install Restaurant Lighting Retrofit offer was comprised of LED, T8/T8LW, Custom Lighting and CFL incentives with energy (first year) and demand savings of 931,318 kWh and 105 kW, respectively.

- **#2 Contributor to BHTR – Small Business Direct Install Kitchen Exhaust Hood Demand Ventilation Control (7%)**

  Small Business Direct Install Kitchen Exhaust Hood Demand Ventilation Control achieved energy (first year) and demand savings of 64,947 kWh and 11 kW, respectively.

Table 54
BHTR Program Impacts

PY12 BHTR - Business Hard-To-Reach Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
SBDI - Restaurant Lighting	6,334	105	90%	931,318	93%	13,038,458	93%	14.0	3.6	$ 1,424,413	92%	$ 394,433	88%	$ 394,433	87%
Kitchen Exhaust Hood Demand Ventilation	4	11	10%	64,947	7%	974,211	7%	15.0	2.1	$ 119,038	8%	$ 55,800	12%	$ 58,480	13%
Hawaii Energy Hero Landlord Program	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Total	**6,338**	**116**	**100%**	**996,266**	**100%**	**14,012,669**	**100%**	**14.1**	**3.4**	**$ 1,543,451**	**100%**	**$ 450,233**	**100%**	**$ 452,913**	**100%**

Small Business Direct Install Lighting Program – Customer Level Impacts

Customers participating in the SBDIL program have saved over $1,909,000 in operating expenses. Over the life of the lighting measures installed, the customers will save over $26,738,000. This is money that they can invest into business driving more job growth and profitability. See **Table 55** for further details.

These lighting projects provide customers with a return-on-investment of over 971%, generating a 69% internal rate of return.

The restaurant projects saw greater returns due to their longer hours of operation and more frequent change from incandescent to LED technology.

In PY13 the program will drive up cost effectiveness of this program by eliminating the T8 to low-wattage T8 retrofits and concentrate on T12 conversions.

Table 55
SBDIL Program Impacts

PY12 Small Business Direct Install Lighting Program Customer Level Impacts

	Hawaii	Lanai	Maui	Oahu	Total	Program Cost per kWh
SBDI - Lighting Retrofits						
Customers	194	7	47	224	**470**	
Measures	749	33	216	1,443	**2,441**	
kW Reduction	57	0	44	219	**320**	
kWh - First Year	1,223,778	22,649	408,889	2,714,670	**4,369,986**	$ 0.540
kWh - Life	17,132,889	317,083	5,724,452	38,005,379	**61,179,802**	$ 0.039
Incentives	$ 615,296	$ 12,464	$ 140,047	$ 1,591,236	**$ 2,359,042**	
SBDI - Restaurant Lighting						
Customers	27	6	16	65	**113**	
Measures	82	26	81	290	**479**	
kW Reduction	13	2	24	91	**130**	
kWh - First Year	242,757	23,518	142,524	745,423	**1,154,223**	$ 0.342
kWh - Life	3,398,602	329,251	1,995,341	10,435,927	**16,159,122**	$ 0.024
Incentives	$ 87,450	$ 11,228	$ 47,932	$ 247,823	**$ 394,433**	
Total						
Customers	221	13	63	289	**583**	
Measures	831	59	297	1,733	**2,920**	
kW Reduction	70	2	68	310	**450**	
kWh - First Year	1,466,535	46,167	551,414	3,460,093	**5,524,209**	$ 0.498
kWh - Life	20,531,492	646,334	7,719,793	48,441,305	**77,338,924**	$ 0.036
Incentives	$ 702,746	$ 23,691	$ 187,979	$ 1,839,059	**$ 2,753,475**	
Financial Benefits						
Avg. "G" Rate	$ 0.414	$ 0.476	$ 0.380	$ 0.310	**$ 0.346**	
Annual Savings	$ 606,546	$ 21,955	$ 209,477	$ 1,071,937	**$ 1,909,914**	
Lifetime Savings	$ 8,491,640	$ 307,365	$ 2,932,672	$ 15,007,116	**$ 26,738,793**	
Simple Payback	1.2	1.1	0.9	1.7	**1.4 yrs**	
IRR	86%	93%	111%	58%	**69%**	

BHTR Program Expenditures

The Program had a material surplus in the BHTR incentive budget due to a significant backlog of committed projects in the Small Business Direct Install Lighting projects on all islands. During the Program's year-end reconciliation process, a discrepancy of $18,843.11 was discovered, bringing the total BHTR expenditure down to $452,913 from an invoiced amount of $471,756.11 in incentives.

See **Table 56** for details.

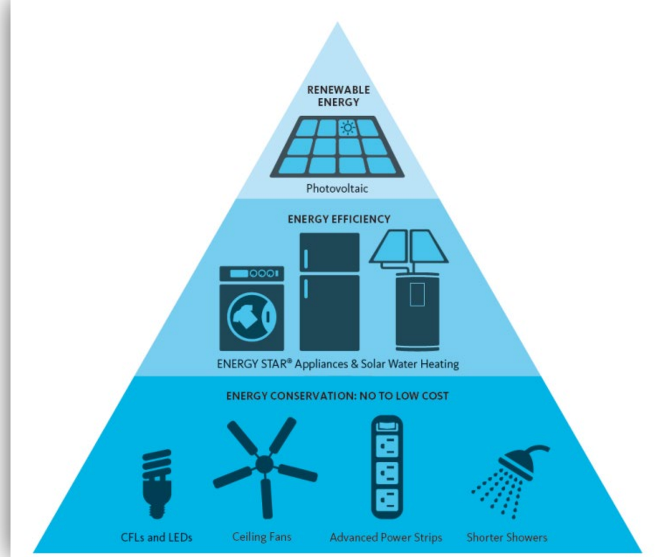
Table 56
BHTR Program Expenditures

	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
BHTR Operations	$ 417,188.44	$ 498,320	84%	$ 81,131.56	16%
BHTR Incentives	$ 471,756.11	$ 1,140,000	41%	$ 668,243.89	59%
Total BHTR	$ 888,944.55	$ 1,638,320	54%	$ 749,375.45	46%

RESIDENTIAL PROGRAM PERFORMANCE

Residential Program Impacts

For PY12, Hawaii Energy's Residential program achieved savings of 70,807,035 kWh (first year) and 9,632 kW savings with $9,051,177.08 in incentives. In relative terms, 46.6% of Hawaii Energy's incentives captured 62.6% and 63.6% of kWh (first year) and kW savings, respectively. See **Table 57.**



This illustration from a residential brochure recommends that households focus on conservation and energy efficiency, starting with low to no-cost measures, appliances and solar water heating, before considering renewable energy (i.e., photovoltaics).

Table 57
Residential Program Summary Impacts

PY12 Residential Program Impacts

Category	Application/ Projects	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
REEM	1,954,603	9,550	99%	69,826,376	99%	483,817,730	98%	6.9	2.2	$ 56,108,200	98%	$ 25,050,907	95%	$ 7,444,044	82%
CESH	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
RESM	175	9	0%	594,523	1%	4,331,660	1%	7.3	1.9	$ 304,282	1%	$ 157,517	1%	$ 51,183	2%
RHTR	2,236	73	1%	386,136	1%	4,885,820	1%	12.7	0.6	$ 650,207	1%	$ 1,173,581	4%	$ 1,455,950	16%
Total	**1,957,014**	**9,632**	**100%**	**70,807,035**	**100%**	**493,035,210**	**100%**	**7.0**	**2.2**	**$ 57,062,689**	**100%**	**$ 26,382,006**	**100%**	**$ 9,051,177**	**100%**

RESIDENTIAL PROGRAM PERFORMANCE

Residential Program Expenditures

The residential portfolio budget increased by 34% from PY11 to $11,734,115. Despite reaching 98.6% of the first year kWh target and 96.3% of kW savings target for the residential portfolio, PY12 ended with a $2.6M surplus, or 23%. Residential Energy Efficiency Measures (REEM), which represents the backbone of the residential portfolio, utilized 90% of its budget with the remaining 10% accounting for nearly a third of this surplus. Residential Energy Services & Maintenance (RESM) was underspent by nearly $700,000, primarily due to a lag in construction and related completion of applications for the specific program, Efficiency Inside Home Design, and represented nearly 26% of the surplus. With the economy rebounding, projects that did not get completed in PY12 will hit in PY13 with some budget pressures resulting. Similar to PY11, the modest budget for Customized Solutions for the Home (CESH) did not play a role in PY12. This contributed $10,500 to the incentive surplus and is not discussed in this report. Despite a major effort on the hard-to-reach sector, the Residential Hard-to-Reach budget closed PY12 with a $1.2M or 45% surplus. In addition to executing a large direct install project of solar water heating systems on Hawaii Island, the Residential team was challenged to find similar viable opportunities throughout the program year. A number of meetings, however, did plant seeds for the Program to assist the hard-to-reach sector in PY13.

During the Program's year-end reconciliation process, a discrepancy of $12,644.55, or 0.1% of spend was discovered, bringing the total Residential incentive expenditure to $9,051,177.08, up from an invoiced amount of $9,038,532.53.

See **Table 58** for details.

Table 58 **Residential Program Expenditures**					
	PY12 Expenditures	**PY12 Budget R2**	**Percent Spent**	**PY12 Unspent**	**Percent Unspent**
Residential Programs					
Residential Program Ops and Management					
REEM	$ 2,267,588.62	$ 2,509,143	90%	$ 241,554.38	10%
CESH	$ 4,935.00	$ 27,881	18%	$ 22,946.00	82%
RESM	$ 29,483.75	$ 103,237	29%	$ 73,753.25	71%
RHTR	$ 92,764.34	$ 103,238	90%	$ 10,473.66	10%
Total Residential Programs	$ 2,394,771.71	$ 2,743,499	87%	$ 348,727.29	13%
Residential Market Evaluation	$ 26,106.85	$ 127,300	21%	$ 101,193.15	79%
Residential Outreach	$ 878,530.86	$ 1,068,601	82%	$ 190,070.14	18%
Total Residential Non-Incentive	$ 3,299,409.42	$ 3,939,400	84%	$ 639,990.58	16%
Residential Incentives					
REEM	$ 7,437,751.48	$ 8,218,682	90%	$ 780,930.52	10%
CESH	$ -	$ 10,500	0%	$ 10,500.00	100%
RESM	$ 150,033.00	$ 847,500	18%	$ 697,467.00	82%
RHTR	$ 1,450,748.05	$ 2,657,433	55%	$ 1,206,684.95	45%
Subtotal Residential Incentives	$ 9,038,532.53	$ 11,734,115	77%	$ 2,695,582.47	23%
Residential Transformational	$ 1,059,432.97	$ 1,097,340	97%	$ 37,907.03	3%
Total Residential Incentives	$ 10,097,965.50	$ 12,831,455	79%	$ 2,733,489.50	21%
Total Residential Programs	**$ 13,397,374.92**	**$ 16,770,855**	**80%**	**$ 3,373,480.08**	**20%**

Residential Trade Allies

Background

The residential trade allies include product manufacturers, wholesalers, retailers and contractors. These companies range from global entities to local proprietorships and all play a vital role in the Program's success. Some are on the front lines, selling energy-efficient products, while others are behind the scenes delivering appliances and recycling those which have been replaced. In all, Hawaii Energy enjoyed the support of almost 200 unique companies playing a role in driving energy efficiency in the residential market.

Solar water heating trade ally meetings are held twice a year. At each meeting, participating solar water heating contractors are recognized for having the highest first-pass inspection rate.

Trade Ally Program Feedback

Hawaii Energy solicits feedback on a daily basis when contractors call in for work orders, or the Program delivers applications to retailers. Twice a year, the Program hosts the solar water heating contractors and contractors installing other measures to congregate for a "State of the Program" presentation, which includes future plans. Feedback is always solicited and the Program has done more to meet the needs of the industry. See **Table 59** for details.

Ongoing Training

In PY12, the Residential program took explicit steps to enhance the quality of programs offered through trade allies. Most notable was the introduction of a quarterly score card sent to every participating solar contractor. This score card reported the first-pass inspection rate for the prior three months and continues to keep quality at the forefront of our participating contractor's attention. The Program actively coaches contractors experiencing challenges that arise from time to time, which has been well received.

RESIDENTIAL PROGRAM PERFORMANCE

Table 59
Residential Trade Ally Activity

	Trade Allies	Measures	Customer Level Demand Savings (kW)	Customer Level Energy Savings (kWh - 1st yr.)	Customer Level Energy Savings (kWh - Life)	Cumulative Customer Level Energy Savings (%)	Incentives
1	Costco	497,734	2,357	16,772,709	110,539,535	18.1%	$ 989,581
2	Feit Electric Company	469,448	2,338	16,945,614	102,389,644	16.8%	$ 671,581
3	Home Depot	293,518	1,518	11,591,093	77,708,084	12.7%	$ 523,495
4	City Mill	235,867	1,174	8,510,777	51,454,561	8.4%	$ 582,767
5	Sears	5,019	179	2,663,838	35,350,494	5.8%	$ 462,600
6	Lowes	68,868	410	3,402,828	26,992,771	4.4%	$ 246,487
7	TCP Lighting	116,670	576	4,162,270	25,524,071	4.2%	$ 147,638
8	Ponchos's Solar Service	418	192	863,170	12,947,550	2.1%	$ 347,050
9	Participant Driven	7,359	73	969,783	11,746,870	1.9%	$ 76,759
10	Sams Club	40,882	202	1,463,146	8,940,434	1.5%	$ 44,238
11	Haleakala Solar	286	131	589,065	8,830,575	1.4%	$ 250,200
12	Walmart	36,941	185	1,340,958	8,045,750	1.3%	$ 37,545
13	OPower	75,000	833	7,295,468	7,295,468	1.2%	$ 891,460
14	Solar Help Hawaii	217	94	427,156	6,322,110	1.0%	$ 165,700
15	Hawaii Energy - Program Grants	2,347	92	468,949	5,834,595	1.0%	$ 1,454,597
16	Best Buy	834	26	424,313	5,761,162	0.9%	$ 75,175
17	Webco	25,163	126	913,417	5,477,670	0.9%	$ 26,802
18	Hawaiian Island Solar	184	80	364,710	5,416,650	0.9%	$ 139,850
19	Alternate Energy	171	78	352,553	5,280,780	0.9%	$ 137,050
20	Navy Exchange (NEX)	961	29	394,910	5,232,413	0.9%	$ 75,140
21	Island Cooling Llc	210	105	210,167	4,195,240	0.7%	$ 15,725
22	Hi-Tech Plumbing Corporation	132	61	272,580	4,088,700	0.7%	$ 101,000
23	Drainpipe Plumbing & Solar	129	59	266,385	3,995,775	0.7%	$ 136,500
24	Greenlite Lighting	17,850	89	647,955	3,887,730	0.6%	$ 24,990
25	Pacific Sustainable Building Science	33	-	495,586	3,211,280	0.5%	$ 76,800
26	C&J Solar Solutions	96	44	198,240	2,973,600	0.5%	$ 75,750
27	Safeway	12,789	64	464,241	2,783,992	0.5%	$ 12,789
28	Philips Lighting	11,906	54	374,112	2,685,104	0.4%	$ 37,367
29	Mid Town Radio / Disco Mart	322	11	190,594	2,586,962	0.4%	$ 31,900
30	Energy Unlimited, Inc.	82	38	169,330	2,539,950	0.4%	$ 65,550
	REMAINING TRADE ALLIES	35,578	707	4,452,119	50,024,411	8.2%	$ 1,127,091
	Residential Program	**1,957,014**	**11,924**	**87,658,038**	**610,063,931**	**100.0%**	**$ 9,051,177**

Hawaii Energy
YOUR CONSERVATION & EFFICIENCY PROGRAM

RESIDENTIAL PROGRAM PERFORMANCE

Residential Energy Efficiency Measures (REEM) Program

REEM Program Objective

This program consisted of five major initiatives including:

- High Efficiency Water Heating
- High Efficiency Lighting
- High Efficiency Air Conditioning
- High Efficiency Appliances
- Energy Awareness, Measurement and Controls Systems

The largest offer, involving CFLs, was administered through indirect upstream incentives to customers via lighting distributors and manufacturers. Second to the CFL offering was Solar Water Heating, which saw a rebound due to the Program's successful marketing campaign and an improving economy. In summary, rounding out the top three initiatives were CFLs, Solar Water Heating and Refrigerator with Trade-In.

REEM Program Impacts

For PY12, the REEM program achieved savings of 69,826,376 kWh (first year) and 9,550 kW savings with $7,444,044 in incentives. In relative terms, 82.2% of Residential program incentives captured 98.6% and 99.1% of kWh (first year) and kW savings, respectively. See Table 60 for details. The three largest contributors were:

- **#1 Contributor to REEM – CFLs (74.4%)**
  CFLs were the largest contributor to the REEM Program savings with energy (first year) and demand savings of 51,964,575 kWh and 7,158 kW, respectively. While the absolute savings from CFLs decreased by approximately 2% from PY11, as a percent of the residential portfolio, the reliance on CFLs dropped over 8% with CFLs accounting for 74.4% of REEM savings in PY12 down from 81.1% in PY11.

- **#2 Contributor to REEM – Solar Water Heating (6.0%)**
  Solar water heating, incentivized directly and through participating lenders, was the second largest contributor to the REEM Program savings with energy (first year) and demand savings of 4,163,509 kWh and 927 kW, respectively. While as a percentage of the REEM portfolio, solar water heating increased 1.0% in PY12 (up from 5.0% in PY11), the number of systems increased 17% and savings increase 27% due to systems being fully funded by PBFA funds and not subsidized by ARRA funds.

- **#3 Contributor to REEM – Refrigerator with Trade-In (5.4%)**
  The Refrigerator with Recycling program marketed as "Trade-Up for Cool Cash" was the third largest contributor to the REEM Program savings with energy (first year) and demand savings of 3,789,226 kWh and 157 kW, respectively. This performance was consistent with PY11 in both scale and contribution to the REEM portfolio. See **Table 60** for details.

Table 60
REEM Program Impacts

PY12 REEM - Residential Energy Efficiency Measures Program Impacts

Category	Apps/ Projects	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
CFL	1,770,503	7,158	75%	51,964,575	74%	311,774,264	64%	6.0	14.1	$ 37,353,374	67%	$ 2,654,375	11%	$ 2,379,660	32%
Solar Water Heating Incentive - Contractor	2,407	895	9%	4,016,021	6%	60,240,309	12%	15.0	0.5	$ 8,181,356	15%	$ 15,886,200	63%	$ 2,048,600	28%
Refrigerator with Recycling	5,702	157	2%	3,789,226	5%	53,049,166	11%	14.0	2.3	$ 4,787,506	9%	$ 2,054,160	8%	$ 712,750	10%
Clothes Washer (Tier II/III) + (Tier I GF)	5,200	118	1%	866,135	1%	10,215,706	2%	11.8	2.2	$ 1,242,614	2%	$ 572,330	2%	$ 286,700	4%
LED	89,420	216	2%	1,197,241	2%	17,930,176	4%	15.0	0.8	$ 938,015	2%	$ 1,162,460	5%	$ 633,740	9%
Peer Group Comparison	75,000	667	7%	5,841,701	8%	5,841,701	1%	1.0	0.9	$ 833,676	1%	$ 891,460	4%	$ 891,460	12%
Garage Refrigerator / Freezer Bounty	1,214	23	0%	573,362	1%	8,027,066	2%	14.0	7.9	$ 720,474	1%	$ 91,050	0%	$ 49,960	1%
Heat Pumps	317	54	1%	385,339	1%	3,853,388	1%	10.0	0.9	$ 491,580	1%	$ 570,600	2%	$ 63,400	1%
VFR Split System AC	373	83	1%	192,365	0%	2,834,528	1%	14.7	1.5	$ 471,174	1%	$ 306,960	1%	$ 77,177	1%
Solar Water Heating Incentive – Lender	89	33	0%	147,488	0%	2,212,319	0%	15.0	0.5	$ 300,448	1%	$ 587,400	2%	$ 89,000	1%
Whole House Fan	220	89	1%	178,907	0%	3,578,138	1%	20.0	10.8	$ 285,874	1%	$ 26,400	0%	$ 16,500	0%
Ceiling Fans	3,120	48	1%	420,620	1%	2,103,102	0%	5.0	13.3	$ 282,132	1%	$ 21,276	0%	$ 124,800	2%
VFD Controlled Pool Pumps	247	1	0%	119,241	0%	1,192,407	0%	10.0	0.7	$ 106,842	0%	$ 147,450	1%	$ 37,050	0%
Refrigerator (<$600)	384	5	0%	32,592	0%	456,282	0%	14.0	1.3	$ 56,200	0%	$ 42,240	0%	$ 19,200	0%
Solar Attic Fans	206	3	0%	90,092	0%	450,461	0%	5.0	1.6	$ 49,090	0%	$ 30,900	0%	$ 10,300	0%
Energy Hero Gift Packs - Akamai PowerStrips	141	1	0%	8,102	0%	40,512	0%	5.0	2.3	$ 5,439	0%	$ 2,397	0%	$ 2,397	0%
Whole House Energy Metering	11	0	0%	2,545	0%	11,406	0%	4.5	0.6	$ 1,330	0%	$ 2,200	0%	$ 892	0%
Room Occupancy Sensors	46	0	0%	770	0%	6,159	0%	8.0	1.1	$ 982	0%	$ 920	0%	$ 359	0%
Dishwasher (GF)	1	0	0%	53	0%	640	0%	12.0	1.2	$ 94	0%	$ 80	0%	$ 50	0%
AC Bounty (GF)	2	-	0%	-	0%	-	0%		-	$ -	0%	$ 50	0%	$ 50	0%
Total	**1,954,603**	**9,550**	**100%**	**69,826,376**	**100%**	**483,817,730**	**100%**	**6.9**	**2.2**	**$ 56,108,200**	**100%**	**$ 25,050,907**	**100%**	**$ 7,444,044**	**100%**

REEM Program Expenditures

In PY12, the Program utilized 90% of available incentive funds, while realizing a surplus of $780,930.52. Despite the budget being increased by approximately $500,000 due to the PY11 carry over request, the PY12 surplus was less than half of the PY11 surplus. Among the mix of measures in the PY12 plan, the goal of 4,000 solar water heating systems (an increase of 87% over PY11 results) may have been a bit aggressive despite the gains seen in PY12 and drove, in part, this surplus. During the Program's year-end reconciliation process, a discrepancy of $6,292.55 was discovered, bringing the total REEM expenditure to $7,444,044.03 up from an invoiced amount of $7,437,751.48 in incentives.

See **Table 61** for details.

Table 61
REEM Program Expenditures

	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
REEM Operations	$ 2,267,588.62	$ 2,509,143	90%	$ 241,554.38	10%
REEM Incentives	$ 7,437,751.48	$ 8,218,682	90%	$ 780,930.52	10%
Total REEM	$ 9,705,340.10	$ 10,727,825	90%	$ 1,022,484.90	10%

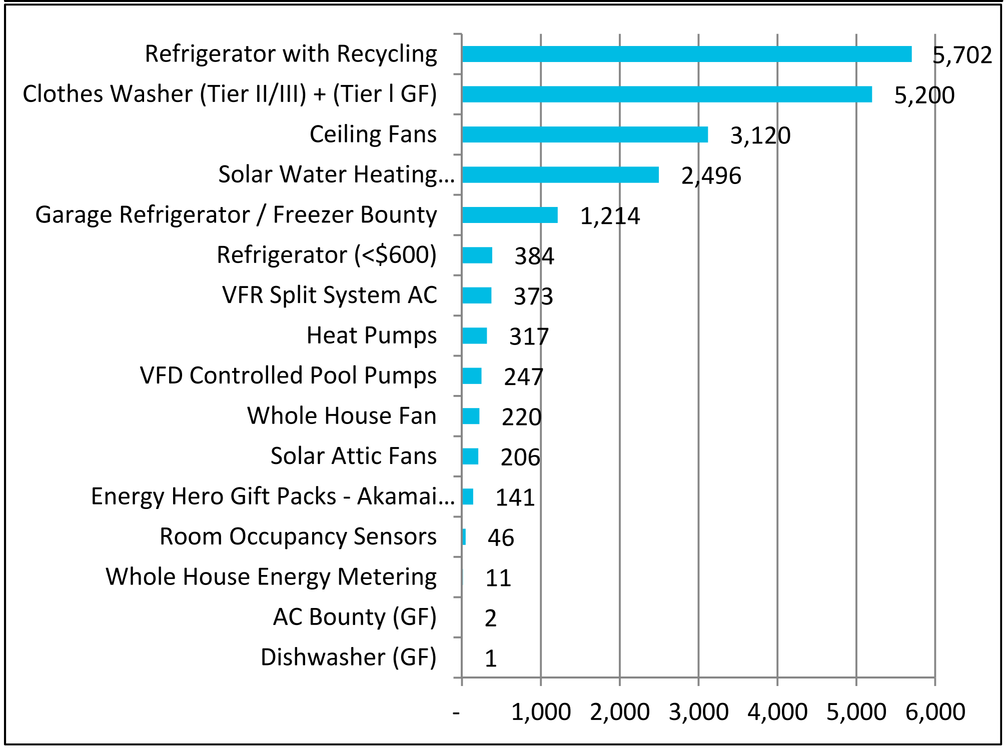
RESIDENTIAL PROGRAM PERFORMANCE

REEM Program Overall Accomplishments

Popular Offerings – **Table 62** summarizes the participation of REEM incentives by measure. The table includes a few new measures, including VFD Controlled Pool Pumps and Room Occupancy Sensors. While these measures were added, some were eliminated or refined to minimize "free ridership", including:

- Elimination of the $110 Split Air Conditioning rebate in favor of continuing rebates for inverter-driven split air conditioners, which are more energy efficient.
- Clothes Washers (Tier II & III) was implemented by disqualifying the basic (Tier I) ENERGY STAR® models. The rebate was established at $75, a $25 increase, but was then reduced back to the $50 level.
- Discontinuation of rebates for high efficiency dishwashers and window air conditioners commenced in PY11, however to maintain good customer satisfaction, a few were grandfathered (GF) in PY12.

Table 62
REEM Rebated Units



Quality Customer Support – During PY12, Hawaii Energy's residential call center handled over 9,566 customer calls ranging from, "What kind of refrigerator should I buy?" to, "How should I size my solar water heating system?" and everything in between. Related to the Peer Group Comparison (Opower Home Energy Report), the Hawaii Energy call center handled 573 calls, which was critical to minimizing participant attrition.

Customer Experience Management – Armed with Medallia, the Program sent out over 7,500 surveys to gauge customer experience with Hawaii Energy. With a response rate of over 33%, the overall satisfaction rating averaged 9.2 out of 10 in areas of field service, rebate satisfaction and willingness to recommend Hawaii Energy offerings. In PY12, Hawaii Energy logged only 8 complaints down from 29 in PY11, which for the most part revolved around customer perception issues.

REEM Program Accomplishments by Incentive Offering

High Efficiency Water Heating (HEWH)

For PY12, the HEWH program achieved a savings of 4,548,847 kWh (first year) and 981 kW savings with $2,201,000 in incentives. In relative terms, 29.6% of REEM incentives captured 6.5% and 10.3% of kWh (first year) and kW savings, respectively.

HEWH - Solar Water Heating (SWH)

Instant Rebate Program – With 2,407 solar thermal systems installed in PY12 per Hawaii Energy specifications, the Program saw a solid increase in installations due to a solar water heating marketing campaign, an increased rebate to $1,000 (up from $750) and improving market conditions. The popularity of photovoltaics (PV), despite the recommended loading order (i.e., solar water heating first, PV second), continues to overshadow the potential of solar water heating.

Interest Buy-Down Program – Interest buy-down, known as "Hot Water, Cool Rates," continued to remain a selling tool for the Program's participating contractors, however, when given the option, customers typically opt for a no-financing solution. While only 89 systems were installed through this offer (down from 166), the Program continues to attract lenders which now numbers 21.

Solar Water Heating Inspections – 85% of installations were inspected in PY12. The Program implemented an algorithm to select systems to be inspected based on a number of factors including first-pass rates, however, inspections will also be conducted on an as-requested basis. This has helped to lower administration costs, while not sacrificing quality. Heat pump water heaters saw a 30% increase over PY11, which is a good trend for a newer technology ideal for smaller households. See **Table 63** for details of the High Efficiency Water Heating offers.

Table 63
REEM HEWH Program Impacts

PY12 High Efficiency Water Heating Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
Solar Water Heating Incentive – Contractor	2,407	895	91%	4,016,021	88%	60,240,309	91%	15.0	0.5	$ 8,181,356	91%	$ 15,886,200	93%	$ 2,048,600	93%
Solar Water Heating Incentive – Lender	89	33	3%	147,488	3%	2,212,319	3%	15.0	0.5	$ 300,448	3%	$ 587,400	3%	$ 89,000	4%
Heat Pumps	317	54	5%	385,339	8%	3,853,388	6%	10.0	0.9	$ 491,580	5%	$ 570,600	3%	$ 63,400	3%
Total	**2,813**	**981**	**100%**	**4,548,847**	**100%**	**66,306,016**	**100%**	**14.6**	**0.5**	**$ 8,973,384**	**100%**	**$ 17,044,200**	**100%**	**$ 2,201,000**	**100%**

Participating Contractor Meetings

Hawaii Energy continued to meet with its network of Participating Contractors on Oahu, Maui and Hawaii islands. These half-day sessions provided a forum to update contractors on Program results, new programs like "Hot Water, Cool Rates" and to provide an opportunity for honest and open dialogue aimed to improve the Program. This year, the agenda was broadened from solar to all of the Program's residential offerings with the intent of transforming this bi-annual meeting into an active residential Trade Ally forum conducted in a "town hall" fashion.

See **Table 64** for details on solar water heating systems installed by island and **Table 65** for solar water heating system installations listed by participating contractor.

Table 64
REEM Solar Water Heating System Installations by Island

PY12 Solar Water Heating Projects by Island									
Category	**Units**	**Program Demand (kW)**	**%**	**Program Energy (kWh 1st yr.)**	**%**	**Program Energy (kWh Life)**	**%**	**Incentives ($)**	**%**
Hawaii Island	386	141	15.2%	634,245	15.2%	9,513,668	15.2%	394,250	18.4%
Maui	367	136	14.6%	608,337	14.6%	9,125,056	14.6%	355,450	16.6%
Molokai	2	1	0.1%	3,303	0.1%	49,547	0.1%	1,750	0.1%
Oahu	1,741	650	70.1%	2,917,624	70.1%	43,764,357	70.1%	1,386,150	64.8%
Total	**2,496**	**928**	**100%**	**4,163,509**	**100%**	**62,452,628**	**100%**	**$ 2,137,600**	**100%**

Table 65

REEM Solar Water Heating System Installations by Participating Contractor

CONTRACTOR	% TOTAL	CONTRACTOR	% TOTAL
PONCHOS SOLAR SERVICE- OAHU	16.78%	PROFESSIONAL ELECT' HAWAIIAN CONTRACTORS	0.33%
SOLAR HELP HAWAII	8.85%	ALTERNATE ENERGY - MAUI	0.29%
ALTERNATE ENERGY - OAHU	6.97%	PACIFIC ENERGY STRATEGIES, LLC.	0.29%
HALEAKALA SOLAR, INC. - MAUI	6.92%	PERRIN PLUMBING, LLC	0.29%
HAWAIIAN ISLAND SOLAR, INC.	6.70%	ALLEN'S PLUMBING - OAHU	0.25%
HI-TECH PLUMBING CORPORATION	5.87%	TNH PLUMBING	0.25%
HALEAKALA SOLAR - OAHU	5.21%	21ST CENTURY TECHNOLOGIES HI - OAHU	0.21%
DRAINPIPE PLUMBING & SOLAR	4.86%	BUILT TO LAST PLUMBING	0.21%
C&J SOLAR SOLUTIONS	3.90%	PACIFIC ISLANDS CONSTRUCTION	0.21%
TRUE GREEN SOLAR, LLC	3.81%	QUALIFIED PLUMBING	0.21%
ENERGY UNLIMITED, INC.	3.55%	SUNNY SOLUTIONS, INC.	0.21%
HAWAIIAN SOLAR & PLUMBING	2.41%	ADVANTAGE MECHANICAL PLUMBING, INC.	0.17%
KEITH SHIGEHARA PLUMBING, INC.	2.15%	KNIGHT'S PLUMBING, INC.	0.17%
MAUI PACIFIC SOLAR, INC.	2.02%	PONCHO'S SOLAR SERVICE - MAUI	0.17%
SONSHINE SOLAR CORP.	1.93%	AHI, INC.	0.13%
ISLAND SOLAR SERVICE, INC. - OAHU	1.84%	CALVIN'S PLUMBING	0.13%
HI-POWER SOLAR, LLC	1.62%	SOUTH PACIFIC PLUMBING, LLC	0.13%
AFFORDABLE SOLAR CONTRACTING	1.58%	TAMURA PLUMBING	0.13%
GRAND SOLAR	1.45%	ADON CONSTRUCTION, INC. - OAHU	0.08%
SOLAR SERVICES HAWAII	1.40%	AOKI PLUMBING	0.08%
SUN KING - MAUI	1.40%	M. TORIGOE PLUMBING, INC.	0.08%
PONCHO'S SOLAR SERVICE - BIG ISL	1.14%	MOLOKAI SOLAR	0.08%
SOLAR AIDE COMPANY	1.14%	ROYAL FLUSH PLUMBING	0.08%
BONTERRA SOLAR SERVICES	0.96%	SOLAR ENG & CONTRACTING-OAHU	0.08%
KONA SOLAR SERVICE, LLC	0.96%	CED'S PLUMBING	0.04%
GIANT SOLAR, LLC	0.92%	DORVIN D LEIS COMPANY INC-OAHU	0.04%
RT'S PLUMBING, INC	0.92%	KIHEI PLUMBING	0.04%
ALLEN'S PLUMBING - MAUI	0.79%	RED OPAE PLUMBING	0.04%
SUN KING - OAHU	0.79%	ROMEO VALLESTEROS	0.04%
APOLLO SOLAR	0.70%	W CONTRACTING INC. DBA ENERGYPRO HAWAII	0.04%
COMMERCIAL PLUMBING, INC.	0.44%	**TOTAL**	**100.00%**

High Efficiency Lighting

For PY12, the High Efficiency Lighting Program achieved savings of 53,161,817 kWh (first year) and 7,374 kW savings with $3,013,400 in incentives. In relative terms, 40.5% of REEM incentives captured 76.1% of kWh (first year) and 77.2% kW savings, respectively.

The program moderated the volume of CFLs to a level of 1.7M (down from 1.8M), which ironically required a higher average incentive level due to a late program year promotion. PY12 saw the LED market make significant strides in qualifying products for the residential market. The 89,420 units rebated reflect an increase of 750% over PY11.

Much effort was spent maintaining program participation with both manufacturers and retailers gained in PY12.

See **Table 66** for details.

Table 66
REEM High Efficiency Program Lighting Impacts

PY12 High Efficiency Lighting Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
CFL	1,770,503	7,158	97%	51,964,575	98%	311,774,264	95%	6.0	14.1	$ 37,353,374	98%	$ 2,654,375	70%	$ 2,379,660	79%
LED	89,420	216	3%	1,197,241	2%	17,930,176	5%	15.0	0.8	$ 938,015	2%	$ 1,162,460	30%	$ 633,740	21%
Total	**1,859,923**	**7,374**	**100%**	**53,161,817**	**100%**	**329,704,440**	**100%**	**6.2**	**10.0**	**$ 38,291,389**	**100%**	**$ 3,816,835**	**100%**	**$ 3,013,400**	**100%**

High Efficiency Air Conditioning

For PY12, the High Efficiency Air Conditioning Program achieved savings of 878,612 kWh (first year) and 223 kW savings with $227,777 in incentives. In relative terms, 3.1% of REEM incentives captured 1.3% and 2.3% of kWh (first year) and kW savings, respectively.

For PY12, Hawaii Energy ceased the rebate for Split-AC Ductless Systems in favor of continuing Variable Refrigerant Flow (VRF) Systems, which experienced an uptick of 231% from PY11.

Solar Attic Fans and Whole House Fans, introduced in PY10, continued to show steady demand.

See **Table 67** for details.

Table 67
REEM High Efficiency Air Conditioning Program Impacts

PY12 High Efficiency Air Conditioning Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
Ceiling Fans	3,095	47	21%	417,249	47%	2,086,244	23%	5.0	13.2	$ 279,874	26%	$ 21,168	5%	$ 123,800	54%
Solar Attic Fans	206	3	1%	90,092	10%	450,461	5%	5.0	1.6	$ 49,090	5%	$ 30,900	8%	$ 10,300	5%
VFR Split System AC	373	83	37%	192,365	22%	2,834,528	32%	14.7	1.5	$ 471,174	43%	$ 306,960	80%	$ 77,177	34%
Whole House Fan	220	89	40%	178,907	20%	3,578,138	40%	20.0	10.8	$ 285,874	26%	$ 26,400	7%	$ 16,500	7%
Total	**3,894**	**223**	**100%**	**878,612**	**100%**	**8,949,371**	**100%**	**10.2**	**2.8**	**$ 1,086,012**	**100%**	**$ 385,428**	**100%**	**$ 227,777**	**100%**

High Efficiency Appliances

For PY12, the High Efficiency Appliances Program achieved savings of 5,383,981 kWh (first year) and 304 kW savings with $1,106,760 in incentives. In relative terms, 14.9% of REEM incentives captured 7.7% and 3.2% of kWh (first year) and kW savings, respectively. Since PY09, Hawaii Energy has continued to expand its retail community to Hawaii and Maui counties, with a current total of 195 retail participants, doubling last year's count. This includes many new independently owned retailers along with all of the "big box" retailers in the State. Hawaii Energy's Trade Ally Team regularly visited all retailers throughout the program year to keep them current on rebate levels, promotions and to ensure proper display of Hawaii Energy's Point-of-Purchase (POP) collateral. Throughout the program year, retailers were regularly updated via emails and phone calls.

As ENERGY STAR® products become more common (and non-ENERGY STAR® models become less available), the Program has continued to curtail rebate offerings for some common ENERGY STAR® products. In PY12, the Program modified its refrigerator rebate offers to better target its incentives. First, the $50 rebate for ENERGY STAR® refrigerators was limited to models priced at $600 or less in order to target the low-end higher energy-consuming models that might suit a landlord. For models above $600, the participant would have to trade-in the refrigerator being replaced. This traded-in refrigerator would be recycled and therefore not end up in a garage or refurbished and resold. In order to moderate demand and manage the available PBF funds, the Program offered this rebate in four (4) batches throughout PY12 and secured 3,789,226 kWh savings from this offer, reflecting 70% of the High Efficiency Appliance Program. New in PY12 was the VFD Controlled Pool Pump, which saw a good inaugural showing at 247 units.

Garage Refrigerator/Freezer Bounty Program – This program offered a rebate to customers who unplugged and recycled a working refrigerator and/or freezer. The neighbor island offer was retooled and now curbside pick-up is available to all participants. With industry partners properly recycling appliances, Hawaii Energy has a solid foundation upon which to grow the recycling component of its Programs. In all, 1,214 units yielding 573,362 kWh savings came from this offer, reflecting 11% of the High Efficiency Appliance Program. This reflected a 15% increase from PY11.

See **Table 68** for details.

ENERGY STAR

Table 68 **REEM High Efficiency Appliances Program Impacts**															
PY12 High Efficiency Appliance Program Impacts															
Category	**Units**	**Program Demand (kW)**	**%**	**Program Energy (kWh 1st yr.)**	**%**	**Program Energy (kWh Life)**	**%**	**Avg. Measure Life (yrs.)**	**TRB/ TRC**	**Total Resource Benefit (TRB)**	**%**	**Total Resource Cost (TRC)**	**%**	**Incentives ($)**	**%**
Refrigerator with Recycling	5,702	157	52%	3,789,226	70%	53,049,166	73%	14.0	2.3	$ 4,787,506	69%	$ 2,054,160	71%	$ 712,750	64%
Clothes Washer (Tier II/III) + (Tier I GF)	5,200	118	39%	866,135	16%	10,215,706	14%	11.8	2.2	$ 1,242,614	18%	$ 572,330	20%	$ 286,700	26%
Garage Refrigerator / Freezer Bounty	1,214	23	7%	573,362	11%	8,027,066	11%	14.0	7.9	$ 720,474	10%	$ 91,050	3%	$ 49,960	5%
VFD Controlled Pool Pumps	247	1	0%	119,241	2%	1,192,407	2%	10.0	0.7	$ 106,842	2%	$ 147,450	5%	$ 37,050	3%
Refrigerator (<$600)	384	5	2%	32,592	1%	456,282	1%	14.0	1.3	$ 56,200	1%	$ 42,240	1%	$ 19,200	2%
Ceiling Fans	25	0	0%	3,372	0%	16,859	0%	5.0	20.9	$ 2,258	0%	$ 108	0%	$ 1,000	0%
Dishwasher (GF)	1	0	0%	53	0%	-	0%	12.0	1.2	$ 94	0%	$ 80	0%	$ 50	0%
AC Bounty (GF)	2	-	0%	-	0%	-	0%	-	-	$ -	0%	$ 50	0%	$ 50	0%
Total	**12,775**	**304**	**100%**	**5,383,981**	**100%**	**72,958,124**	**100%**	**13.6**	**2.4**	**$ 6,915,988**	**100%**	**$ 2,907,468**	**100%**	**$ 1,106,760**	**100%**

Energy Awareness, Measurement and Control Systems

For PY12, the Energy Awareness, Measurement and Control Systems Program achieved savings of 5,853,119 kWh (first year) and 668 kW savings with $895,108 in incentives. In relative terms, 12.0% of REEM incentives captured 8.4% and 7.0% of kWh (first year) and kW savings, respectively.

Smart Strip – Event Promotion – These devices were primarily distributed at trade shows and other Program outreach events. Customer information was collected to verify that they were qualified to receive the device.

Peer Group Comparison – In PY12, Hawaii Energy continued the Home Energy Report program in Ewa and the neighbor islands, including Maui, Molokai, Lanai and Hawaii Island with the number of households participating totaling approximately 75,000. The Home Energy Report consists of an outbound mailer measuring a home to 99 homes in their peer group (i.e., similar sized home and demographics). Initial calls from the customer responding to mailings ranged from inquiry about the program to anger (e.g., save paper, privacy, low ranking). This was the expected outcome of the mailers, which are designed to elicit a strong response followed by behavioral changes. Customers were shown how to log in to their account and enter information specific to their home, followed by a discussion of how they could save money. Typically during the call, customers decided to continue their participation in the program. Hawaii Energy continues to maintain the lowest attrition rate nationwide with the Peer Group Comparison report. In all, 5,841,701 kWh savings came from this offer, reflecting 99.8% of the Energy Awareness and Control System program.

Room Occupancy Sensors – In PY12, Hawaii Energy soft-launched this offer via a pilot with a limited number of qualifying products at four locations of one big-box retailer. The mail-in rebate yielded little participation, so an upstream program was instituted. With only 46 units rebated, the Program will evaluate this offer in PY13.

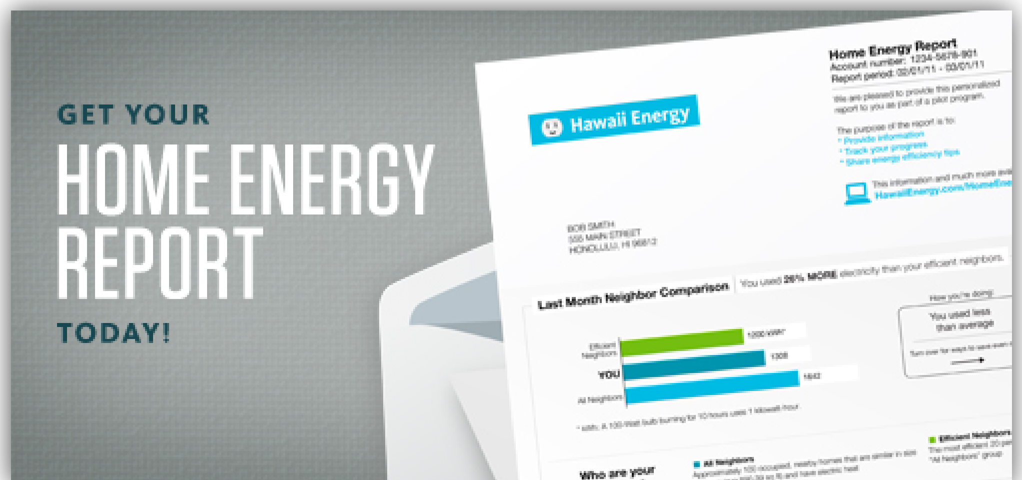
Whole House Energy Metering – Hawaii Energy soft-launched this offer with a variable rebate in PY10. Although there was low participation, the Program is starting to hear from customers who after installing PV are still not "net-zero" and are interested in understanding their usage better. A strategy to increase targeted participation is being devised for PY13.

See **Table 69** for details.

Table 69
REEM Energy Awareness, Measurement and Control Systems Program Impacts

PY12 Energy Awareness, Measurement and Control Systems Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
Peer Group Comparison	75,000	667	99.8%	5,841,701	99.8%	5,841,701	99.0%	1.0	0.9	$ 833,676	99.1%	$ 891,460	99.4%	$ 891,460	99.6%
Energy Hero Gift Packs – Akamai Power Strips	141	1	0.1%	8,102	0.1%	40,512	0.7%	5.0	2.3	$ 5,439	0.6%	$ 2,397	0.3%	$ 2,397	0.3%
Whole House Energy Metering	11	0	0.0%	2,545	0.0%	11,406	0.2%	4.5	0.6	$ 1,330	0.2%	$ 2,200	0.2%	$ 892	0.1%
Room Occupancy Sensors	46	0	0.0%	770	0.0%	6,159	0.1%	8.0	1.1	$ 982	0.1%	$ 920	0.1%	$ 359	0.0%
Total	**75,198**	**668**	**100%**	**5,853,119**	**100%**	**5,899,779**	**100%**	**1.0**	**0.9**	**$ 841,427**	**100%**	**$ 896,977**	**100%**	**$ 895,108**	**100%**



Custom Energy Solutions for the Home (CESH)

This incentive category provided a measure of flexibility within the prescriptive portfolio to accommodate unforeseen market opportunities with budgetary and unit cost targets to provide financial efficacy guidance to the Program and allies who champion these opportunities. In PY12, there were no such proposals; rather all opportunities were addressed through the other programs (e.g., REEM, RESM and RHTR). As the market continues to evolve in PY13, the Program may see some activity for which this incentive category plays a modest role.

Table 70
CESH Program Impacts

PY12 CESH - Customized Energy Solutions for the Home

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
Custom Packaged Proposals	-	-		-		-		-	-	-		-		-	
Total	-	-		-		-		-	-	-		-		-	

A modest amount of time was spent reviewing a few inquiries involving the PY12 expenditures. See **Table 71** for more detail.

Table 71
CESH Program Expenditures

	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
CESH Operations	$ 4,935.00	$ 27,881	18%	$ 22,946.00	82%
CESH Incentives	$ -	$ 10,500	0%	$ 10,500.00	100%
Total CESH	$ 4,935.00	$ 38,381.00	13%	$ 33,446.00	87%

Residential Energy Services & Maintenance (RESM) Program

For PY12, the RESM Program achieved savings of 594,523 kWh (first year) and 9 kW savings with $151,183 in incentives.

For details, see **Table 72.**

Table 72
RESM Program Impacts

PY12 RESM - Residential Energy Services and Maintenance Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
Efficiency Inside Home Design	150	-	0%	574,462	97%	4,319,151	100%	7.5	2.0	$ 301,111	99%	$ 147,000	93%	$ 147,000	97%
Custom Packaged Proposals	2	8	85%	14,057	2%	6,506	0%	0.5	0.6	$ 2,067	1%	$ 3,617	2%	$ 3,033	2%
Central AC Maintenance	23	1	15%	6,003	1%	6,003	0%	1.0	0.2	$ 1,104	0%	$ 6,900	4%	$ 1,150	1%
Solar Water Heater Tune-Ups	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Direct Install	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Hawaii Energy Hero Audits	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Total	**175**	**9**	**100%**	**594,523**	**100%**	**4,331,660**	**100%**	**7.3**	**1.9**	**$ 304,282**	**100%**	**$ 157,517**	**100%**	**$ 151,183**	**100%**

RESM Program Expenditures

In PY12, the program had a material surplus primarily due to the deferral in launching another solar thermal tune-up offer and a delay in participating vendors providing applications relating to the Efficiency Inside Home Design offer. During the Program's year-end reconciliation process, a discrepancy of $1,150 was discovered, bringing the total RESM expenditure up to $151,183 from an invoiced amount of $150,033 in incentives. In this case, Central AC Maintenance was invoiced under REEM, rather than RESM.

See **Table 73** for details.

Table 73
RESM Program Expenditures

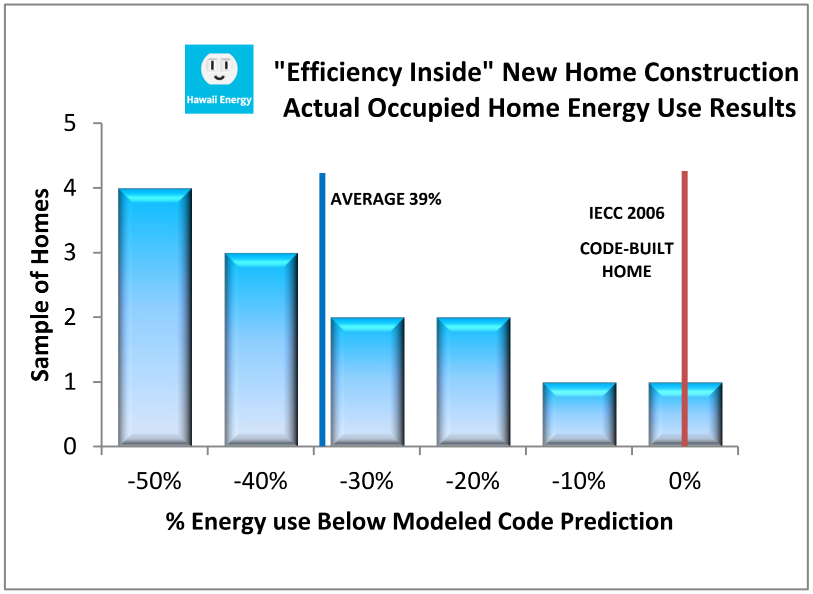
	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
RESM Operations	$ 29,483.75	$ 103,237	29%	$ 73,753.25	71%
RESM Incentives	$ 150,033.00	$ 847,500	18%	$ 697,467.00	82%
Total RESM	$ 179,516.75	$ 950,737.00	19%	$ 771,220.25	81%

RESIDENTIAL PROGRAM PERFORMANCE

Residential Design and Audit Programs

Efficiency Inside Home Design – Introduced in PY10, this program requires energy modeling to make comparisons between energy code-compliant designs and enhanced designs. This approach had many advantages including:

- The ability to base energy savings on computer energy modeling programs to compare a code-built homes to the home designs being offered by the developer;
- Providing the developer the maximum flexibility in designing homes to dovetail with existing federal tax credits and ENERGY STAR® programs;
- Possible collaboration among developers, designers, energy consultants and Hawaii Energy to maximize utilization of incentives through comparing model scenarios;
- A number of developers constructing Net-Zero homes with PV systems considered as an efficiency measure.



Hawaii Energy has found that all participating developers are building homes 39% better than International Energy Conservation Code (IECC) 2006 requirements.

Hawaii Energy now has a good relationship with a number of developers, modeling and testing consulting firms but received fewer applications in PY12 than the strong pipeline of projects had indicated. Therefore, the Program is looking to broaden participation.

In early discussions, developers provided valued feedback that raised Hawaii Energy's cognizance of issues facing developers including:

- The need to design and equip homes to respond to home buyer market forces;
- Homes are not competitive for sale in Hawaii if they are not designed with A/C;
- There are limitations in Hawaii's building code and density requirements that do not allow "classic" Hawaiian architecture such as rooms open to outside hallways encouraging homes to be built with no or minimal A/C;
- There is a challenge with appraisers that reward homes that have greater "enclosed" square footage over large lanais and central courtyards that, again, would encourage outdoor living and minimize A/C use.

With the economy improving, 150 homes underwent energy modeling and testing and yielded 574,462 kWh (first year) savings with incentives of $147,000.

RESIDENTIAL PROGRAM PERFORMANCE

Residential Hard-To-Reach (RHTR) Program

The Program significantly increased resources to this traditionally underserved demographic, most notably through a major solar water heating grant and collaboration with Blue Planet Foundation to bring the refrigerator exchange program, Hui Up, to Lanai.

For PY12, Hawaii Energy's Residential Hard-to-reach Program achieved savings of 386,136 kWh (first year) and 73 kW savings with $1,455,950 in incentives. In relative terms, 16.1% of Hawaii Energy's incentives captured 0.5% and 0.8% of kWh (first year) and kW savings, respectively.

See **Table 74** for details.

Table 74
RHTR Program Impacts

PY11 RHTR - Residential Hard-to-Reach Program Impacts

Category	Units	Program Demand (kW)	%	Program Energy (kWh 1st yr.)	%	Program Energy (kWh Life)	%	Avg. Measure Life (yrs.)	TRB/ TRC	Total Resource Benefit (TRB)	%	Total Resource Cost (TRC)	%	Incentives ($)	%
Solar Water Heater - Grant	169	62	85%	277,763	72%	4,166,452	85%	15.0	0.5	$ 565,800	87%	$ 1,123,359	96%	$ 1,412,359	97%
Energy Hero Gift Packs – Akamai Power Strips	2,037	10	14%	88,650	23%	443,249	9%	5.0	1.7	$ 59,507	9%	$ 34,629	3%	$ 35,048	2%
Lanai Hui Up	30	1	1%	19,723	5%	276,119	6%	14.0	1.6	$ 24,900	4%	$ 15,594	1%	$ 8,544	1%
Solar Inspections (WAP)	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Hawaii Energy Hero Landlord Program	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Custom SWH Proposals	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Energy Hero Gift Packs	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
CFL Exchange	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Hawaii Energy Hero Audits	-	-	0%	-	0%	-	0%			$ -	0%	$ -	0%	$ -	0%
Total	**2,236**	**73**	**100%**	**386,136**	**100%**	**4,885,820**	**100%**	**12.7**	**0.6**	**$ 650,207**	**100%**	**$ 1,173,581**	**100%**	**$ 1,455,950**	**100%**

RHTR Program Expenditures

PY12 saw a 238% rise in Program support for the Residential Hard-to-reach (RHTR) sector through nearly $840,000 more incentives than in PY11. Despite a number of solicitations and concerted efforts to find organizations in need, the Program was unable to secure viable projects within the program year and closed PY12 with a $1.2M surplus, or 45.4% of the expanded RHTR budget. During the Program's year-end reconciliation process, a discrepancy of $5,202 was discovered, bringing the total RHTR expenditure to $1,455,950, up from an invoiced amount of $1,450,748.05 in incentives.

See **Table 75** for detailed expenditures and unspent funds.

Table 75
RHTR Program Expenditures

	PY12 Expenditures	PY12 Budget R2	Percent Spent	PY12 Unspent	Percent Unspent
RHTR Operations	$ 92,764.34	$ 103,238	90%	$ 10,473.66	10%
RHTR Incentives	$ 1,450,748.05	$ 2,657,433	55%	$ 1,206,684.95	45%
Total RHTR	$ 1,543,512.39	$ 2,760,671.00	56%	$ 1,217,158.61	44%

Solar Water Heater – Direct Install

In late PY11, the Program was keen on achieving island equity targets and mindful of a difficult solar water heating market. Therefore, the Program sought out funding opportunities on Maui and Hawaii Island. We learned of an HCEOC project about to get underway that was going to help a number of "in need" families, which the Program would consider hard-to-reach. It was determined that by collaborating on this project with the Program providing funding for solar water heating systems, HCEOC could extend its grant to help more families in other ways. In addition to the 53 systems in PY11, the project continued to install 169 more systems to clients of HCEOC in PY12.

Smart Strip – Event Promotion

In PY12, the Program distributed energy-saving smart strips, many of which were in support of the Program-funded Helen N. Wai workshops on Financial Literacy and Energy Efficiency (see Market Transformation). These devices were not only practical, but successfully attracted an enhanced level of participation in the hard-to-reach offerings and outreach where they were distributed.

Lanai Hui Up

In late PY11, Blue Planet Foundation approached Hawaii Energy to support their effort to bring Hui Up to Lanai. The project was at-risk because the ARRA funding that supported the previous Hui Up on Molokai was no longer available. After some creative planning and financial analysis, the Program was able to support this initiative with its standard "refrigerator with recycling" or "Trade-Up for Cool Cash" rebate offer as well as supportive funding characterized as "catalyst funding. " Without this catalyst funding, the Lanai Hui Up would have been canceled. It was the first time Hui Up was brought to Lanai, so participation was light with only 30 households participating. That said, it made a material difference to those participating and seed interest for future energy efficiency initiatives.

MARKET TRANSFORMATION PROGRAM PERFORMANCE

Introduction

Introduced in PY11, the Transformational program diversified its offerings in PY12 to focus on four key areas, specifically: (1) Government, (2) Business & Industry, (3) Education and (4) Residential. Government-related initiatives supported State agencies, the State University system and the National Guard. Business-related initiatives provided both technical and sales education to spur more activity in energy efficiency arena, including professional certifications. Education-related initiatives supported the professional development of teachers and those entering the energy-related workforce, while residential-related initiatives focused on developing fundamental energy literacy in a number of ways. The underlying intent of these offerings is to transform the market, through various means, that will lead to gains through energy efficiency and conservations within three to five years.

Local teachers on Oahu participating in the Hawaii Energy-sponsored National Energy Education Development workshop.

Kupuna of Alu Like in Nanakuli learning about how to save energy.

Government Support

Residential and Commercial Code Training Seminars

2009 International Energy Conservation Code (IECC) & Design Strategies to Achieve Compliance

The State Building Code Council has approved a new energy code and adoption is underway in Hawaii, Honolulu, Maui and Kauai counties. Hawaii Energy in co-sponsorship with the Department of Business, Economic Development, and Tourism (DBEDT) held two one-day technical seminars for building professionals, architects, engineers, contractors and other private sector professionals, as well as local building and code officials. The training provided a review of IECC 2009 Code and Hawaii-specific amendments, as well as information on Design Strategies for Code Compliance for air-conditioned residences and small commercial buildings.

Two meetings were held on Oahu on November 13th & 14th; one on Maui on Nov 16th; and in Hilo and Kona on the 19th and 20th, respectively. In all, over 300 professionals and officials attended these seminars.

Training workshop to review the 2009 International Energy Conservation Code.

Rebuild Hawaii Consortium

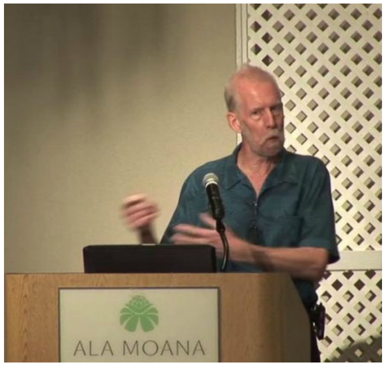
Focus on the Hospitality Industry

The Rebuild Hawaii Consortium promotes sharing best practices and lessons learned about the proven benefits of energy and resource efficiency. The consortium has representatives from federal, state and local government agencies, utilities and the private sector. Because Waikiki is one the largest economic engines for Hawaii, due in large part to its international appeal and reputation as a premium tourist destination, this meeting focused on hospitality industry. Industry experts from the Sheraton Hotels, the Four Seasons Resorts and the Marriott Hotels shared their recent experience in planning and implementing energy efficiency projects.

This meeting was funded by Hawaii Energy and drew over 80 participants to the Ala Moana Hotel. To expand public access to the meeting, especially for the neighbor islands, the meeting was video-streamed over the Internet bringing total meeting attendance to over 150. This event also offered Hawaii Energy an outreach opportunity to raise awareness of the Program. See "Rebuild Hawaii" in Marketing & Outreach section for further details.

Revell Newton from the Sheraton Hotels

Watch the video of Mr. Newton's presentation at https://vimeo.com/56360575.



Patrick Ware from the Four Seasons Resort

Watch the video of Mr. Ware's presentation at https://vimeo.com/56360577.

Tyrone Crockwell from Marriott Hotels

Watch the video of Mr. Crockwell's presentation at https://vimeo.com/56360578.

Transforming End-Use Behavior: Achieving the Energy Independence Mission (AEIM)

Smart Sustainability Consulting, LLC

Hawaii Energy subcontracted Smart Sustainability Consulting (SSC), a local firm specializing in transforming energy-consuming end-use behavior, to engage Hawaii's Department of Defense, specifically the National Guard and State Civil Defense. The primary goal of the project was to educate participants about the unique energy challenges in Hawaii, the basics of energy measurement and how to perform a simple audit. Through this education, the secondary goal was to reduce the facilities' energy consumption through occupant behavior in the work place and to identify potential energy efficiency and conservation measures.

Members of the National Guard learning about energy efficiency and conservation measures.

Project sponsors within the National Guard and State Civil Defense called the undertaking Achieving the Energy Independence Mission with the clever acronym AEIM (pronounced "aim"). From multiple facilities, 132 members of the Guard and Civil Defense volunteered for the training. Structured by facility, teams of 4-5 participants were formed and then paired with a trainer from SSC. Training involved three interactive sessions: (1) energy training, (2) a goal setting workshop and (3) a certification ceremony. As part of the energy training, teams conducted a walk-through energy audit of their respective facilities to identify and measure plug loads, note lighting types and assess illumination levels, and measure room temperatures to assess air conditioning operating parameters.

This training was well received by the participants. One of the participants, Tamah-Lani Noh, an energy auditor representing one of the facilities (Building 300) stated that after the training, she and her team, "felt very comfortable moving forward with audits on their own and confident that they understood the 'hows' and 'whys' of the audit, better preparing them to address any circumstances that would arise." Ms. Noh became an energetic supporter of AEIM when she became aware, through the training, of just how much energy her building, air conditioning and appliances were using. Now aware, she unplugged her personal water cooler, turned off excessive lights, and opened up her shades to allow natural daylight. She also reported that she would be ordering advanced power strips for her team before it was required. In addition to leading her building's initiatives, she utilized the provided "train the trainer" curriculum to recruit and train occupants from four additional buildings. Ms. Noh represents an ideal trainee of the AEIM program.

First Annual Hawaii Sustainability in Higher Education Summit

University of Hawaii, Hawaii Pacific University, Brigham Young University-Hawaii, and Chaminade University

Hawaii Energy made a conscious effort in PY12 to develop strong relationships within the University of Hawaii (UH) system. One of the ways in which Hawaii Energy collaborated with the UH system is in the financial and intellectual support of the University of Hawaii Sustainability in Higher Education Summit. The 1st Annual Summit was a two-day conference for policy planning and program sharing about sustainability initiatives within the UH 10-campus system and higher education colleagues at Hawaii Pacific University, Brigham Young University – Hawaii, and Chaminade University. Hawaii Energy was a gold sponsor for this event, a speaker, and a panelist in educating and promoting the Program's mission.

The goal of the conference was to produce a UH System policy document on sustainability and provide an opportunity for building cross-campus collaboration and networking opportunities by sharing insights and best practices. The conference was attended by over 200 university personnel and invited guests, as well as other like-minded thinkers. A system-wide sustainability policy was drafted and action items are being executed currently to improve the sustainability of the UH system.

The 1st annual University of Hawaii Sustainability in Higher Education Summit held at UH West Oahu.

MARKET TRANSFORMATION PROGRAM PERFORMANCE

Green Classroom Professional Certificate Workshop + Toolkits

United States Green Building Council (USGBC) via Department of Business, Economic Development and Tourism (DBEDT)

Hawaii Energy directly supported DBEDT (and indirectly through SSC's Hawaii Energy-funded participation) in their efforts to collaborate with the USGBC in hosting a workshop for pre-K-12 teachers, paraprofessionals, administrators, and other pre-K-12 stakeholders. The four-hour workshop attended by over 100 individuals offered hands-on training in a classroom setting to reinforce USGBC Green Classroom Professional Certification (GCPC) curriculum. The curriculum includes an online Green Classroom Professional Certificate self-paced course, one Green Classroom Tool Kit per school or per team and a Classroom Mentoring Program.

Business & Industry Support

Energy Efficiency Sales Professional Training

EEFG® - Mark Jewell, President

Transformational efforts have been focused on changing the viewpoint of energy-related behavior and acceptance of the value of energy efficiency as the new norm for better decision making in business. As such, decision-making practices of the past need to be approached with new skills that can better communicate the importance of investments in energy efficiency.

Continuing from the last program year of transforming the energy culture in Hawaii and recognizing that educating a new generation of energy conservation and efficiency sales and advocacy professionals could lead to a true energy efficiency industry, the Program sought out Energy Efficiency Funding Group (EEFG) a training and education services firm based in California. Mr. Jewell worked in commercial real estate investment for over 15 years before becoming a nationally recognized expert on energy efficiency. It was concluded that this was just the type of training we would need to "Energize Efficiency" in Hawaii.

EEFG's education and training services focus on teaching professionals how to drive energy efficiency projects by "connecting the dots" for decision-makers. They take an innovative approach to teaching challenging topics. Participants leave informed, engaged, entertained, fired-up and ready to apply what they learned. Participants learn to identify projects, increase participation in incentive programs, achieve greater energy savings, and make their (or their customers') operations more competitive, profitable and valuable. The Program presented a number of courses by EEFG throughout the program year, specifically:

"The class is comprehensive and sets you up for success through the great material offered."

Able Konan, Hawaii Department of Agriculture

Efficiency Sales Professional Boot Camp

The Efficiency Sales Professional™ (ESP) certificate program included 48 hours of training on sales, energy efficiency, financial analysis, and personal productivity delivered over 6 full-day sessions. The Efficiency Sales Professional Boot Camp continues to be highly valued by its growing audience of market influencers.

His robust course included 24 learning modules teaching participants to find the highest valued targets and capture their attention, to map the decision-making chain and skillfully assess motivations, to concisely communicate value and artfully blend emotion and logic to neutralize objection to gain approval, and to replace myth with math and motivation to escape the clutches of simple payback period.

MARKET TRANSFORMATION PROGRAM PERFORMANCE

"Mark Jewell brings such a broad background to the table. He makes connecting the dots between the diverse aspects of selling energy efficiency sound so easy."

Chris Corley, Introspective Systems, Inc.

These workshops were held in Honolulu from October 22 to 27, 2012 with 52 attendees. They were offered a second time by popular demand from June 10 to 15, 2013 with 33 attendees.

Post-training surveys revealed that both Mr. Jewell and the courses were well-received. Many attendees commented on the abundance of valuable course material alongside expressions of gratitude to have the opportunity to attend these high-level trainings at such an affordable cost.

Learning to S.E.E.™ (Sell Efficiency Effectively)

This one-day workshop was a "sampler" version of the more comprehensive Efficiency Sales Professional (ESP) program. Learning to S.E.E.™ helped participants become better sales professionals. Topics included:

- Engaging all stakeholders in the sales process
- Effectively using tips and templates for sales letters and proposals
- Leveraging knowledge of tariffs, rebates and incentives
- Using metrics for more compelling value propositions

The workshop held on October 29th in Honolulu had 49 attendees. Nearly all attendees reported that they would begin applying what they learned within the year and that they expected this knowledge would make a significant impact on their work.

Financial Analysis of Energy Efficiency Projects

This workshop held on Maui covered several approaches to calculating a project's returns as well as the pros and cons of using various financial metrics when requesting capital. Attendees learned how to model expected cash inflows and outflows over time, how to calculate a project's present value and other financial metrics, and how to generate compelling capital budget requests. The event was held on October 30, 2012 and had 18 participants. Survey results confirmed that attendees learned a wide array of practical skills and techniques that they found both inspiring and highly relevant to their current work.

Workshop Series IV

This 2-day series of workshops included half-day sessions that targeted medium-sized businesses, which typically do not have dedicated energy staff to understand and champion energy projects and their associated benefits. The first day was themed *Using Efficiency to Build Your Business* and included two half-day sessions, *Finding Your Focus* and *Getting Efficiency Projects Approved*. Because of its success, this series was offered for each of the sessions, Honolulu had 47 and 39 attendees, and Hawaii Island had 11 and 7 attendees, respectively. The second day was themed *Boosting Your Competitiveness, Profitability and Value with Efficiency* and included two different half-day sessions, *Taking Control of Your Energy Use* and *Making Efficiency Happen*. These four half-day sessions were designed to allow people the flexibility of investing a smaller time commitment and was offered in both Honolulu and Hawaii Island. Attendees to each of the four sessions in Honolulu were 25 and 24 for the morning and afternoon sessions on Hawaii Island, 18 and 17 attendees for each session, respectively. The Transformational Program continues to receive positive emails and comments regarding this series and requests for more workshops on a regular basis.

Participants of the Energy Sales Professional™ Certificate Boot Camp, June 2013

Fostering Sustainable Behavior through Community-Based Social Marketing (CBSM)

Doug McKenzie-Mohr

Hawaii Energy sponsored current and potential community partners in fostering sustainability and energy conservation to attend the *Fostering Sustainable Behavior: An Approach to Community-Based Social Marketing (CBSM)* workshop, presented by Dr. Doug McKenzie-Mohr.

The Program supported three sessions. The first two included a one-day introductory workshop and a two-day advanced workshop, while the third was an executive briefing, in which Hawaii Energy addressed the audience about the Program and its mission. Hawaii Energy sponsored current and potential partners by purchasing fifty (50) seats and an additional subsidy to cover the travel cost for nine (9) non-profit attendees from the neighbor islands.

The workshops administered in Hawaii were an approach to community-based social marketing tailored to waste reduction & management, water conservation & management, energy efficiency, pollution prevention, transportation change, climate change adaptation, environmental education, and public health. Participants learned how to develop, implement and monitor human behavior change programs to improve sustainability and protect environmental resources based on the proven community-based social marketing methodology.

The workshops were an opportunity for multiple communities throughout the State of Hawaii to participate in a group setting to learn about community-based social marketing concepts and strategies and how to apply them to various projects. The purpose of engaging these parties was to develop a network of like-minded professionals in which Hawaii can instill positive behavioral change in energy efficiency, sustainability and conservation on multiple fronts.

Willow Krause, Maui Smart Grid Project Coordinator of Maui Economic Development Board (MEDB) and her colleague, Lory Basa stated they, "appreciate Hawaii Energy supporting their attendance" at the workshops, that they "got so much out of it", and summarized that it was an "excellent experience." Ms. Krause led two projects in which she engaged local volunteers that connected closely to Hawaii Energy's mission. From the workshop, she has applied lessons of the workshop to increase enthusiasm, participation, and accountability from her volunteers, and developed stronger relationships between them and MEDB members.

Certified Energy Manager (CEM), Energy Manager in Training (EMIT) and Online Training

Association of Energy Engineers (AEE)

The Association of Energy Engineers is represented in 89 countries with over 16,000 members worldwide and has a recently established a Hawaii Chapter. AEE is recognized as a leading resource for energy education and related certifications.

The Certified Energy Manager (CEM) training in particular is an internationally recognized certification which originated in 1981, and is applicable to any industry and any business. In addition to the rigorous exam, the CEM certification requires education and work experience. Those without the required credentials may receive an Energy Manager in Training (EMIT) certification upon successful completion of the exam until they are able to acquire the required education and experience.

Participants of a CEM training session on Maui

Individuals with an CEM or EMIT certification have a proven fundamental understanding of how energy is generated, regulated, distributed, financed and all the many ways energy is used, as well as end user behaviors, which helps them make savvy decisions about energy-related spending and savings. The course is based on the principle of energy conservation and efficiency which assists business managers, engineers and other professional in making better financial decisions while they reduce Hawaii's overall dependence on imported oil for energy.

During the first half of the program year, the Program identified the CEM course as an ideal workforce development opportunity and decided to pilot a sponsorship for eligible Maui residents to attend the 5-day Certified Energy Manager (CEM) course at a discount of 75% (regular non-AEE member price is $2,200 per student). Each subsidized student paid $300 for the cost of the exam. A total of 35 people enrolled in this course with 25 achieving CEM certification and three (3) receiving EMIT certification.

Hawaii Energy also offered two subsidized AEE Online Training Courses, specifically the *Fast Track CEM Prep Course for Energy Managers* and *Justifying Energy Efficiency as a Business Investment*. The purpose of these courses were to stimulate energy efficiency activity within Hawaii Energy's territory, particularly among the commercial customers and to provide professional development to those selling energy-efficient equipment/services and to facility operators in Hawaii. This online training offered flexibility for people who have a limited amount of time and could not be away from the office. Seventeen (17) professionals completed the CEM prep course, while eight (8) completed the course justifying energy efficiency as a business investment.

Business Lighting Workshops - "LED vs. Everything" Workshop

Lighting Wizards – Stan Walerczyk, Principal

With both availability and interest growing in solid-state lighting (the energy-efficient technology using light emitting diodes or LEDs), it is important for consumers to be able to effectively judge the quality, specifications, and comparisons among the many technology choices now available. This workshop, offered four (4) times throughout the program year, provided vendor-neutral education for participants to understand this rapidly evolving lighting technology by comparing LEDs to the most common lighting solutions.

The instructor subcontracted to offer the course was, Stan Walerczyk, Principal of Lighting Wizards, an energy efficiency consultant specializing in lighting. Local to Hawaii (Maui), he has 24 years of lighting experience in maintenance, retrofit contracting, third party review, luminaire design, policy making and research. He is a contributor to the DOE Commercially Available LED Product Evaluation and Reporting (CALiPER) program and a consultant for California's Title 20 Appliance Standard and Federal EPACT Standards, which mandates efficiency standards for lighting products. He has done considerable independent project managing for California Lighting Technology Center's work on California Energy.

The four workshops targeted medium power users (electric rate schedule of J and P) and were offered at the Maui Arts and Culture Center in Kahului, the Natural Energy Laboratory of Hawaii (NELHA) in Kona, the Hawaii Innovation Center in Hilo and the Central Union Church in Honolulu with ninety-two (92) attendees in total. The post surveys indicated that the 98% of attendees rated the workshop as "Excellent" or they were "very satisfied" with the workshop and most found the content provided to be "very helpful" in broadening their understanding of lighting. Overall, the workshop was well-received and successful. Several attendees asked for more information in regards to financing and cost/benefit of different lighting options. Most surveys provided positive feedback and gratitude towards Hawaii Energy for providing this workshop.

At the Lighting Wizards' "LED vs. Everything" workshops, participants learn how LEDs compare to the most common lighting solutions. In the photo at left, Stan Walerczyk facilitates a workshop at the Hawaii Innovation Center in Hilo.

Building Automation Workshops

International Facility Management Association (IFMA)

IFMA Building Automation workshop in Honolulu

Founded in 1980, IFMA is the world's largest and most widely recognized international association for facility management professionals, supporting more than 23,000 members in 85 countries. IFMA certifies facility managers, conducts research, provides educational programs, recognizes facility management certificate programs and produces World Workplace, the world's largest facility management conference and exposition. The association's members, represented in 130 chapters and 17 councils worldwide, manage more than 37 billion square feet of property and annually purchase more than $100 billion in products and services.

Hawaii Energy partnered with IFMA's Hawaii Chapter to bring two workshops on Building Automation to provide an introductory and intermediate-level workshop to facility operators that would help them run the facilities' equipment at designed efficiency levels. The classes offered were *An Introduction to Energy Management & Control Systems (EMCS)* and *An Explanation of Direct Digital Control (DDC) and Building Automation System (BAS) Fundamentals*. The classes were presented by Ken Richardson, Les Taniyama and Jason Forester.

These courses attracted fifty-nine (59) participants and emphasized the need for energy measurement and how the resulting data allows for managing the energy used by facility equipment. They learned how control of systems and subsystems provide information for operators, so they can make educated decisions for the facility. They were also challenged with examples requiring the review and analysis of energy management data to optimize building operations.

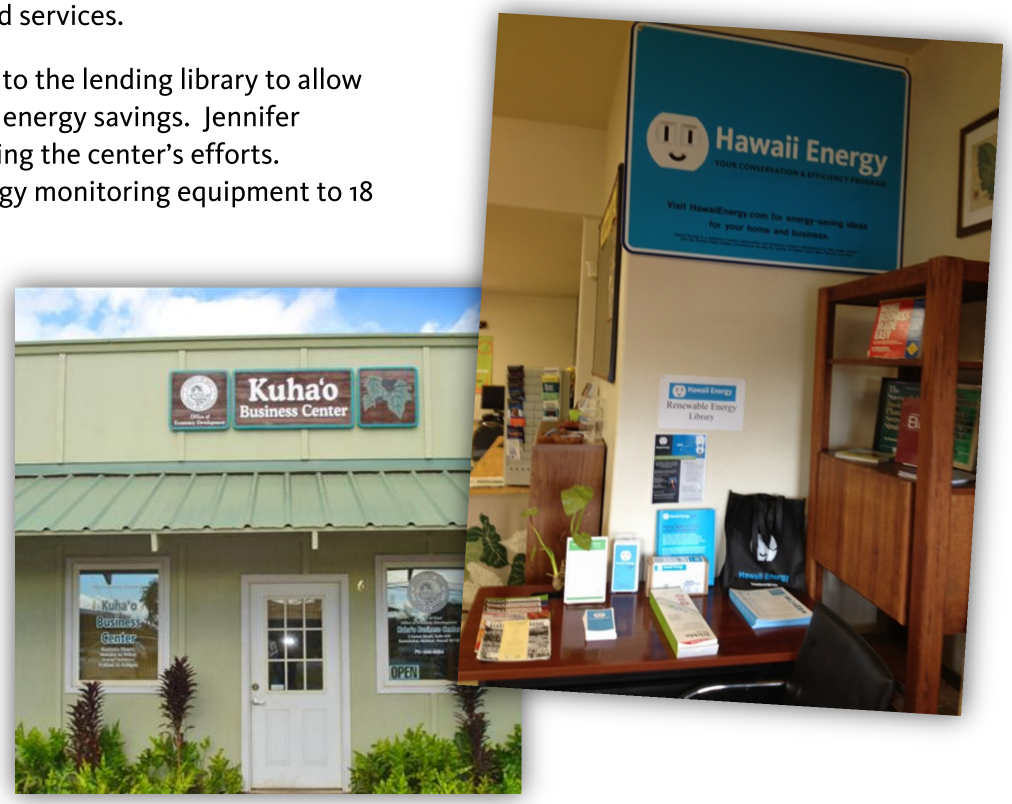
Energy Resource Center

Molokai's Kuha'o Business Center

The Kuha'o Business Center was established to help Molokai entrepreneurs and other local residents to start small businesses. In 2006, the Center became an extension project of the County of Maui and the Office of Economic Development. Hawaii Energy began a partnership with this organization in June 2012 with the establishment of a modest but valued Energy Resource Center.

The Kuha'o Business Center's mission aligns with Hawaii Energy's mission in that energy plays a large role in the economic viability of any business. The Kuha'o Business Center office serves as an energy efficiency lending library to local businesses and residents. It also offers a business library, small business-related workshops and seminars, confidential business counseling, business plan development, online access to business resources and other customized services.

Hawaii Energy provided plug load monitors and advanced power strips to the lending library to allow business and residential customers to evaluate energy use and achieve energy savings. Jennifer Hawkins was recently hired as the Small Business Specialist and is leading the center's efforts. Throughout the last program year, the Lending Library has loaned energy monitoring equipment to 18 Molokai residents and business owners.



Outside (left) and inside (right) the Kuha'o Business Center on Molokai, which houses an energy efficiency library for local businesses and residences.

Education Support

Energy Education in the Schools

The NEED Project

The NEED Project brings over 30 years of experience in energy education and has correlated their lessons and materials to Hawaii's education standards. NEED programs embrace a "Kids Teaching Kids" philosophy and all programs are designed to practice student peer to peer teaching and cooperative learning. More importantly, NEED's student-directed activities empower students to take active roles in educating their peers, families, and communities about energy issues and in identifying and solving the problems unique to their communities. Distance learning opportunities are available for rural and hard-to-reach communities via NEED's online curriculum, materials and support.

Hawaii Energy, in collaboration with The NEED (National Energy Education Development) Project, reached out to teachers by offering two (2) types of energy education workshops that included curriculum materials to teachers of all grade levels and subject matter to use in integrating energy and energy efficiency education into their classrooms and clubs. These curriculum materials are aligned with the Hawaii State Department of Education (DOE) standards.

The NEED Project workshops focused on developing a clear understanding of the science of energy and energy efficiency and conservation lessons for school, home, and commercial applications. The two one-day workshops: *Basic Energy Workshop* and *Building Science Workshop* were offered to teachers in the Hawaii Energy service area including hard-to-reach areas throughout the school year during PY12. Teachers were provided with professional development credits, a substitute reimbursement for their attendance, plus energy learning kits to use in their classrooms. In addition, teachers who attended the NEED workshops were eligible for grants for up to $2,500 throughout the program year for projects that build capacity in energy efficiency and conservation. Six (6) grants were awarded to teachers at local schools ranging from $500 - $2,500 each yielding a total of $9,250.

Teachers experience hands-on learning and curriculum development at The NEED Project workshops, sponsored by Hawaii Energy

MARKET TRANSFORMATION PROGRAM PERFORMANCE

The newly-formed NEED Teacher Advisory Board

NEED teachers had the opportunity to delve deeper into the NEED curriculum at the annual National Energy Conference for Educators held in July 2012. For PY12, the Program subsidized the travel and attendance cost for eight (8) Hawaii NEED teachers to participate in this 5-day conference to explore the NEED curriculum further with their peers from across the country to learn from well-seasoned NEED teachers as their facilitators.

Some new implementations this program year were the Punahou Sustainable Schools Educator's Energy Exchange and the Teacher Advisory Board (TAB). The purpose of the Punahou Sustainable Schools Educator's Energy Exchange was to reach out to the community of local educators. This event offered teachers the opportunity to share their integration of energy education and to encourage and support other educators in doing the same. Over the summer, NEED and the Program held a TAB session that was comprised of teachers who have participated in past NEED workshops and have shown high potential and good initiative in the use of NEED materials. These members were selected by Hawaii Energy and NEED staff. The TAB session, which was facilitated by both Hawaii Energy and NEED staff, serves as a platform for teachers to discuss further developments that would benefit teachers to apply energy education into their curriculum. Hawaii Energy and NEED have taken these suggestions from the TAB and have begun to integrate them into NEED curriculum and operations.

Throughout PY12, 262 teachers across the Hawaii Energy service area participated in NEED activities. These teachers were from 87 public and private schools, representing 43 communities. The level of participation surpassed the Program's initial goal for the offering and was well-distributed with a focus on serving the hard-to-reach demographic. Participant evaluations were extremely positive about the NEED offering. Nearly 85% of participants stated that the content was relevant to their teaching assignments and 97% of participants said the workshop was "very good" or, "one of the best workshops I have attended."

"Students had so much fun learning and exploring these concepts and sharing their experiences with their parents, other students, and other teachers at the school. They have started to analyze their own energy use as well as think about more sustainable ways to utilize energy sources."

Laura Cummings
Sunset Beach
Elementary School
Haleiwa, Hawaii

Transforming End-Use Behavior: Student Energy Ambassador Development (SEAD)

Smart Sustainability Consulting, LLC

Hawaii Energy subcontracted Smart Sustainability Consulting (SSC), a local firm specializing in transforming energy-consuming end-use behavior to engage schools and public institutions. The primary goal of the project was to educate participants about the unique energy challenges in Hawaii, the basics of energy measurement and how to perform a simple energy audit.

SEAD provided training to participating students in the Department of Education and local private schools. Structured by school, teams of 4-5 participants were formed and lead by a teacher. Training by SSC involved three interactive sessions: (1) energy training, (2) a goal setting workshop and (3) a certification ceremony. As part of the energy training, teams conducted a walk-through energy audit of their respective school to identify and measure plug loads, note lighting types and assess illumination levels, and measure room temperatures to assess air conditioning operating parameters.

Lead teachers were charged to champion the implementation of identified opportunities, such that the schools could reduce their energy consumption. In addition, the students were encouraged to apply these lessons in both school and at home.

The SEAD program served 165 participants of which there were enthusiastic responses:

- At the Academy of the Pacific, one of the students filmed a day of energy auditing and created a video. This video was then submitted to a video contest for high school students interested in changing the world.
- With the SEAD program serving as a catalyst, Maryknoll High School created a sustainability club called "The Green Team" shortly following the program.
- At the Hongwanji Mission School, one of the adults, Donald Miller (parent of participating student), audited his home and implemented ECM's. He then messaged SEAD a month later stating that his home energy bill dropped by at least $100 and he was very thankful for the education provided to him by this program.

Energy Trainers Mondenna Jamshidi and Jon Fritzler speak to students at Momilani Elementary School (top) and Maryknoll High School (bottom) as part of the SEAD program sessions.

RISE (Rewarding Internships for Sustainable Employment)

Kupu

The Program recognizes the need to prepare the next generation for green jobs and sees great value in green workforce development. Therefore, Hawaii Energy teamed up with RISE program operated by Kupu to recruit, train and mentor interns for green workforce development, specifically in energy efficiency in residential, commercial, and agriculture sectors.

Through the RISE program, college students and young professionals will be provided with opportunities to work in energy efficiency and conservation, market research in agriculture in residential and commercial sector in the form of paid internships. These interns will contribute to green initiatives with guidance and mentorship from Hawaii Energy and Kupu staff.

This initiative was set in place late in the program year with the intent to continue to the subsequent program year. PY12 was used as a launching pad for Kupu and Hawaii Energy to prepare job descriptions, marketing materials, training materials, and coordinate with other local partners. PY13 will be the full implementation of the RISE Program. Hawaii Energy looks forward to conveying the success of this offering in the coming program year.

Green Workforce Development and Residential Energy Literacy in Hard-to-Reach Communities

Hui Up 3.0 with Sustainable Molokai

Hawaii Energy subcontracted Sustainable Molokai and Blue Planet Foundation (see *Residential Support* on following page) to prepare the launch of Hui Up 3.0 on Molokai; a refrigerator exchange program with a required education component to improve the energy literacy of participating households. The professional development and education aspects of this project are driven by Sustainable Molokai, which will recruit and train a team of local youth to convey energy efficiency and conservation information, tips and practices to participating households. In addition to providing this in-home training, these youths will perform a home energy audit with a particular focus on plug loads, especially the refrigerators they encounter.

The Program engaged Sustainable Molokai late in the program year with the intention to launch this initiative in the next program year. Sustainable Molokai used this time to prepare training for interns, develop marketing materials to recruit participants, and to generate interest among local youth for internship positions.

Since this offering is still developing, data and results are not available as of the date of this Report. The Program looks forward to sharing the success of this offering in the subsequent program year.

Residential Support

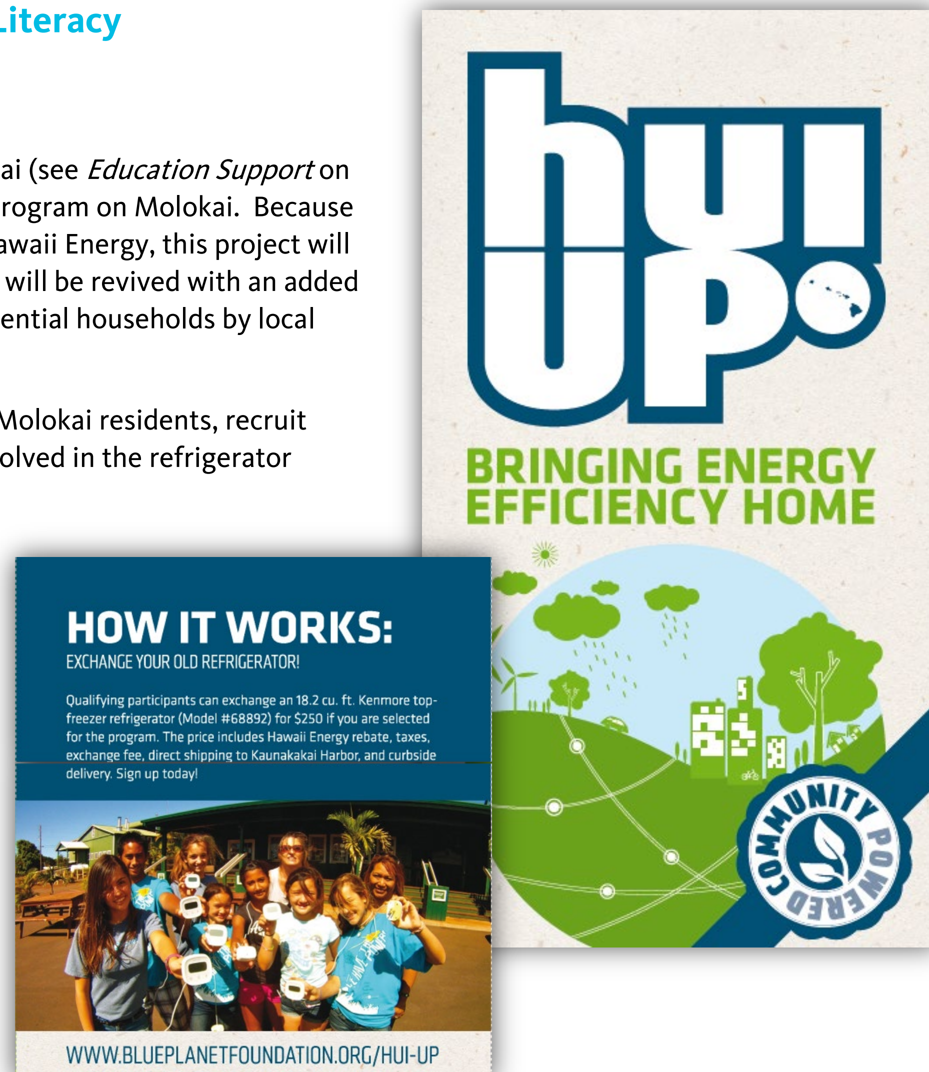
Marketing and Logistics Support for Residential Energy Literacy in Hard-to-Reach Communities

Hui Up 3.0 with Blue Planet Foundation

The Program subcontracted Blue Planet Foundation and Sustainable Molokai (see *Education Support* on prior page) to launch the next round of Hui Up, the refrigerator exchange program on Molokai. Because previous success was achieved on Molokai and Lanai with the support of Hawaii Energy, this project will be fully funded by the Program. In addition to the refrigerator exchange, it will be revived with an added educational component for energy efficiency and conservation within residential households by local youth interns providing these homes with energy audits.

Blue Planet Foundation's focus is to effectively market this opportunity to Molokai residents, recruit eligible participants and handle the logistical and fiduciary components involved in the refrigerator exchange.

This project was started late in the program year with the intention to continue into PY13. Thus far, 97 potential participants have signed up for the refrigerator exchange due to significant marketing efforts. A road map of logistics is in place as well. Since this offering is still developing, data and results are not available as of the date of this report. The Program looks forward to sharing the success of this offering in the subsequent program year.



Energy Literacy in Hard-to-Reach Communities

"Sharing the Aloha" Workshops – A free community workshop with Helen Wai

"Sharing The Aloha" workshop participants from Alu Like Kupuna of North Kona in April 2013

For islanders living at or below Hawaii's average income level, a cause of great frustration and feeling of helplessness is an apparent inability to control high electricity costs, let alone understand energy. Hawaii Energy subcontracted Helen N. Wai due to her experience in providing face-to-face financial literacy instruction and guidance to Hawaii's rural, low-income and Native Hawaiian families and communities over the past 15 years. The Program worked with Helen Wai to augment her classes to address energy efficiency and enhanced her offering with a complimentary energy-saving item for each participant. This free item enhanced participation, but also helped attendees save energy via their plug loads.

Throughout PY12, the need for free community education to assist struggling residents with escalating energy costs became increasingly apparent as there were 91 "Sharing the Aloha" workshops attended by almost 2,600 participants. The greatest level of participation was from Maui County.

Throughout the program year, Hawaii Energy received many positive emails and phone calls from workshop participants. Participants were empowered by the information and by Helen's unique local style of delivery making the course material very accessible.

Residents participate in Helen Wai's workshop at a Lahaina Honolua Senior Club meeting in Nov.2012

Participants answer to the question "What was the most important thing you've learned?"

- "I need to be more vigilant about my spending and wiser concerning the amount of energy we use"
- "To save on my electric bill (Wow) thank you Helen for vital information for my household"
- "I learned so many things, there not just one"
- "How much I can save in area's I may be over using"
- "I need to save!! My income is the same but the cost of living up tremendously so I need to make a difference & share with my family. I only pay for what I use!!!"

- “Stop using unnecessary items – this will allow you to save much more now! Thank you very much! Change will make a big difference yearly”
- “We pay for appliances we are not using”
- “When my solar heater runs out of hot water it goes to the electric grid!”
- “About rebates and Hawaii Energy programs”
- “How to Read the electric bill and understand clearly of usage.”

Hawaii Energy continues to get numerous requests from residents and organizations to bring this valuable and dynamic offering to their community.

A map showing the places where “Sharing the Aloha” workshops were held in PY12 (far right), and participants from a workshop at the Iwalani Village residences in Kapolei (right).

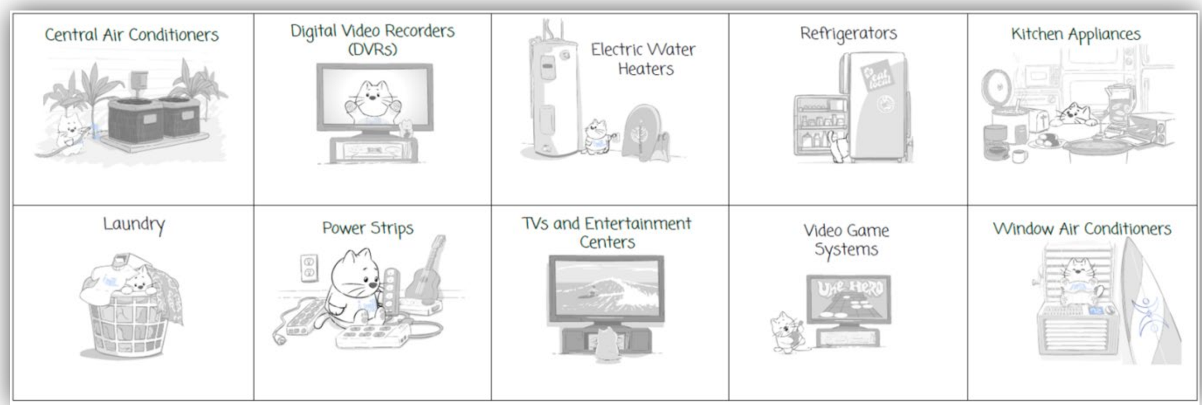
Energy Efficiency Literacy at Scale – Creating and Disseminating Socially Relevant Energy-Saving Information

Kanu Hawaii

Hawaii Energy recognizes that developing an energy-literate population is a significant challenge to achieve, but necessary. It requires a long-term and sustainable strategy, not only in capturing and retaining the public's attention and interest, but doing so in a scalable, cost-effective manner. For Hawaii's unique population and culture, a paramount requirement in fostering energy efficiency literacy is to do so with socially relevant information with a local context. This information needed to be crafted in order to achieve three things: (1) educate/inspire action, (2) encourage sharing with friends and family and (3) encourage further conversation amongst friends and family. Furthermore, the information needed to anticipate strategies for distribution via print, internet, mobile devices and social media.

Kanu Hawaii (Kanu) was subcontracted to take on this task based on its vision related to the above challenge and its mission to, "empower people to build more environmentally sustainable, compassionate, and resilient communities rooted in personal commitments to change." Furthermore, with a deep love for Hawaii and its unique way of life, a membership approaching 20,000 and a social media reach in the hundreds of thousands, Kanu Hawaii was an ideal partner for Hawaii Energy in this endeavor.

The project embarked to identify ten (10) meaningful energy saving areas/activities relevant to Hawaii families and create messages to identify these behaviors and communicate value. It needed to be attractive and appealing to "pull" people to want to learn about saving energy. Next, it needed to demonstrate energy-saving behavior that people can adopt.

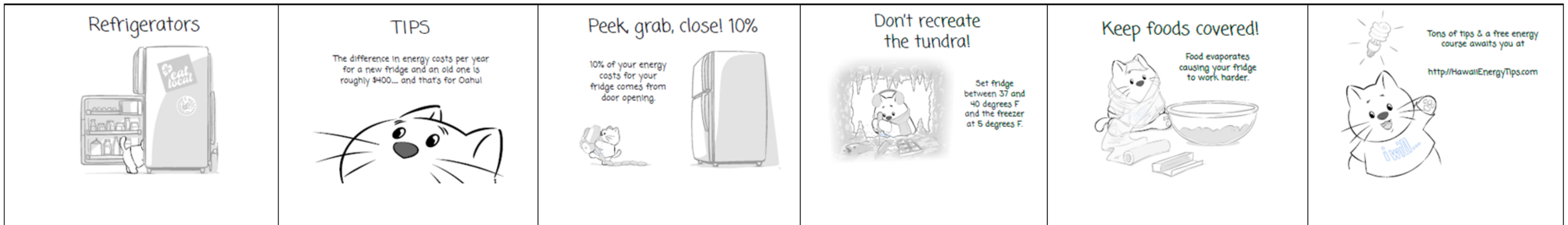


Kanu Hawaii's Energy Efficiency Literacy memes

MARKET TRANSFORMATION PROGRAM PERFORMANCE

Kanu's interaction with its large membership distilled these 10 opportunities for this project to address: central air conditioners, DVRs, electric water heaters, refrigerators, kitchen appliances, laundry, power strips, entertainment centers, video games systems and window air conditioners. A series of memes ("an idea, behavior, or style that spreads from person to person within a culture") were created by Kanu reflecting a sense of Hawaii culture that identifies energy-saving activities in an attractive, relatable way. Once a person sees an interesting meme in a printed document, webpage, blog or presentation they are presented with further information in infographics and/or videos that further explain the value of new behaviors that when adopted will produce financial savings.

Hawaii Energy intends to have twenty more energy saving areas/activities crafted next program year to round out a complement of thirty subjects. Consistent with the original vision, this critical mass of information-based assets will be leveraged in a number of ways. Most promising is the development of a free Hawaii-centric, hard-to-reach friendly, energy-efficiency course that will be accessible on various print and online platforms (i.e., internet, mobile devices, social media, etc.). Such an initiative will serve as a starting point for developing new collateral which will appeal to various age groups, social levels and organizations including businesses, government, social clubs, faith groups, schools and past "Sharing the Aloha" participants.



Activity/Area	Value	Behavior	Behavior	Behavior	Behavior

Energy Efficiency Literacy at Scale – Lending Library Pilot

Kanu Hawaii

The Modlet by ThinkEco was used during the "Pay It Forward" pilot program. Residents were encouraged to monitor their energy usage and then pass the device on to a friend, family member or neighbor.

To complement efforts to produce Hawaii-centric information to save electricity, the Program believed there was a need to take the lending library concept (see Energy Resource Center – Molokai's Kuha'o Business Center) to a new level. The "how to" information being developed by the Program is foundational; however, limited access to the tools that measure plug loads and quantify the saving opportunity remained a significant barrier to acting on this information. A major challenge for the Program to address is the financial and personnel resources required to get tools in the hands of those least likely to have access, and do so at a meaningful scale.

Therefore, Hawaii Energy subcontracted Kanu Hawaii (Kanu) to create and pilot a Lending Library that incorporated a Pay-It-Forward (PIF) model. The Lending Library was designed to recruit participants, deploy and track devices that measure and/or conserve electricity lent by the library, and measure the outcomes.

The PIF model's goal is to provide via the postal service simple to use, energy-saving devices to be self-installed by the household that will help them understand and take action to curb energy use. The innovative PIF model will encourage the original recipient, once the tool has served them well in saving electricity, to become energy ambassadors to their friends, family and neighbors by forwarding the tool along with their personal experience. This peer-to-peer education is expected to be very effective; however, if the participant declines to "pay-it-forward", the device can be returned to the Program for future participants. This PIF model has the potential to reach underserved communities, including rural locations, with a program that can be easily measured for effectiveness.

To properly measure the effectiveness and support participating families, an energy-saving device produced by ThinkEco called Modlet was chosen primarily for being compatible with various computer operating systems and popular smart phones, plus its simple installation process. The Modlet records the energy consumption of up to two devices and displays the electricity cost. After a base-load period, savings schedules can be set to turn devices completely off when not in use, eliminating all phantom loads for the devices. With the online account, the participant can see how much electricity was used and saved, along with the associated cost and cost savings. Other devices were piloted as well.

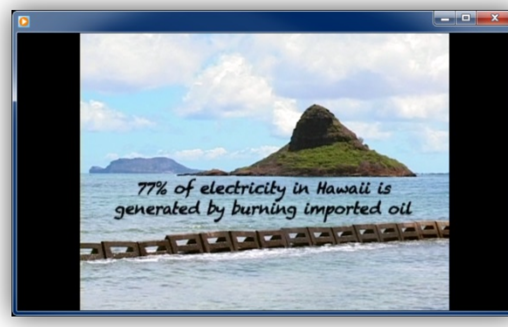
MARKET TRANSFORMATION PROGRAM PERFORMANCE

During the limited two-month pilot, Kanu engaged over 48 families by sending them the energy-saving devices. Data collected suggests there is demand for this type of offer and that it can make a difference in reducing energy use. Participants responded positively, in feeling that the Modlet will help them learn about their home energy usage and that other people can benefit from this type of energy-saving device. For example, one participant noted that their brand-new, EPA award winning ENERGY STAR® cable DVR used 100 watts when on, but 50 watts when turned-off (stand-by mode). Having the Modlet enabled the participant to see the energy consumption, schedule the unit to cycle on and completely off and see the resulting electricity and dollar savings. Kanu has engaged with the manufacture of the Modlet to acquire energy-related data to firmly quantify the energy savings realized.

The Program plans to continue and expand this pilot next program year by incorporating additional energy-saving devices, creating short videos "How to use" and linking it to other Hawaii Energy offers focused on energy efficiency literacy (see Creating and Disseminating Socially Relevant Energy-Saving Information). Hawaii Energy expects this offering to produce measurable energy savings over the next year, but more importantly create a broader acceptance and understanding that low and no-cost behaviors can be communicated to the hard-to-reach demographics in a cost effective and scalable manner.

Energy Efficiency Literacy - Video Training Project

'Ōlelo Community Media



'Ōlelo Community Media received funding from Hawaii Energy to offer video training classes at various 'Ōlelo Community Media Centers (CMCs) throughout the island of Oahu to develop public service announcements (PSAs) related to Hawaii Energy's mission and goals. The effort included a partnership with the Hawai'i Centers for Independent Living (HCIL), which helped to enroll seniors and those with disabilities.

These video production classes typically cost $150 to attend, but were free to the 71 students, adults and kupuna that enrolled, including seven hearing-impaired adults. In all, 10 classes were held in Wai'anae, Windward, Palolo, Honolulu and Mapunapuna. The course was co-instructed by 'Ōlelo's Jeffery Galicinao and Zach Cruz and assisted by an American Sign Language (ASL) interpreter.

Thirty-six (36) PSAs were produced by the cohort of students, who upon completing the class earned a certificate in video production. As demonstrated by the PSAs, the participants all learned more about Hawaii Energy's initiatives and the practical steps they could implement to reduce their energy consumption in the home. The most exciting result of the project for these students was to have their PSAs aired on 'Ōlelo's channels.

Graduates of a video training held in partnership with the Hawaii Centers for Independent Living, co-instructed by Jeffery Galicinao and Zach Cruz.

Energy Efficiency Literacy 2012 Youth Exchange Contest

ʻŌlelo Community Media

Youth Xchange is a Statewide student video competition that began in 2003 to encourage dialogue among Hawaii's students on community issues. Participation has grown exponentially, making Youth Xchange Hawaii's largest and only issues-oriented student video competition in the State. More than a contest, Youth Xchange creates a way to engage, educate and empower students, providing them with a compelling voice for positive change and community well-being. This competition of Elementary, Intermediate and High School division allows students to do a video between 30 seconds to 5 minutes long on a problem of their choice. The topic choices were Energy Conservation, Peacemaker, Traffic Safety, Start Living Healthy and Water. Hawaii Energy sponsored the energy conservation topic that drew 40 entries from various islands.

Youth Xchange Energy Conservation category winners:

Elementary:	"Save Energy, Save Money" – Fern Elementary School	view here: http://bit.ly/14C6wk7
Middle School:	"It's A Brighter World" – Kapolei Middle School	view here: http://bit.ly/1837yUM
High School:	"Turn It Off" – Mililani High School	view here: http://bit.ly/1fhQiOp

Hawaii Energy's Chelsea Harder with Kapolei Middle School students, winners of the middle school Energy Conservation category

MARKETING & OUTREACH

The goal of the Program's marketing, outreach and communications efforts has always been and continues to be to increase the public's awareness of Hawaii Energy's mission to educate, encourage and incentivize the electric utility customers of Hawaii, Honolulu and Maui counties to invest in efficiency measures and to adopt energy-saving behaviors.

The Program's marketing, outreach and communications continued to build up capacity in PY12. The marketing and communications team (Marcom) was restructured to consist of a Director of Communications, a Marketing Manager and a recently-hired Outreach and Marketing Specialist. This restructuring enabled the Program to be more strategic in its marketing and communications efforts, utilize existing talent and continue to effectively reach targeted audiences. The Program continued to retain Milici Valenti Ng Pack, Inc. (MVNP) to provide strategic and public relations services. In addition, the Program continued its relationship with creative advertising and web agency Wall-to-Wall Studios to ensure brand consistency.

This team supported Hawaii Energy through the strategic use of marketing, advertising, promotions, public relations and outreach, with highlights presented on the following pages.

At bottom right, Hawaii Energy collaborated with Special Olympics Hawaii on a "Change A Bulb, Change A Life" project, to increase energy efficiency awareness while helping to raise funds by making a donation in exchange for a CFL.

Marketing, Advertising and Promotions

Web Redesign

The Program launched a redesigned website in late June 2013. With everything becoming more online-focused, making sure our website provides the best experience for ratepayers and effectively communicates our message is essential to the success of Hawaii Energy. One of the Program's strongest marketing tools is our website as it is the easiest way for interested residents and businesses to learn more and get all of the information they need on energy efficiency and conservation.

Considering that the average lifespan of a website is 2-3 years and the Program's original website dates back to the Program's inception 4 years ago, it was the appropriate time to evolve and streamline the website. With the redesign, the Program had the opportunity to rethink our site architecture and reevaluate how our content is presented to visitors. The website redesign focused on improving the site's functionality and navigational elements all while developing a sleek, simplified design. Some key elements to note about the new website are:

- Fast, intuitive navigation – The new website has more simplified and streamlined categories so that users can easily find all of the information needed to help them take their first (or continued) steps towards energy efficiency.

- Enhanced user experience – To engage users and make the website more friendly and usable, the new site simplifies complex content to core relevant messages and uses more photos and other images.

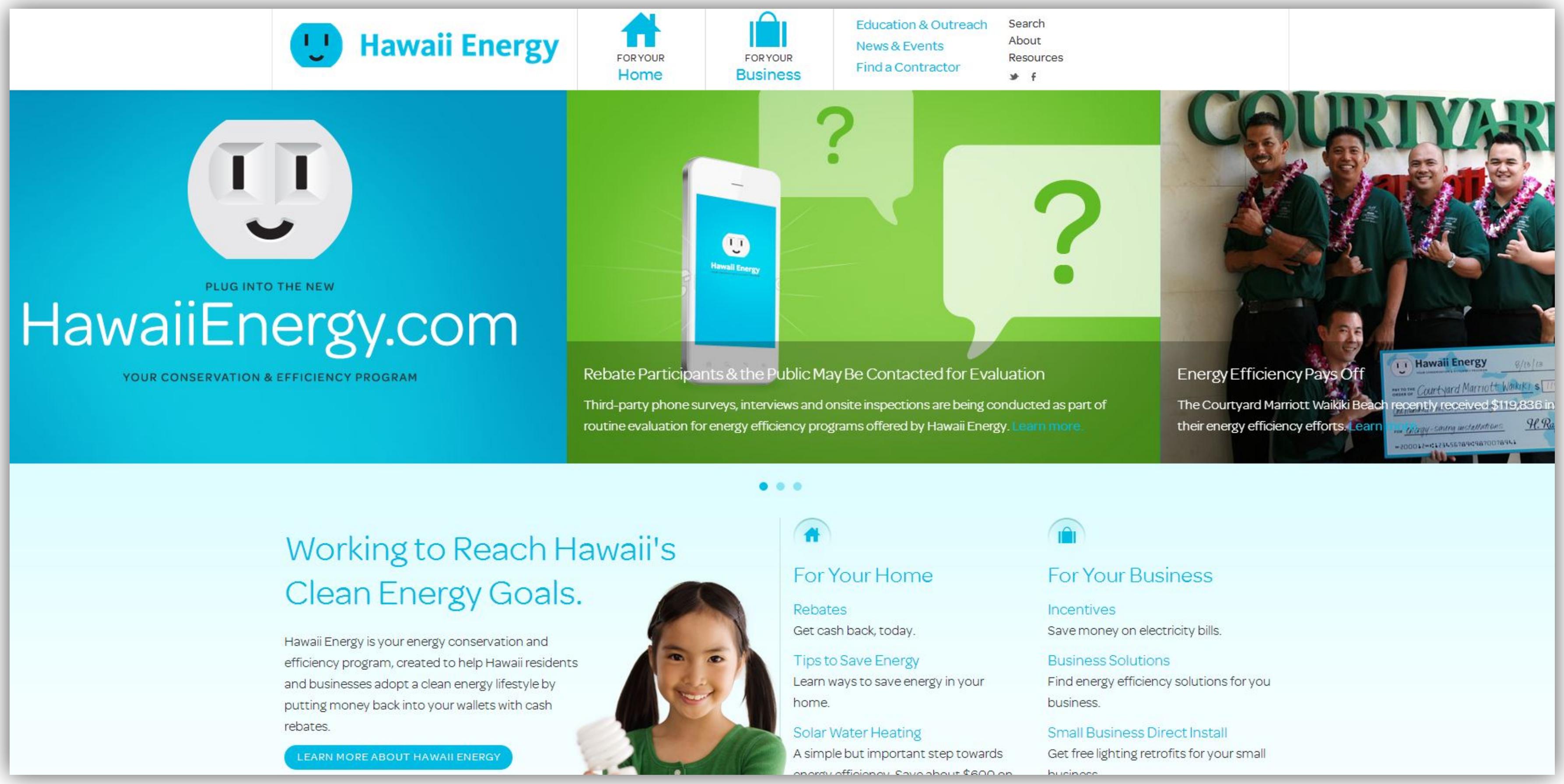
- Rebates and incentives finder on homepage – The rebates and incentives finder on the homepage enables users to easily search for relevant rebates and incentives for their homes and businesses. The finder streamlines the search for rebates and incentives by categorizing them into energy-efficient measures.

- "Tips to Save Energy" page – Since everyone may not have the means to invest in energy efficiency measures, the page provides a way to find low to no-cost energy conservation tips on our "Tips to Save Energy" webpage.

- Energy success stories – To make energy conservation and efficiency even more relatable, the site highlights the ways people in our community save energy in their homes. These success stories are featured on a rotating basis at the bottom of the homepage. They are also all featured on a webpage. Winners and finalists from our recent and past Energy Success Story Contests are showcased.

MARKETING & OUTREACH

Hawaii Energy's website, as with any website, is a continual work in progress to ensure that content remains relevant and that the user continues to have a seamless experience.



Screenshot of the new Hawaii Energy website

Hawaii Energy Conservation Award

This year we presented our first-ever Hawaii Energy Conservation Award to Allen Evans of Oahu-based Refrigerant Recycling Inc. at a ceremony during the 20th Annual Hawaii Conservation Conference. The Hawaii Energy Conservation Award honors an individual or organization whose outstanding leadership and innovation in the area of energy conservation has made a positive impact on the well-being of the State of Hawaii. Mr. Evans played an integral part in helping Hawaii Energy develop our "Trade Up for Cool Cash" and refrigerator and freezer "Bounty" offers. His recycling service, the first of its kind, breaks refrigeration devices down to the bare components; including oil, scrap metals, refrigerant and other containments. The Program intends to continue presenting an annual Conservation Award.

Program Director Ray Starling presenting Allen Evans with the Hawaii Energy Conservation Award

"In 2008 I looked into getting PV and it was too expensive. I then learned about home energy efficiency from HawaiiEnergy.com, and started applying what I found."

- *Wes Wada,* Energy Success Story contest winner

2nd Annual Energy Success Story Contest

From October 8th through the 31st, the Program held its second annual Energy Success Story Contest for electric ratepayers of Hawaii, Honolulu and Maui counties. The contest asked Hawaii's homeowners and renters to send in their inspiring and motivating stories and photos showcasing their outcomes and successes in conserving and using electricity more effectively. We received over 65 entries from Oahu, Hawaii Island and Maui. Wes Wada of Honolulu was selected as the grand prize winner and nine other finalists were also selected for their winning submissions. As the grand prize winner, Mr. Wada received a home energy monitoring system including installation. Each of the finalists received a gift bag consisting of energy efficiency tools such as advanced power strips and conserve power switches. The winning stories were posted on our website and highlighted in a press release with hopes that their stories would help fellow residents learn how they can reduce their electric bills.

Solar Water Heating Marketing and Advertising Campaign

In PY12, the Program experienced a slight decrease in solar water heating installations due to the following factors: (1) depressed market conditions and (2) the rise in popularity of photovoltaics (PV) and companies marketing their installation. Along with the increase of PV companies into the local market came an upsurge in advertising. Due to these factors, it was important for the Program to develop a develop a fully integrated advertising and marketing campaign to highlight the benefits of solar water heating and the increased, limited-time rebate from $750 to $1,000.

Marketing objectives were the following:

- **Awareness:** To increase awareness of solar water heating, the Hawaii Energy brand and our mission.
- **Education:** To educate electric ratepayers on the benefits of solar water heating, the Hawaii Energy rebate and the savings you could get by adopting this efficiency measure.
- **Conversion:** To encourage electric ratepayers to act by driving them online to learn more about solar water heating, the compelling reasons to have one installed and the simple steps to take to qualify for a rebate, including finding an approved solar water heating contractor with Hawaii Energy's handy list online.

With a strategy to promote solar water heating while continuing to build the Hawaii Energy brand, Wall-to-Wall Studios developed a creative concept that easily translated into print, television, radio and online advertising. The creative concept focused on highlighting the monetary savings – an estimate of $600 – you could get if you had installed a solar water heating system in your home. The spots were developed in an exaggerated way focusing on a unique character and the extreme, unrealistic items they bought with their savings (e.g., 200 pair of slippers or 100 bags of rice). The concepts were meant to be humorous but factual.

In order to effectively deliver the message from the creative concepts, the following deliverables were created and distributed across various media channels from March 2013 through June 2013:

- Two (2) 30-second television spots
- One (1) 30-second radio spot
- Two (2) print advertisements
- Two (2) online banner ads

MARKETING & OUTREACH

For this year's campaign, we continued to reach electric ratepayers through traditional media outlets including television, radio and print. In addition, this year, the Program decided to include online and social media advertising into our media buy and to focus more on advertising on the neighbor islands through their local radio stations and print publications. The portfolio of media purchased for this campaign yielded 31,390,949 estimated reach, which helped to convey our message and increase Hawaii Energy's brand among ratepayers. Reach is defined as the estimated number of readers or viewers reached in a given medium.

Stills from Hawaii Energy's two 30-second television commercial spots, created by Wall-to-Wall studios, to promote our limited time solar water heating installation rebates.

Earned Media

In addition to paid media described above, the campaign successfully garnered considerable media coverage across all channels. For a full list of media coverage, please refer to Attachment G.

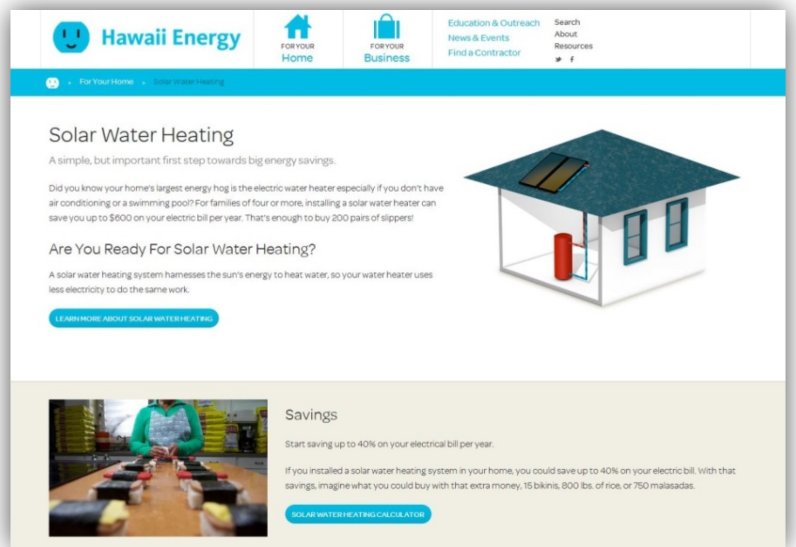
Website

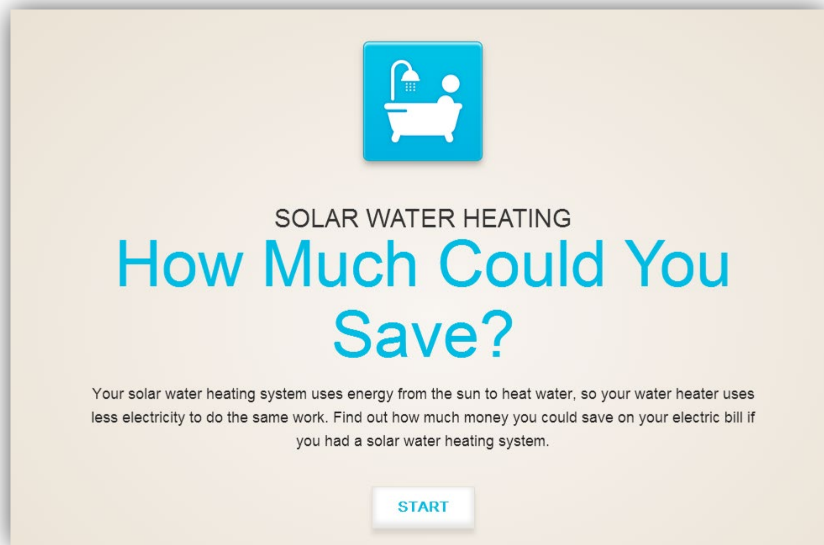
At the time of the launch of the solar water heating campaign (i.e., March 2013), the Program's redesign of the website was in progress. Since interactive content to help the public understand the benefits of solar water heating and how to take action was important to the campaign, we launched a microsite that mirrored the look and feel of the then to-be-launched redesigned website. This allowed for seamless incorporation of the microsite content into the redesigned site, which was launched in late June.

MARKETING & OUTREACH

The solar water heating microsite focused on four areas:

- "Resources and Information" was a page where the public could find more information on solar water heating including videos on "how to maintain your solar water heater" and "how to set your timer."
- "The Cost of a Solar Water Heater" page provided a way to help compare the two different Hawaii Energy offerings available for solar watering heating, so the public could best determine the offering that best fit their needs (i.e., $1,000 instant rebate vs. $1,000 solar water interest buy-down).
- "Solar Water Heater Calculator" allowed the public, in an interactive way, to find how much money they could save on their electric bill if they installed solar water heating. By selecting the island you live on and the number of people in the household, an automated calculation showed users the kWh and cost savings on their electric bill if they installed a solar water heater at home.
- "Find a Participating Contractor" page was updated so that users could search by county. In addition, "Tips to Choosing a Contractor" section was added to provide guidelines to search for contractors.



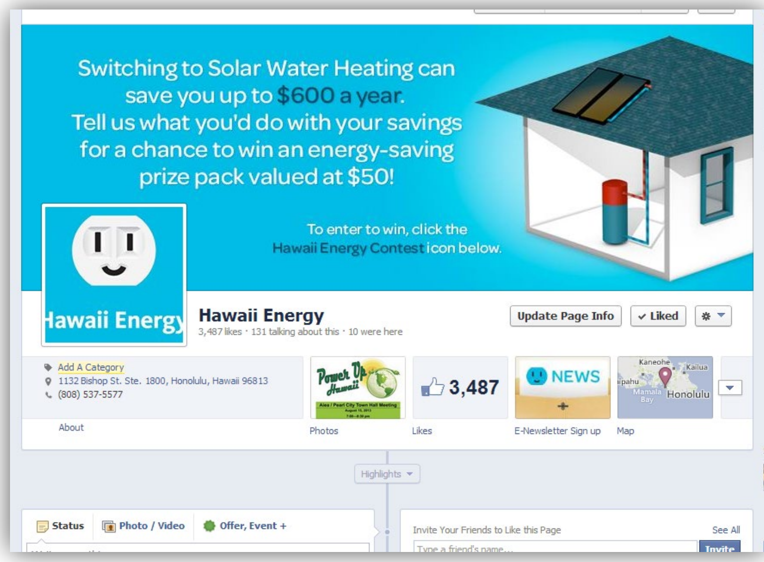


Screen shots from Hawaii Energy's solar water heating microsite, now active on the hawaiienergy.com website. Through the microsite, users are able to easily calculate the potential savings they could receive by installing a solar water heater.

MARKETING & OUTREACH

Social Media

To complement the rest of the solar water heating campaign, a promotional contest and application was developed for Facebook. To enter the contest, we asked Facebook users to submit what they would do or how they would spend the $600 saved if they installed a solar water heating system in their home. One winner was chosen each week and received an energy saving gift pack consisting of various energy efficiency tools like conserve power switches and energy monitors to measure plug loads. The contest launched in mid-June with a run of ten weeks, which will end August 24. Just in the two weeks of June alone, there was active ratepayer participation and interest in the contest with approximately 60 entries received.



The Hawaii Energy Facebook page featuring promotion for the Solar Water Heating contest

Results

The PY12 goal for solar water heating was to have 3,750 systems installed through our instant $1,000 rebate and 250 systems installed through our interest buy-down or "Hot Water, Cool Rates" rebate. At the inception of the solar water heating marketing and advertising campaign that began in March, the Program had only reached 45% of its installation goal for the instant rebate and only 30% of its goal for the interest-buy down rebate.

From the time the campaign launched, the Program saw a 25.2% increase in solar water heating authorizations compared to non-campaign time. A solar water heating authorization is defined as when an application is approved and a work order is issued for a participating contractor to move forward with installation.

Some additional notables include:

- Comparing PY12 March – June with PY11 March – June, there was an 8.24% increase in solar water heating authorizations.
- During the first full week in March when the campaign launched, there was a 36% increase in solar water heating authorizations compared to the same time in PY11.

MARKETING & OUTREACH

Public Relations

Public relations is the management of relationships between an organization and its various stakeholders through strategic communications. Hawaii Energy's public relations focus is media relations, which is the fostering of good working relationships with print, broadcast and online media to communicate newsworthy messages, stories and information to the public. Positive media coverage about the Program (e.g., print or online articles, television or radio mentions) is the tangible result of media relations.

Throughout the program year, Hawaii Energy continued to strategically identify and leverage media opportunities to garner positive coverage to increase ratepayer awareness of and participation in Hawaii Energy as a program as a whole, as well as specific residential and business offerings. Public relations was – and will continue to be – a critical component of the Program's integrated marketing strategy to maximize the credibility and reach of the Program's messages as communicated through other marketing channels such as website, social media, advertising, email communications and community outreach.

Metrics

Through collaboration with public relations subcontractor MVNP, Hawaii Energy generated substantial media coverage on local radio and television stations, as well as in newspapers, magazines and websites:

- The estimated cumulative reach of the media coverage generated is 9,632,406.
- The total publicity value of the media coverage is estimated at $244,635. Publicity value is calculated by multiplying the advertising value equivalency by three, which is a factor generally accepted by the marketing industry. Advertising value equivalency is defined as the value of media coverage by comparing it to the cost of a similar placement as an advertisement.

Media Coverage Highlights

Key media coverage is highlighted in this section. For a better understanding of the wide range of coverage achieved this year, see the media coverage report in Attachment G.

MARKETING & OUTREACH

PY12 - First Quarter

On July 26, 2012, Hawaii Energy orchestrated a major press conference with The Westin Ka'anapali Ocean Resort Villas (“Westin KORV”) and presented an incentive check for $215,657, the largest check to date to a Maui business from Hawaii Energy. The conference was held in recognition of extensive energy efficiency retrofits that Westin KORV recently completed including the replacement of over 9,500 incandescent lamps with energy-efficient, ENERGY STAR® qualified LEDs, which reduces electricity use related to lighting by over 80 percent, as well as a control system that monitors the carbon monoxide levels in the garage, operating the ventilation exhaust fans only when needed thus reducing fan operating times and energy consumption related to garage ventilation by over 90 percent.

The Westin Ka'anapali Ocean Resort Villas received $215,657 for extensive energy efficiency retrofits – the largest commercial incentive Hawaii Energy has awarded to date to a business on Maui.

These retrofits will save an estimated 1,914,958 kWh of energy annually, a third of the electricity the property purchases from the utility each year - equal to $608,956 in savings per year. Featured speakers were Maui County Mayor Alan Arakawa, Westin KORV General Manager Angela Nolan and Hawaii Energy Program Director Ray Starling. By-invitation attendees included involved vendors, Maui legislators, county councilmembers, as well as tourism and hospitality industry leaders. The conference generated significant media coverage including KITV-4 and KHON-2 evening news, as well as Maui News.

On August 1, 2012, Hawaii Energy presented its first-ever Hawaii Energy Conservation Award to Allen Evans of Oahu-based Refrigerant Recycling, Inc. during the 20th Annual Hawaii Conservation Conference. The Hawaii Energy Conservation Award honors an individual or organization whose outstanding leadership and innovation in the area of energy conservation has made a positive impact on the well-being of the State of Hawaii.

Mr. Evans helped Hawaii Energy create and fine-tune recycling channels for the “Trade-up for Cool Cash” offer. Following on the success of the “Trade-up” offer, Hawaii Energy developed and launched the residential “Bounty” offer in mid-2011. Since spring of 2010, Mr. Evans’ company Refrigerant Recycling, Inc., on behalf of Hawaii Energy’s “Trade-up” and “Bounty” offers, has recycled approximately 9,500 refrigerators and freezers. This has netted 300 tons of metals, 8,300 pounds of refrigerant and 9,500 quarts of oil. It is estimated that over 7,828,000 kilowatt hours (kWh) of electricity and approximately $2,504,960 in electricity costs have been saved as a result of both offers (based on a blended savings of 824 kWh per recycled unit and electricity at 32 cents per kWh). Media coverage received included Hawaii Public Radio, Hawaii News Now morning news and MidWeek.

MARKETING & OUTREACH

Hawaii Energy's Derrick Sonoda on Hawaii News Now promoting the 2nd Annual Energy Success Story Contest

In September 2012, Hawaii Energy worked with Forest City Military Communities to promote the first two months of savings of Hawaii's Energy Smart Initiative, which was launched on May 29, 2012. In just the first two months, the Initiative had already played a significant role in helping Forest City's Navy and Marine housing to reduce overall electricity use by 674,956 kWh, as compared to the same two-month period last year (June and July). Forest City reduced its electricity use, on average, by 58 kWh per occupied housing unit each month in June and July. This reduction is equal to approximately $147,125 in savings. Media including Honolulu Star-Advertiser and HawaiiReporter.com covered the story.

PY12 – Second Quarter

In October, the Program launched Hawaii Energy's second annual Energy Success Story Contest. Marketing communications included an electronic news blast and press release, as well as updated web content. The Program received a variety of coverage including a morning news interview on Hawaii News Now, which aired photos of winners from last year's contest.

Throughout the year, but particularly during the second quarter of PY12, Hawaii Energy focused on identifying and leveraging public relations opportunities. This included developing bylined articles and working with various community and trade publications on features. The Program's efforts were successful and resulted in substantial coverage reaching across various ratepayers segments including:

- *Newsletter from Senator Michelle Kidani (D), Senate District 17, Mililani Mauka, Mililani Town, Waipio Acres and Waipio Gentry, September issue (newsletter for constituents):* Cover page feature "Hawaii Energy Recognizes Mililani's Allen Evans" and "Did You Know . . . that if you purchase a new ENERGY STAR® rated refrigerator . . ."

- *Wiliki o Hawaii (Engineer of Hawaii) newsletter, October 2012 issue*: Cover page story bylined by Hawaii Energy entitled "October is Energy Awareness Month: Hawaii Energy's Incentives Can Help Your Company or Client Battle Rising Electricity Costs" (cover photo at right)

- *Building Management Hawaii, October & November 2012 issue*: "Air It Out: Don't Let Exhaust Fans Blow Your Money" by lined by Deputy Program Director Michael Chang

wiliki o hawaii
ENGINEER OF HAWAII
VOL. 48 NO. 8
SERVING 2000 ENGINEERS & LAND SURVEYORS
OCTOBER, 2012

October is Energy Awareness Month:
Hawaii Energy's Incentives Can Help Your Company or Client Battle Rising Electricity Costs

MARKETING & OUTREACH

- *Hawaiian Properties newsletter, December 2012 issue (for property managers of Hawaiian Properties):* Cover page feature "Christmas Comes Early to Country Club Village 6" and interior full-page feature "Battle Your Property's Rising Electricity Costs with Hawaii Energy Incentives"

- *Building Management Hawaii, December 2012 - January 2013 issue:* "Does Your Building Have 'Heavy Users'? – High Utility Costs, New Technology and a New State Act Make Submetering a Real Possibility for Many Buildings"

- *Maui Family, Winter 2012 issue:* "Holiday Tips to Save You Money & Electricity – From Hawaii Energy, a ratepayer-funded conservation and efficiency program"

- *Hawaii Business, January 2013 issue:* "Military Drives Alternative Energy in Hawaii" (highlighting results of Hawaii Energy Smart Initiative with Forest City Military Communities)

- *Building Management Hawaii, February - March 2013 issue:* "Top 3 Energy Incentives – Minimize Your Operating Budget Variances with Energy Efficiency Measures" bylined by Deputy Program Director Michael Chang

- *Pacific Business News, March 1, 2013:* "State Stays On Course to Meet 2030 Energy Goals" (highlighting Hawaii Energy and Program Director Ray Starling)

PY12 media clippings from (clockwise from top): Hawaiian Properties newsletter, Pacific Business News, Maui Family magazine and Building Management Hawaii

PY12 – Third Quarter

Since January 2013 and continuing through December 2013, Hawaii Energy is featured in a weekly drive-time radio spot broadcasting live on KGU 760AM radio from 4 to 5 p.m. on Wednesdays called "Negawatt[2] Moment with Hawaii Energy".

[2] A Negawatt is a theoretical unit of power representing an amount of energy (measured in watts) saved. The energy saved is a direct result of energy conservation or increased energy efficiency.

Program Specialist Lisa Harmon presenting the weekly "Negawatt Moment on the "Hawaii: The State of Clean Energy" radio show, produced by ThinkTech Hawaii.

This opportunity is a part of Hawaii Energy's sponsorship of the "Hawaii: The State of Clean Energy" show produced and hosted by Jay Fidell of ThinkTech Hawaii. Since its inception, various Hawaii Energy team members have participated as guests of the "Negawatt Moment" to highlight Hawaii Energy rebate and incentive offerings as well as conservation tips. In addition to being live on KGU, the show is streamed live on Ustream.com.

In March, public relations was a key component of Hawaii Energy's integrated marketing campaign to promote residential solar water heating and limited-time $1,000 instant rebate. Hawaii Energy issued a press release and pitched various media to maximize reach. The launch garnered significant and widespread media coverage, including features in Honolulu Star-Advertiser, Maui News and Pacific Business News.

PY12 – Fourth Quarter

In April 2013, Hawaii Energy pitched a news release reminding ratepayers to take advantage of the Program's "Bounty" rebate to leverage Earth Day, April 22. For "Bounty", Hawaii Energy picks up and recycles old, working refrigerators and freezers for free and provides a rebate. Significant media coverage was garnered including Honolulu Star-Advertiser, KHON-2 morning and evening news, Hawaii News Now morning news, Lahaina News, Maui Weekly and BigIslandNow.com.

Hawaii Energy's Larry Newman on Hawaii News Now's Sunrise morning show promoting Bounty for Earth Day

On May 29, 2013, the Program orchestrated a presentation of a $73,678 incentive check to One Kalakaua Senior Living in recognition of extensive energy efficiency measures recently completed including: (1) the installation of a new chiller with variable frequency drives to replace two inefficient chillers, (2) an automated energy management system that monitors and controls the various components associated with this upgrade and (3) an energy-efficient heat pump for hot water.

All together, the project will save One Kalakaua an estimated 448,517 kWh annually and reduce their demand by 51.2 kW, which equates to $119,206 in savings per year based on $0.263 per kWh and $24.34 per kW demand. Public relations work included development and

Hawaii Energy presents the residents and staff of One Kalakaua Senior Living Center with an incentive check for $73,678.

distribution of a media advisory and news release. Coverage included a Hawaii News Now morning news segment.

In mid-June, the Program promoted Hawaii Energy's first-ever Facebook contest promoting the limited-time $1,000 residential solar water heating rebate. The goal of the 10-week contest is to expand the awareness of and participation in the Program and rebate through engagement of ratepayers who are active with social media. As part of the contest, Hawaii Energy asks ratepayers what they would do with the $600 annual savings from installing solar water heating. One winner was selected each week (in PY13) to receive an energy efficiency prize pack. To promote the contest, the Program distributed and pitched a news release, which received significant media including HawaiiReporter.com, Pacific Business News, Hawaii News Now morning news and West Hawaii Today.

Additionally, in June, the Hawaii Energy pitched a story highlighting the Program's collaboration with Ma Ka Hana Ka 'Ike, a non-profit construction-skills training program for at-risk youth in Hana, to bring solar water heating systems to three households in the area. Students had the opportunity to work hands-on in the design, installation and maintenance of systems with a licensed professional. The collaboration received media coverage including Maui News, MauiNow.com and HawaiiReporter.com, as well as Maui's Pacific Media Group (92.5FM, 93.5FM, 98.3FM, 99.9FM, AM900 and AM550) news mentions.

Weather | Jobs | Crime Statistics | Public Noti

MAUI NOW.com Maui's News & Information Hub

Front News Entertainment Business Real Estate Surf Sports Food People Events Discus

MAUI MEMORIAL MEDICAL CENTER Saving lives with

Hāna Students Install Solar Water Heating in 3 Homes

June 24th, 2013 · No Comments · Maui News

Share

Photo courtesy Hawai'i Energy and Ma Ka Hana Ka 'Ike.

By Maui Now Staff

Three homes in East Maui had solar water heating systems installed under a partnership between the Hawai'i Energy initiative, and the non-profit Ma Ka Hana Ka 'Ike construction skills training program for at-risk youth, an announcement said.

"We are excited to be a part of this project, which not only facilitated the installation of solar water heating systems for in-need households in Hāna, but also provided an opportunity for the training of Ma Ka Hana Ka 'Ike team members and students in the design, installation and maintenance of these systems," said Ray Starling, Hawai'i Energy Program Director in a press release.

Under the partnership, students had the opportunity to earn hands-on experience in the energy efficiency and conservation field which included work alongside a licensed professional.

According to the announcement, students learned how to design a solar water heating system, order materials, mount solar panels and orient them for optimum performance. They also learned plumbing skills, including soldering, insulating and constructing to code.

"Through this mentorship approach to education, Hāna youth gained valuable and practical hands-on training," said Starling.

A partnership with Ma Ka Hana Ka 'Ike, a non-profit construction skills training program for at-risk youth, allowed Hawaii Energy to bring solar water heating systems to three households in Hana's rural community.

Outreach

For PY12, Hawaii Energy's outreach efforts included: (1) partnering with local businesses and non-profit organizations to further conservation messaging efforts; (2) increasing presence and participation at local events and expos in order to broaden our audience reach and (3) continuing to present the Program to a variety of organizations and groups.

Partnerships

Honolulu Board of Water Supply

Hawaii Energy partnered with the Honolulu Board of Water Supply's (BWS) to develop a unique contest theme, "Save Water, Save Energy" for their 2013 Water Conservation Week Poster and Poetry Contests. The theme challenged students to depict conservation behaviors that promote both water and energy efficiency. More than 1,300 posters and 200 poems were received in the 35th annual poster and 5th annual poetry contests. Winners were selected based on the accuracy of information, originality, creativity and artistic or poetic ability, based on the student's age, to convey this year's contest theme. Twenty-four (24) Oahu students from kindergarten to 12th grade were recognized and presented with awards at a ceremony at the City and County of Honolulu's Mission Memorial Auditorium.

Hawaii Energy partnered with the Honolulu Board of Water Supply to support its 2013 Water Conservation Week Poster & Poetry Contest. On May 15th, many of our island's keiki were recognized at an awards ceremony for their winning posters and poetry.

Special Olympics Hawaii – "Change a Bulb, Change a Life"

The Program teamed up with Consolidated Electrical Distributors (CED) and GE Lighting Hawaii to help raise funds for the Special Olympics Summer Games, which were held from Friday, May 24 through Sunday, May 26 at the University of Hawaii at Manoa. As part of the collaboration, the Program provided Special Olympics Hawaii with energy-efficient CFLs. Attendees at the Summer Games were then encouraged to donate a $1 or more to the non-profit organization to receive a free CFL. Volunteers from Hawaii Energy and CED helped to promote the CFL donation during the games. Special Olympics Hawaii was able to raise $1,000 to support their athletes and programs.

MARKETING & OUTREACH

Hawaii Conservation Conference

Through a sponsorship with the Hawaii Conservation Conference, Hawaii Energy coordinated three symposium panels featuring key community leaders: (1) “Growing Green Jobs in Hawaii”, (2) “Clean Energy as an Economic Development Strategy for Hawaii” and (3) “Energy Conservation through Efficiency Measures.” The annual conference was held from July 31st through August 2nd, 2012 at the Hawaii Convention Center and is the largest gathering of people actively involved in the protection and management of Hawaii’s natural environment. Its purpose is to facilitate information transfer and interaction between natural resource managers and the scientific community.

Rebuild Hawaii

In conjunction with the Rebuild Hawaii Consortium, the Program presented Business and Residential program offerings to approximately 100 attendees and 200 online viewers at Rebuild Hawaii Consortium’s quarterly meeting. A hosted live webcast of the meeting was executed as part of the consortium’s effort to encourage and facilitate partnerships that help leverage its members’ assets to develop innovative solutions to energy and resource efficiency issues.

Rebuild Hawaii

Event Participation and Presentations

For PY12, the Program's goal for community outreach event participation was three-fold: (1) to reach a wide-array of electric ratepayers; (2) to continue involvement in past outreach events that were deemed successful and (3) to find and participate in new outreach events. Community outreach participation is defined as the Program having a booth or table at an expo, conference, tradeshow, fair or festival and distributing Program-related information and giveaways. Overall, the Program participated in 28 community outreach events in PY12, which reached about 73,122 people. Of these events, 64% of them were in Honolulu County, 21% in Hawaii County and 14% in Maui County.

Furthermore, we identified and participated in some community outreach events that we had never participated in before, such as YMCA Healthy Kids Day, Children & Youth Day, the Maui County Agricultural Festival and the Hawaii Community College Earth Fair. By having a presence at these events, the Program was able to reach different and larger audiences.

In addition to community outreach event participation, the Program conducted 30 presentations to a variety of organizations providing information on Hawaii Energy, residential rebates and business incentives. Of these presentations, 33% were in Hawaii County, 53% in Honolulu County and 13% in Maui County. Hawaii Energy was able to reach approximately 3,882 people through these efforts.

Number of Events and Presentations				
	Counties			
	Hawaii	Honolulu	Maui	Grand Total
Community Outreach Events	6	18	4	28
Presentations	10	16	4	30

Estimated Number of People Reached				
	Counties			
	Hawaii	Honolulu	Maui	Grand Total
Community Outreach Events	1,713	66,150	5,259	73,122
Presentations	333	3,420	129	3,882

KEY REPORTING ASSUMPTIONS

Technical Resource Manual (TRM)

All energy efficiency and conservation programs need to estimate the average amount of energy and demand that is saved for installations of standard measures. This allows an effective program to promote these standard measures across markets with an incentive amount that is appropriate for the amount of energy and/or demand that is typically saved. Hawaii Energy maintains these energy saving estimates in the Technical Resource Manual (TRM). The following describes how the TRM was developed and the key assumptions that were used in estimating the energy (kWh) savings and demand (kW) reduction impacts claimed by the Program. Changes are made from time to time at the recommendations of the Program Evaluator. Upon the end of each program year, a formal evaluation is conducted by the Program Evaluator whereby updates are implemented for the subsequent program year.

The TRM is intended to be a flexible and living document. New measures may be added as new program designs are implemented. These measures are often not yet characterized, so new information will be gathered through evaluations or research. Savings for current measures may change as the market evolves.

There are four main reasons to update TRM values:

- **New Measure Additions** – As new technologies become cost-effective, they will be characterized and added to the manual. In addition, new program delivery design may result in the need for new measure characterization.

- **Existing Measure Updates** – Updates will be required for a number of reasons; examples include: increase in the federal standard for efficiency of a measure; new information from field tests; altered qualification criteria; decrease in measure cost; or a new evaluation that provides a better value of an assumption for a variable. As programs mature, characterizations need to be updated to meet the changes in the market.

- **Retiring Existing Measures** – When the economics of a measure become such that it is no longer cost-effective or the free-rider rate is so high that it is not worth supporting, the measure shall be retired.

- **Third-Party Measurement and Verification (M&V) Contractor TRM Review** – Annually the M&V contractor will provide a review of the current TRM and make recommendations based on current market research and in-field savings verification of measures.

KEY REPORTING ASSUMPTIONS

Description of the TRM

The TRM provides methods, formulas and default assumptions for estimating energy and peak demand impacts for measures and projects that receive financial incentives from Hawaii Energy. It is organized by program, end use and measure. It describes how the Program estimates energy savings from each measure. The PY12 TRM represents a total of 68 measures for both residential and commercial programs and is shown as Attachment F.

Overview of the TRM Derivation

In the TRM, each measure includes a description of the typical baseline (average) energy use and the high efficiency energy use for that type of technology. The energy saved is typically the differential between the two. The energy use of the baseline technology may include some estimation of market status related to various types of older, less efficient equipment. The final savings values are compared against the previous evaluation studies performed for the Hawaiian Electric Companies' programs, as described in this report.

Data assumptions are based on Hawaii specific data, when and where available. Where Hawaii data was not available, data from neighboring regions is used where available and in some cases, engineering judgment is applied. Referenced data sources, in general order of preference, but not necessarily limited to, include:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Management Programs – KEMA
- HECO IRP-4: Energy Efficiency Potential Study (HECO DSM Docket)
- 2004 – 2005 Database for Energy Efficiency Resources (CA DEER database)
- 2007 – 2008 Database for Energy Efficiency Resources (CA DEER database) Update
- Other Energy Efficiency Program Design Information (e.g. Efficiency Maine, Focus on Energy, etc.)
- CEUS – The California Commercial Building End-Use Survey
- Evergreen TRM Review/Report dated 6/20/13
- ENERGY STAR® Partner Resources
- Field verification of measure performance

The savings estimates for each measure were initially drawn from the KEMA Evaluation Report for 2005 through 2007 since this report was the most recent information available on specific markets. The values in this report were built upon previous evaluation reports and in-field measurements.

Since there were many measures that used "average" field measured data and no mathematical savings derivations, the calculation approach in the TRM attempted to develop these savings calculations based on typical measure characteristics. The primary use of the KEMA report values was to guide market assumptions, especially for the baseline energy use, to more accurately estimate the typical savings.

KEY REPORTING ASSUMPTIONS

Customer level savings are based on many variables including: measure life, market sectors, base versus enhanced case, persistence and coincidence factors. Claimed savings were compared against other sources, such as savings values used in other jurisdictions and research documentation from KEMA, the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), the National Renewable Energy Laboratory (NREL) and other organizations.

Factors Determining Program Level Savings

Application of System Loss Factors

The amount of energy saved at a customer site is not equal to the amount saved at the electric utility plant supplying the energy to that site. There are system losses in generation, transmission and distribution of energy from the power plant to the site. This results in a larger savings at the power plant than at the customer site. To account for this larger impact on the system the "system loss factor" needs to be estimated. The system loss factors were provided by HECO, MECO and HELCO. They do not vary by measure, but by island, and are listed in **Table 78.**

Table 78
System Loss Factors

County System to Customer Energy Loss Factors		
Oahu	**Maui**	**Hawaii**
11.17%	9.96%	9.00%

The system loss factors were applied to the estimated Customer Level savings for each measure to calculate the impact on the system of a particular measure. The resulting System Level savings was used to estimate the overall impact to the reduced cost of not producing the saved energy. This "avoided cost" is the overall economic benefit and used within one of the primary cost benefit measures for the Program, called a Total Resource Cost (TRC) test.

Net-to-Gross Ratio

The Net-to-Gross (NTG) Ratio is used to adjust the System Level Energy savings to determine the energy saving that is attributed to the Program, or "Program Level Savings."

Program Level Savings are those directly attributed to Hawaii Energy actions by separating out the impacts that are a result of other influences, such as consumer self-motivation or free-riders. Free-riders are ratepayers or participants who received an incentive and/or education by the Program, but the incentive and/or education did not play a role in their decision to purchase or receive the savings measure. **Table 79** shows the NTG ratios used for the utilities' 2008 program year (HECO 2008 A&S report). Hawaii Energy utilizes the combined Program total NTG ratio of 73%.

Table 79
Net-to-Gross Factor - PY12

Program		**Net-to-Gross Ratio**		**Savings**	
		Energy	**Demand**	**Net Energy Savings 2008**	**Gross Energy Savings 2008**
HECO (PY08)	CIEE	0.653	0.664	45,798,527	70,135,569
	CINC	0.596	0.610	17,469,147	29,310,648
	CICR	0.759	0.755	28,749,233	37,877,777
	ESH	0.850	0.850	32,203,749	37,886,763
	REWH	0.729	0.731	8,237,872	11,300,236
	RNC	0.841	0.885	8,267,217	9,830,222
	RLI	1.000	1.000	7,899,869	7,899,869
	Total	0.728		148,625,614	204,241,084
Program		**Net-to-Gross Ratio**		**Savings**	
		Energy	**Demand**	**Net Energy Savings 2012**	**Gross Energy Savings 2012**
Hawaii Energy	All	0.730	0.730	113,198,801	155,066,850

New Program Net-to-Gross Values

The Third-Party Evaluator recommendations for Net-to-Gross values were adopted for the development of the PY13 Annual Plan and were based on verified PY11 results. These values recognize the differences in Program-driven savings between the various categories of measures. The evaluation can be found at www.hawaiienergy.com/information-reports. The values to be used in PY13 are provided in **Table 80:**

Table 80
Net-To-Gross Recommendation for PY13

Program	Measures	PY11 percent of portfolio savings	Recommended NTG Rate for PY13	NTG Adjusted Percent Savings
BEEM	Business Energy Efficiency Measures	27%	0.75	20%
CBEEM	Custom Business Energy Efficiency Measures	17%	0.75	13%
BESM	Business Services and Maintenance	2%	0.95	2%
BHTR	Business Hard-to-reach	1%	0.99	1%
REEM	Residential Energy Efficiency Measures	51%	0.79	40%
CESH	Custom Energy Solutions for the Home	0%	0.65	0%
RESM	Residential Services and Maintenance	0%	0.92	0%
RHTR	Residential Hard-to-reach	2%	1.00	2%
	Composite NTG Rate			77.6%

* Evergreen Economics - Third-Party Evaluation NTG Recommendation Memo January 2013:
Net-to-Gross Issues in Hawaii Energy Efficiency Programs: Challenges, Near-term Options, and a Longer-term Approach

Development of Avoided Costs

As described above, the primary overall economic benefit for the State is the avoided cost for the energy that is saved. The total avoided cost of all the energy that is saved is called the Total Resource Benefit (TRB). To estimate the TRB for individual measures or for the total savings for the Program, the cost per MWh supplied and the system capacity cost per kW need to be estimated into the future.

HECO Avoided Costs Not Appropriate

HECO-provided avoided energy and capacity costs for future years are shown in **Table 81.** The avoided cost values for energy and capacity were deemed inappropriate to use for reasons that included a negative avoided cost value for energy in the years 2015 to 2023 and no capacity costs for years 2010 to 2014.

Table 81
HECO IRP4 Avoided Costs

Year	$/MWh	$/kW
2006	$ 109.62	$ 180.20
2007	$ 107.16	$ 181.14
2008	$ 102.19	$ 181.14
2009	$ 106.89	$ 181.14
2010	$ 98.90	$ -
2011	$ 100.41	$ -
2012	$ 401.04	$ -
2013	$ 103.69	$ -
2014	$ 108.86	$ -
2015	$ (139.65)	$ 1,530.33
2016	$ (132.67)	$ 1,704.00
2017	$ (118.95)	$ 1,537.80
2018	$ (115.35)	$ 1,412.69
2019	$ (109.01)	$ 1,304.38
2020	$ (104.57)	$ 1,207.27
2021	$ (100.02)	$ 1,149.38
2022	$ (109.30)	$ 1,112.04
2023	$ (111.41)	$ 1,076.56
2024	$ 137.30	$ (411.76)
2025	$ 114.46	$ (744.16)

Proxy Avoided Cost Developed

The avoided cost that is used for PY12 is estimated using an extrapolation of the avoided energy data provided by HECO. The energy and capacity cost data from the first few years was then extrapolated over 20 years. **Table 82** shows this extrapolation. This table was deemed a reasonable estimate of actual avoided energy and capacity costs as it was more in line with the avoided costs used in many other programs. Therefore, these avoided costs were used to calculate the TRB.

Table 82
Program PY2012 Utility Avoided Cost

		Discount Rate		
		6%	Utility Avoided Cost	
Year	**Measure Life**	**NPV Multiplier**	**$/kW/yr.**	**$/kWh/yr.**
2012	1	1.00	$ 339	$ 0.104
2013	2	0.94	$ 353	$ 0.104
2014	3	0.89	$ 371	$ 0.109
2015	4	0.84	$ 383	$ 0.112
2016	5	0.79	$ 386	$ 0.113
2017	6	0.75	$ 388	$ 0.114
2018	7	0.70	$ 389	$ 0.114
2019	8	0.67	$ 392	$ 0.115
2020	9	0.63	$ 391	$ 0.115
2021	10	0.59	$ 395	$ 0.116
2022	11	0.56	$ 398	$ 0.117
2023	12	0.53	$ 397	$ 0.117
2024	13	0.50	$ 401	$ 0.118
2025	14	0.47	$ 406	$ 0.119
2026	15	0.44	$ 409	$ 0.120
2027	16	0.42	$ 416	$ 0.122
2028	17	0.39	$ 423	$ 0.124
2029	18	0.37	$ 429	$ 0.126
2030	19	0.35	$ 436	$ 0.128
2031	20	0.33	$ 436	$ 0.128

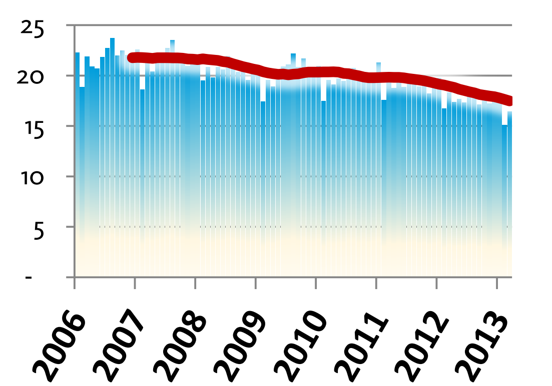
CONCLUSION

In closing this PY12 Annual Report, the Hawaii Energy team would like to thank the PUC and the people of Hawaii for the opportunity and privilege to serve as your Public Benefits Fee Administrator. We particularly appreciate the confidence placed in us by extending our contract for two more years and allowing us to play a key role in the administration of the PUC's exciting new On-Bill Financing program. We intend to exceed your expectations in every way.

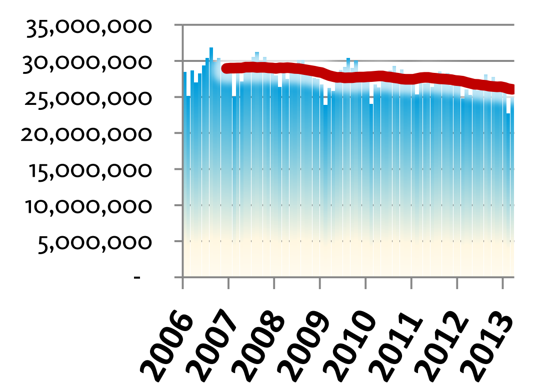
We also want to thank the PUC staff, our Contract Manager, subcontractors, allies, friends and constituents for all the support you have provided to help us develop the Program to this point of evolution, positioned to make great advances in clean energy for Hawaii consumers over the next few years.

As we begin our new program year, the Hawaii Energy team pledges to continue our best efforts to accelerate Hawaii's progress towards a 100% clean energy economy.

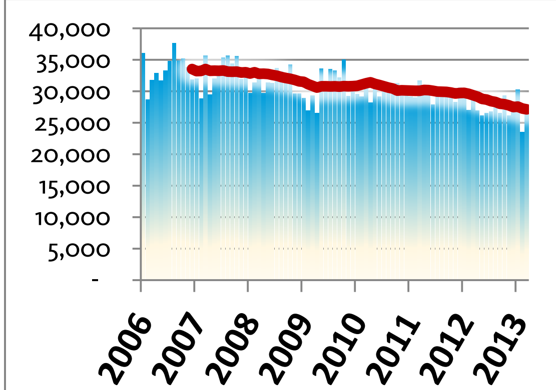
Hawaii Average Residential
Energy Consumption (kWh per Day)



Hawaii Total
Energy Consumption (kWh per Day)



Hawaii Average Barrels of Oil per day
to Generate Electricity



MAHALO,
THE HAWAII ENERGY TEAM

Hawaii Energy
YOUR CONSERVATION & EFFICIENCY PROGRAM

DESCRIPTION OF ATTACHMENTS

Attachment A: Acronym List
A list of the commonly used Hawaii Energy acronyms

Attachment B: PY2012 Program Participation List
A report of Program impacts by program and measure, including gross and net, annualized and lifecycle savings.

Attachment C: Contractor Budget (Attachment F from contract)
The detailed contractor budget as defined in the HEEP contract between the Hawaii Public Utilities Commission and SAIC as well as the budget progression of changes approved by the PUC.

Attachment D: Performance Incentive Mechanism (Attachment C from contract)
The Performance Incentive Mechanism as defined in the HEEP contract between the Hawaii Public Utilities Commission and SAIC. The attachment includes an overview, description of performance indicators and documentation and verification details.

Attachment E: PY2012 Annual Plan
The Program's annual plan, which provides SAIC's strategies and plans for administration and delivery of the Hawaii Energy portfolio for PY12 (July 1, 2012 to June 30, 2013). Through this plan, Hawaii Energy set forth overall strategies to increase program participation, maximize energy savings, and encourage the development of energy efficiency materials.

Attachment F: PY2012 Technical Reference Manual
The Program's reference manual, which provides methods, formulas, and default assumptions for estimating energy and peak impacts of incentivized projects and measures. The reference manual is organized by program, end use and measure.

Attachment G: PY2012 Media Coverage Report
The media coverage report contains highlights of print and online media coverage, which ranged from general population publications to localized media.

Attachment A

Acronym List

Hawaii Energy

ACRONYM LIST

Revised 8/30/13

ACRONYM	ACRONYM EXTENSION	COMMENTS
AC	Air Conditioner	
AEE	Association of Energy Engineers	
AEIM	Achieving the Energy Independence Mission	
AHU	Air Handler Unit	
AOAO	Associations of Apartment Owners AOAO	
ARRA	American Recovery and Reinvestment Act	
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers	
ASL	American Sign Language	
BAS	Building Automation System	
BBLS	Barrels	
BEEM	Business Energy Efficiency Measures	Former Commercial industrial Energy Efficiency (CIEE), and Commercial Industrial New Construction (CINC)
BESM	Business Energy Services & Maintenance	
BHTR	Business Hard to Reach	
BTU	British Thermal Unit	
BWS	Board of Water Supply	
C&I	Commercial and Industrial	
CA	California	
CALiPER	Commercially Available LED Product Evaluation and Reporting	
CBEEM	Custom Business Energy Efficiency Measures	Former Commercial Industrial Customized Rebate (CICR)
CBSM	Community-Based Social Marketing	
CEE	Consortium for Energy Efficiency	
CEM	Certified Energy Manager	
CESH	Custom Energy Solutions for the Home	
CEUS	Commercial End-Use Survey	
CFL	Compact Fluorescent Lamps	
CMC	Community Media Center	
DBEDT	Department of Business, Economic Development & Tourism	
DDC	Direct Digital Control	
DEER	Database for Energy Efficient Resources	
DIRLR	Direct Install Restaurant Lighting Retrofit	
DOE	Department of Education	
DOE	Department of Energy	
DSM	Demand Side Management	

ACRONYM	ACRONYM EXTENSION	COMMENTS
DVR	Digital Video Recorded	
ECM	Electrically Commutated Motor	
EEFG	Energy Efficiency Funding Group	
EEPS	Energy Efficiency Portfolio Standard	
EMCS	Energy Management Control System	
EMIT	Energy Manager in Training	
EPA	Environmental Protection Agency	
EPACT	Energy Policy Act	
EPMIS	Energy Program Management Information System	
ESP	Efficiency Sales Professional	
GF	Grandfathered	
GWh	Gigawatt Hour	
HCEI	Hawaii Clean Energy Initiative	
HCEOC	Hawaii County Economic Opportunity Council	
HCIL	Hawaii Centers for Independent Living	
HECO	Hawaiian Electric Company	
HEI	Hawaiian Electric Industries	
HELCO	Hawaii Electric Light Company	
HEWH	High Efficiency Water Heating	
HID	High Intensity Discharge	
HVAC	Heating Ventilation and Air Conditioning	
IECC	International Energy Conservation Code	
IFMA	International Facility Management Association	
IREC	Interstate Renewable Energy Council	
IRP	Integrated Resource Planning	
IRR	Individual Rate of Return	
IT	Information Technology	
KIUC	Kauai Island Utilities Cooperative	
KORV	Kaanapali Ocean Resort Villas	
kW	Kilowatt	
kWh	Kilowatt Hour	
LED	Light Emitting Diode	
M	Million	
MECO	Maui Electric Company	
MEDB	Maui Economic Development Board	
MM	Master Metered	
MMBTU	One Million British Thermal Unit	
MVNP	Milici Valenti Ng Pack, Inc.	
MWh	Megawatt Hour	
NEED	National Energy Education Development Project	
NELHA	National Energy Laboratory of Hawaii	
NEM PV	Net Energy Metered Photovoltaic	

ACRONYM	ACRONYM EXTENSION	COMMENTS
NPV	Net Present Value	
NREL	National Renewable Energy Laboratory	
NTG	Net-to-gross	
O&M	Operations and Management	
OBF	On-Bill Financing	
OCCC	Oahu Community Correctional Center	
PBF	Public Benefits Fee	
PBFA	Public Benefits Fee Administrator	
PIF	Pay-It-Forward	
POP	Point of Purchase	
PSA	Public Service Announcement	
PUC	Public Utilities Commission	
PV	Photovoltaic (PV)	REWH, RNC AND ESH combined for PY2010
REEM	Residential Energy Efficiency Measures	
RESM	Residential Energy Services & Maintenance	Program from PY2009; now combined in REEM
RFP	Request For Proposal	Former Residential Low Income (RLI)
RHTR	Residential Hard to Reach	
RISE	Rewarding Internships for Sustainable Employment	
RPS	Renewable Portfolio Standard	Cancelled Program for PY2010
SAIC	Science Applications International Corporation	
SBDI	Small Business Direct Install	
SBDIL	Small Business Direct Install Lighting	
SEAD	Student Energy Ambassador Development	
SEE	Sell Efficiency Effectively	
SEE&I	SAIC Energy, Environment & Infrastructure	
SSC	Smart Sustainability Consulting	
SWH	Solar Water Heating	
TAB	Teacher Advisory Board	
TAG	Technical Advisory Group	
TBD	To Be Determined	
TRB	Total Resource Benefit	
TRC	Total Resource Cost Ratio .	
TRM	Technical Reference Manual	
UH	University of Hawaii at Manoa	
USGBC	United States Green Building Council	
VFD	Variable Speed Drive	
VFR	Variable Flow Refrigerant	
VRF	Variable Refrigerant Flow	
WAP	Weatherization Assistance Program	
YR	Year	

Attachment B

PY2012 Program Participation List

Hawaii Energy PY2012 Program Participation List

Program / Measure	Units	Customer Level Demand (kW)	Customer Level Energy (kWh)	Program Level Demand (kW)	Program Level Energy (kWh)	Average Useful Life (Yrs)	Lifetime Resource Acquisition Cost ($/kWh-Life)	Program TRB ($)	TRC ($)	Average Customer Level kW/Unit	Average Customer Level kWh/ Unit
BEEM	**119,795**	**4,228**	**30,924,773**	**3,417**	**25,001,128**	**13.1**	**$ 0.012**	**$ 33,839,141**	**$ 12,103,633**	**0.035**	**258.1**
T8 /T8LW	52,512	853	7,991,099	690	6,457,585	14.0	$ 0.010	$ 9,737,705	$ 6,488,609	0.016	152.2
LED	30,045	725	5,585,684	586	4,514,505	14.9	$ 0.007	$ 3,322,140	$ 390,585	0.024	185.9
CFL	11,898	228	2,202,179	185	1,784,176	3.0	$ 0.005	$ 718,365	$ 17,846	0.019	185.1
Chillers	26	354	1,781,929	284	1,432,943	20.0	$ 0.011	$ 3,343,658	$ 1,624,644	13.598	68,535.7
VFD - Pump	58	467	1,721,900	377	1,390,718	13.5	$ 0.008	$ 2,464,458	$ 162,138	8.058	29,687.9
HVAC - Packaged/Split	969	259	1,714,425	209	1,385,188	15.0	$ 0.027	$ 2,429,043	$ 195,099	0.267	1,769.3
Delamping	7,922	156	1,709,758	126	1,385,780	14.0	$ 0.004	$ 2,008,973	$ 88,400	0.020	215.8
Condominium Submetering	1,795	176	1,398,256	143	1,134,484	8.4	$ 0.028	$ 1,606,630	$ 640,725	0.098	779.0
Window Tinting	52	356	1,342,115	289	1,088,902	10.0	$ 0.025	$ 1,789,843	$ 278,246	6.847	25,809.9
Delamp/Reflector	6,786	132	1,319,780	107	1,068,743	14.0	$ 0.008	$ 1,583,707	$ 216,760	0.019	194.5
Sensors	4,361	29	720,262	24	584,435	8.0	$ 0.019	$ 482,423	$ 318,353	0.007	165.2
Refrigerator with Recycling	630	21	517,860	17	419,633	14.0	$ 0.010	$ 530,000	$ 125,280	0.034	822.0
VFD Domestic Water Booster Packages	13	50	469,960	41	381,392	15.0	$ 0.009	$ 602,707	$ 214,500	3.858	36,150.8
VFR - Variable Refrigerant Flow AC	163	36	379,224	29	306,712	15.0	$ 0.035	$ 470,745	$ 387,838	0.221	2,326.5
Heat Pump - Upgrade	5	11	356,096	9	284,006	10.0	$ 0.013	$ 272,393	$ 37,762	2.266	71,219.1
VFD - AHU	41	114	288,898	92	233,652	15.0	$ 0.008	$ 634,612	$ 45,252	2.785	7,046.3
Kitchen Exhaust Hood Demand Ventilation	8	49	288,314	40	231,687	15.0	$ 0.022	$ 424,637	$ 195,750	6.159	36,039.2
VFD Pool Pump Packages	26	20	244,814	16	197,429	15.0	$ 0.016	$ 224,170	$ 98,100	0.755	9,415.9
ECM	249	24	227,441	20	182,994	15.0	$ 0.008	$ 289,736	$ 50,298	0.098	913.4
HID Pulse Start	621	25	189,588	20	152,604	14.0	$ 0.014	$ 243,875	$ 18,133	0.040	305.3
LED - Refrigerated Case Lighting	838	30	187,377	24	151,436	5.0	$ 0.069	$ 112,783	$ 318,440	0.036	223.6
Solar Water Heating - Commercial	30	64	59,601	51	47,842	15.0	$ 0.020	$ 257,360	$ 13,200	2.130	1,986.7
Clothes Washer (Tier II/III) + (Tier I GF)	222	6	45,732	5	37,055	11.8	$ 0.029	$ 53,044	$ 24,420	0.028	206.0
Ceiling Fans	204	4	34,068	3	27,424	5.0	$ 0.060	$ 18,388	$ 1,287	0.019	167.0
Induction	138	3	33,031	3	26,514	2.0	$ 0.100	$ 7,162	$ 6,065	0.024	239.4
CEE Tier 1 - Premium Efficiency Motors	38	14	29,595	11	23,917	15.0	$ 0.016	$ 72,694	$ 6,791	0.371	778.8
ECM - Evaporator Fans	66	3	29,425	3	23,880	15.0	$ 0.016	$ 37,814	$ 9,292	0.048	445.8
Cool Roof Technologies	6	10	25,629	8	20,799	10.2	$ 0.097	$ 56,871	$ 102,516	1.709	4,271.5
Garage Refrigerator / Freezer Bounty	21	1	15,462	0	12,404	14.0	$ 0.005	$ 15,588	$ 1,575	0.029	736.3
Refrigerator (<$600)	46	1	4,830	1	3,906	14.0	$ 0.042	$ 6,736	$ 5,060	0.017	105.0
Solar Water Heating Incentive - Contractor	2	1	4,130	1	3,286	15.0	$ 0.039	$ 6,694	$ 13,200	0.460	2,065.0
Heat Pumps	2	0	3,006	0	2,416	10.0	$ 0.017	$ 3,082	$ 3,600	0.210	1,503.0
Commercial Solar Water Heating	1	2	2,302	2	1,868	15.0	$ 0.020	$ 10,050	$ 3,750	2.468	2,301.9
Whole House Fan	1	1	1,003	0	814	20.0	$ 0.005	$ 1,055	$ 120	0.500	1,003.0

Hawaii Energy PY2012 Program Participation List

Program / Measure	Units	Customer Level Demand (kW)	Customer Level Energy (kWh)	Program Level Demand (kW)	Program Level Energy (kWh)	Average Useful Life (Yrs)	Lifetime Resource Acquisition Cost ($/kWh-Life)	Program TRB ($)	TRC ($)	Average Customer Level kW/Unit	Average Customer Level kWh/ Unit
CBEEM	**341**	**2,125**	**15,862,988**	**1,720**	**12,844,300**	**14.0**	**$ 0.011**	**$ 19,442,140**	**$ 13,109,157**	**6.231**	**46,519.0**
Customized Measures - Over 5 year Life	**330**	**2,055**	**15,398,936**	**1,664**	**12,467,766**	**14.1**	**$ 0.011**	**$ 18,956,515**	**$ 12,379,401**	**6.226**	**46,663**
High Efficiency Lighting	272	876	6,939,734	709	5,619,323	11.3	$ 0.011	$ 7,250,856	$ 3,892,288	3.220	25,514
Energy Awareness, Measurement and Control Systems	22	465	3,610,445	376	2,921,022	12.8	$ 0.014	$ 4,190,682	$ 2,327,970	21.145	164,111
High Efficiency HVAC	10	389	2,315,767	315	1,877,643	17.0	$ 0.011	$ 3,642,559	$ 1,969,679	38.910	231,577
Building Envelope Improvements	11	234	1,823,441	190	1,479,797	24.9	$ 0.008	$ 3,180,855	$ 3,415,948	21.305	165,767
High Efficiency Water Pumping	6	78	561,205	63	451,130	9.7	$ 0.016	$ 505,965	$ 371,198	12.983	93,534
Commercial Industrial Processes	3	9	110,259	7	88,189	16.9	$ 0.008	$ 139,023	$ 309,420	2.900	36,753
High Efficiency Water Heating	4	3	22,801	2	18,257	15.0	$ 0.012	$ 30,266	$ 86,341	0.720	5,700
High Efficiency Motors	2	1	15,284	0	12,404	15.0	$ 0.013	$ 16,309	$ 6,558	0.300	7,642
Customized Project Measures - Under 5 Year Life	**9**	**65**	**407,462**	**52**	**330,672**	**10.9**	**$ 0.013**	**$ 452,213**	**$ 584,824**	**7.167**	**45,274**
High Efficiency Lighting	9	65	407,462	52	330,672	10.9	$ 0.013	$ 452,213	$ 584,824	7.167	45,274
Garage Active Ventilation Control	**2**	**6**	**56,590**	**5**	**45,862**	**6.2**	**$ 0.021**	**$ 33,412**	**$ 144,932**	**2.800**	**28,295**
BESM	**31,406**	**320**	**4,403,514**	**259**	**3,550,072**	**14.0**	**$ 0.078**	**$ 4,902,114**	**$ 4,168,577**	**0.010**	**140.2**
SBDI - Lighting Retrofits	31,346	320	4,369,986	259	3,523,159	14.0	$ 0.048	$ 4,872,317	$ 2,359,042	0.010	139.4
Energy Study Assistance	22	-	33,528	-	26,913	14.0	$ 0.803	$ 29,797	$ 335,949	-	1,524.0
Energy Project Catalyst	1	-	-	-	-			$ -	$ 5,301	-	-
Central Plant Performance - Commissioning	18	-	-	-	-			$ -	$ 693,472	-	-
Central Plant Performance - Benchmark Metering	18	-	-	-	-			$ -	$ 749,682	-	-
Design Assistance - 50%	1	-	-	-	-			$ -	$ 25,131	-	-
BHTR	**6,338**	**144**	**1,235,846**	**116**	**996,266**	**14.1**	**$ 0.032**	**$ 1,543,451**	**$ 450,233**	**0.023**	**195.0**
SBDI - Restaurant Lighting	6,334	130	1,154,223	105	931,318	14.0	$ 0.030	$ 1,424,413	$ 394,433	0.020	182.2
Kitchen Exhaust Hood Demand Ventilation	4	14	81,623	11	64,947	15.0	$ 0.060	$ 119,038	$ 55,800	3.488	20,405.8
Hawaii Energy Hero Landlord Program	-	-	-	-	-			$ -	$ -		

Hawaii Energy PY2012 Program Participation List

Program / Measure	Units	Customer Level Demand (kW)	Customer Level Energy (kWh)	Program Level Demand (kW)	Program Level Energy (kWh)	Average Useful Life (Yrs)	Lifetime Resource Acquisition Cost ($/kWh-Life)	Program TRB ($)	TRC ($)	Average Customer Level kW/Unit	Average Customer Level kWh/ Unit
REEM	**1,954,603**	**11,821**	**86,441,466**	**9,550**	**69,826,376**	**6.9**	**$ 0.015**	**$ 56,108,200**	**$ 25,050,907**	**0.006**	**44.2**
CFL	1,770,503	8,853	64,269,259	7,158	51,964,575	6.0	$ 0.008	$ 37,353,374	$ 2,654,375	0.005	36.3
Peer Group Comparison	75,000	833	7,295,468	667	5,841,701	1.0	$ 0.153	$ 833,676	$ 891,460	0.011	97.3
Solar Water Heating Incentive - Contractor	2,407	1,107	4,970,455	895	4,016,021	15.0	$ 0.034	$ 8,181,356	$ 15,886,200	0.460	2,065.0
Refrigerator with Recycling	5,702	194	4,687,044	157	3,789,226	14.0	$ 0.013	$ 4,787,506	$ 2,054,160	0.034	822.0
LED	89,420	268	1,484,372	216	1,197,241	15.0	$ 0.035	$ 938,015	$ 1,162,460	0.003	16.6
Clothes Washer (Tier II/III) + (Tier I GF)	5,200	146	1,071,200	118	866,135	11.8	$ 0.028	$ 1,242,614	$ 572,330	0.028	206.0
Garage Refrigerator / Freezer Bounty	1,214	28	711,252	23	573,362	14.0	$ 0.006	$ 720,474	$ 91,050	0.023	585.9
Ceiling Fans	3,120	59	521,040	48	420,620	5.0	$ 0.059	$ 282,132	$ 21,276	0.019	167.0
Heat Pumps	317	67	476,451	54	385,339	10.0	$ 0.016	$ 491,580	$ 570,600	0.210	1,503.0
VFR Split System AC	373	102	237,300	83	192,365	14.7	$ 0.027	$ 471,174	$ 306,960	0.273	636.2
Whole House Fan	220	110	220,660	89	178,907	20.0	$ 0.005	$ 285,874	$ 26,400	0.500	1,003.0
Solar Water Heating Incentive - Lender	89	41	183,786	33	147,488	15.0	$ 0.040	$ 300,448	$ 587,400	0.460	2,065.0
VFD Controlled Pool Pumps	247	1	147,459	1	119,241	10.0	$ 0.031	$ 106,842	$ 147,450	0.006	597.0
Solar Attic Fans	206	4	111,240	3	90,092	5.0	$ 0.023	$ 49,090	$ 30,900	0.020	540.0
Refrigerator (<$600)	384	7	40,320	5	32,592	14.0	$ 0.042	$ 56,200	$ 42,240	0.017	105.0
Energy Hero Gift Packs - Akamai PowerStrips	141	1	9,984	1	8,102	5.0	$ 0.059	$ 5,439	$ 2,397	0.008	70.8
Whole House Energy Metering	11	0	3,152	0	2,545	4.5	$ 0.078	$ 1,330	$ 2,200	0.007	286.5
Room Occupancy Sensors	46	0	957	0	770	8.0	$ 0.058	$ 982	$ 920	0.005	20.8
Dishwasher (GF)	1	0	67	0	53	12.0	$ 0.078	$ 94	$ 80	0.015	67.0
AC Bounty (GF)	2	-	-	-	-			$ -	$ 50	-	-
CESH	**-**	**-**	**-**	**-**	**-**			**$ -**	**$ -**		
Custom Packaged Proposals	-	-	-	-	-			$ -	$ -		
RESM	**175**	**12**	**732,947**	**9**	**594,523**	**7.3**	**$ 0.035**	**$ 304,282**	**$ 157,517**	**0.067**	**4,188.3**
Efficiency Inside Home Design	150	-	707,866	-	574,462	7.5	$ 0.034	$ 301,111	$ 147,000	-	4,719.1
Custom Packaged Proposals	2	10	17,652	8	14,057	0.5	$ 0.466	$ 2,067	$ 3,617	5.050	8,826.0
Central AC Maintenance	23	2	7,429	1	6,003	1.0	$ 0.192	$ 1,104	$ 6,900	0.074	323.0
Solar Water Heater Tune-Ups	-	-	-	-	-			$ -	$ -		
TBD	-	-	-	-	-			$ -	$ -		
Hawaii Energy Hero Audits	-	-	-	-	-			$ -	$ -		
RHTR	**2,236**	**91**	**483,625**	**73**	**386,136**	**12.7**	**$ 0.298**	**$ 650,207**	**$ 1,173,581**	**0.041**	**216.3**
Solar Water Heater - Grant	169	78	348,985	62	277,763	15.0	$ 0.339	$ 565,800	$ 1,123,359	0.460	2,065.0
Energy Hero Gift Packs - Akamai PowerStrips	2,037	13	109,980	10	88,650	5.0	$ 0.079	$ 59,507	$ 34,629	0.006	54.0
Lanai Hui Up	30	1	24,660	1	19,723	14.0	$ 0.031	$ 24,900	$ 15,594	0.034	822.0
Solar Inspections (WAP)	-	-	-	-	-			$ -	$ -		
Hawaii Energy Hero Landlord Program	-	-	-	-	-			$ -	$ -		
Custom SWH Proposals	-	-	-	-	-			$ -	$ -		
Energy Hero Gift Packs	-	-	-	-	-			$ -	$ -		
CFL Exchange	-	-	-	-	-			$ -	$ -		
Hawaii Energy Hero Audits	-	-	-	-	-			$ -	$ -		

Attachment C

Contractor Budget (Attachment F from Contract)

Summary Budget Numbers – The worksheets on this page show a summary of the Program budget numbers for PY2011 and PY2012 that result from the assumptions made in this Renewal Proposal. The full Proposed Program Budget and Impacts (July 1, 2011 – June 30, 2013) can be found at Appendix B to this Proposal.

PROGRAM BUDGET

Year		Total Budget	%
PY2011 Budget (7/1/11 to 6/30/12)	$	32,271,390	48%
PY2012 Budget (7/1/12 to 6/30/13)	$	34,960,672	52%
Two Year Contract Budget	$	67,232,062	100%

PY2011 Budget (7/1/11 to 6/30/12)

Total PY2011 Budget	$	32,271,390		
Budget Item / Category		Amount	% of Total Budget	% of Subtotal
Direct Incentives	$	19,974,424	62%	90%
Transformation Incentives	$	2,194,455	7%	10%
Total Incentives	$	22,168,879	69%	100%
Administration / IT	$	2,190,479	7%	22%
Direct Program Operations	$	7,779,032	24%	78%
Total Operations	$	9,969,511	31%	100%
Total Incentives	$	22,168,879	69%	69%
Total Operations	$	9,969,511	31%	31%
Total PY2011 Budget	$	32,138,390	100%	100%

PY2012 Budget (7/1/12 to 6/30/13)					Total			
Total PY2012 Budget	$	34,960,672			$	67,232,062		
Budget Item / Category		Amount	% of Total Budget	% of Subtotal		Amount	% of Total Budget	% of Subtotal
Direct Incentives	$	21,637,050	62%	90%	$	41,611,474	62%	90%
Transformation Incentives	$	2,377,326	7%	10%	$	4,571,781	7%	10%
Total Incentives	$	24,014,376	69%	100%	$	46,183,255	69%	100%
Administration / IT	$	2,190,479	6%	20%	$	4,380,958	7%	21%
Direct Program Operations	$	8,622,818	25%	80%	$	16,401,849	24%	79%
Total Operations	$	10,813,297	31%	100%	$	20,782,807	31%	100%
Total Incentives	$	24,014,376	69%	69%	$	46,183,255	69%	69%
Total Operations	$	10,813,297	31%	31%	$	20,782,807	31%	31%
Total PY2012 Budget	$	34,827,672	100%	100%	$	66,966,062	100%	100%

<u>Summary PBFA Budget Breakout</u> – The worksheets on this page show a summary of the PBFA budget breakout numbers for PY2011 and PY2012 that result from the assumptions made in this Renewal Proposal.

Breakout PY2011 PBFA Budget				
Total PY2011 Budget	$	32,271,390		
Budget Item / Category		Amount	% of Total Budget	% of Subtotal
General Administration and IT Costs	$	2,190,479	6.8%	94%
Performance Awards in Excess of Targets*	$	133,000	0.4%	6%
PBFA General Administration and IT Costs	$	2,323,479	7.2%	
Residential Transformational Programs	$	987,505	3.1%	45%
Business Transformational Programs	$	1,206,950	3.7%	55%
Transformational Infrastructure Activities	$	2,194,455	6.8%	100%
Residential Programs	$	12,489,055	38.7%	45%
Business Programs	$	15,264,401	47.3%	55%
PBFA Programs Budget	$	27,753,456	86.0%	100%
Residential Incentives	$	8,988,491	27.9%	72%
Residential Operational	$	3,500,564	10.8%	28%
Residential Programs	$	12,489,055	38.7%	100%
Business Incentives	$	10,985,933	34.0%	72%
Business Operational	$	4,278,468	13.3%	28%
Business Programs	$	15,264,401	47.3%	100%

* This Incentive Award budget amount is not earned until performance is achieved.

Breakout PY2012 PBFA Budget					Total			
Total PY2012 Budget		$34,960,672			$	67,232,062		
Budget Item / Category		Amount	% of Total Budget	% of Subtotal		Amount	% of Total Budget	% of Subtotal
General Administration and IT Costs	$	2,190,479	6.3%	94%	$	4,380,958	6.5%	94%
Performance Awards in Excess of Targets*	$	133,000	0.4%	6%	$	266,000	0.4%	6%
PBFA General Administration and IT Costs	$	2,323,479	6.6%		$	4,646,958	6.9%	
Residential Transformational Programs	$	1,069,797	3.1%	45%	$	2,057,301	6.4%	45%
Business Transformational Programs	$	1,307,529	3.7%	55%	$	2,514,480	7.8%	55%
Transformational Infrastructure Activities	$	2,377,326	6.8%	100%	$	4,571,781	6.8%	100%
Residential Programs	$	13,616,940	38.9%	45%	$	26,105,995	38.8%	45%
Business Programs	$	16,642,927	47.6%	55%	$	31,907,328	47.5%	55%
PBFA Programs Budget	$	30,259,867	86.6%	100%	$	58,013,323	86.3%	100%
Residential Incentives	$	9,736,673	27.9%	72%	$	18,725,164	27.9%	72%
Residential Operational	$	3,880,268	11.1%	28%	$	7,380,832	11.0%	28%
Residential Programs	$	13,616,940	38.9%	100%	$	26,105,995	38.8%	100%
Business Incentives	$	11,900,377	34.0%	72%	$	22,886,310	34.0%	72%
Business Operational	$	4,742,550	13.6%	28%	$	9,021,018	13.4%	28%
Business Programs	$	16,642,927	47.6%	100%	$	31,907,328	47.5%	100%

* This Incentive Award budget amount is not earned until performance is achieved.

Summary Transformational Budget Breakout – The worksheets on this page show a summary of the Transformational Budget Breakout numbers for PY2011 and PY2012 that result from the assumptions made in this Renewal Proposal.

Breakout PY2011 Transformational Budgets

	Residential			*Business*			*Total*
	$ 987,505			$ 1,206,950			$ 2,194,455
	45%			55%			48%
	of one year			of one year			of two year
Budget Item / Category	**Residential**	**% of Total Budget**	**% of Subtotal**	**Business**	**% of Total Budget**	**% of Subtotal**	**Total**
County Energy Office & Program Support							
State Energy Office							
State Legislative Technical Support							
Federal Energy Programs Support							
Hawaii Clean Energy Initative							
Government Clean Energy Strategy and Implementation Support	$ 296,251	30%	100%	$ 362,085	30%	100%	$ 658,337
Educational & Training Institution Support							
Organizational Education and Direct-to-Consumer							
Energy Resource Centers							
Green Workforce Development & Training Support							
Custom Clean Energy Educational and Training Programs							
Educational & Training Institution Support	$ 691,253	70%	100%	$ 844,865	70%	100%	$ 1,536,119
	$ 987,505	45%	100%	$ 1,206,950	55%	100%	$ 2,194,455

Breakout PY2012 Transformational Budgets

	Residential			*Business*			*Total*	**Two Year Total**
	$ 1,069,797			$ 1,307,529			$ 2,377,326	$ 4,571,781
	45%			55%			52%	
	of one year			of one year			of two year	
Budget Item / Category	**Residential**	**% of Total Budget**	**% of Subtotal**	**Business**	**% of Total Budget**	**% of Subtotal**	**Total**	**Two Year Total**
County Energy Office & Program Support								
State Energy Office								
State Legislative Technical Support								
Federal Energy Programs Support								
Hawaii Clean Energy Initative								
Government Clean Energy Strategy and Implementation Support	$ 374,429	35%	100%	$ 457,635	35%	100%	$ 832,064	$ 1,490,401
Educational & Training Institution Support								
Organizational Education and Direct to Consumer								
Energy Resource Centers								
Green Workforce Development & Training Support								
Custom Clean Energy Educational and Training Programs								
Educational & Training Institution Support	$ 695,368	65%	100%	$ 849,894	65%	100%	$ 1,545,262	$ 3,081,380
Government Clean Energy Strategy and Implementation Support	$ 374,429	17%	35%	$ 457,635	21%	35%	$ 832,064	$ 1,490,401
Educational & Training Institution Support	$ 695,368	32%	65%	$ 849,894	39%	65%	$ 1,545,262	$ 3,081,380
	$ 1,069,797	49%	100%	$ 1,307,529	60%	100%	$ 2,377,326	$ 4,571,781

Attachment D

Performance Incentive Mechanism

ATTACHMENT C1
PERFORMANCE INCENTIVE MECHANISM

I. Overview

The *Contractor* and the *Commission* agree that a portion of payments to the *Contractor* shall be based on the *Contractor*'s performance in achieving the *Commission*'s objectives and successfully delivering the strategies and initiatives described in the *Scope of Services*. The performance incentive mechanism is designed to reward superior performance by the *Contractor* in the overall administration and delivery of energy efficiency services which achieve specific resource acquisition outcomes and market transformation goals.

For the period July 1, 2011 through June 30, 2012 (Program Year 2011) and July 1, 2012 through June 30, 2013 (Program Year 2012), a proportional holdback of direct billings (exclusive of incentives or payments made directly to participants, customers, and allies) will be set aside to fund the performance payment. This performance payment pool (Performance Pool) shall be in the amount of **$700,000** for each year. For each Program Year, the *Contractor* can earn up to **$700,000** in Performance Awards for meeting the *Target Level* for program Performance Indicators that are defined in this Attachment.

If the *Contractor* does not meet the Minimum Performance Level, no Performance Award shall be paid for that Performance Indicator. Chart 10 ("Chart 10"), Appendix B-15 ("Appendix B-15") and Item 11 on Page 18 of CONTRACTOR's "Proposal for Supplemental Contract Terms Modifying the March 3, 2009 Hawaii Energy Efficiency Program Contract for the Period July 1, 2011-June 30, 2013" ("Renewal Proposal") dated June 16, 2011 and incorporated as Attachment-S1A to this Contract, lists the Performance Incentive Fractions for Program Year 2011 and Program Year 2012 and Minimum Performance Level and the award amount allocated to that level, respectively. The Minimum Performance for the Transformation Infrastructure Development and Broad Participation (Island Equity) Performance Indicators is at the *Target Level*. The total performance payment for meeting the Minimum Performance Level in each category is **$434,000** for each Program Year.

For the same period, the *Contractor* can earn additional Performance Awards if the *Contractor* exceeds the *Target Level* for performance indicators as identified in Appendix B-15 of the Renewal Proposal. The *Maximum Performance Award* that the *Contractor* can earn in Program Year 2011 or Program Year 2012 is capped at **$833,000** for each Program Year. The Transformation Infrastructure Development and Broad Participation (Island Equity) Performance indicators do not allow additional awards for exceeding the *Target Level*.

Performance Awards for the Energy, Peak Demand and Total Resource Benefits are calculated on a sliding scale based on *Contractor's* yearly achievements. For achievements falling between the *Minimum* and *Maximum Performance Level* the performance award shall be calculated as the sum of the *Minimum Performance Level* award plus the product of the Performance Indicator times the Performance Incentive Rate as specified below.

1. **Verification Process**
   Broad Participation (Island Equity) performance indicators shall be tracked and reported in the Annual Report. Review and final determination of Performance Awards shall be based on the process as described above in Section III.A.1.

2. **Establishment and Documentation of Savings Estimates in Program Years 2011 and 2012.**
   Contractor shall offer *Program* services and incentives in a geographically equitable manner. To track this Performance Indicator, Program Customer Incentives shall be reported by each HECO utility service area or Island. Customer Incentives include incentives or payments made directly to *Program* participants, customers, and allies. The total Customer Incentive expenditures for each island shall be reported for each Program Year. To be eligible for a Performance Award in this category, contractor must establish that Customer Incentive expenditures or the *Program* energy savings are within 20% of yearly PBF contribution ratios for all participating islands. Appendix B-15 of the Renewal Proposal documents minimum target levels for incentive expenditure by Island for each Program year.

Attachment E

PY2012 Annual Plan

Hawaii Energy

Your Conservation and Efficiency Program

Program Year 2012
Annual Plan 07.12.12

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission serving the islands of Hawaii, Lanai, Maui, Molokai, and Oahu.

SAIC

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Preface

On May 7, 2012, SAIC, Energy Environment, & Infrastructure, LLC ("SAIC") submitted its Program Year 2012 Annual Plan Proposal ("Proposal') to the Hawaii Public Utilities Commission (PUC) for review and approval. The PUC subsequently submitted the Proposal to various public stakeholders for comment and received substantive written comments from Blue Planet Foundation ("BPF") and the Division of Consumer Advocacy ("CA"). The written comments of BPF and CA, as well as input from the PUC staff and the PBFA Contract Manager resulted in the modifications made herein from the original Proposal.

1.0 INTRODUCTION

In 2009, the Hawaii Public Utilities Commission selected ***Science Applications International Corporation*** as Hawaii's first independent Public Benefits Fee Administrator (PBFA), with duties and expectations set out in a four year contract which ends on December 31, 2013. Operating as Hawaii Energy Conservation and Efficiency Program ("Hawaii Energy"), SAIC has developed a diverse and progressive PBFA portfolio and become a key player in the state's successful clean energy efforts to date.

The First Three Years – Since its creation in 2009 through Program Year (PY) 2011 (ended June 30, 2012), Hawaii Energy has delivered $45.5 million (M) in ratepayer funds through cash incentives and services, supporting private investment that will have yielded customer energy savings of 425.5 gigawatt-hours (GWh), with a first year bill savings of $124.2M. Over the lifetime of these investments in energy efficiency, customer energy savings will be 3,907 GWh with a bill savings of over $1.1 Billion. With the recent escalation and subsequent stabilization of energy prices, this figure will actually be higher.

Year 1 – During PY09 (ended June 30, 2010), the PBFA delivered $11.9M in ratepayer funds directly to commercial and residential customers in the form of cash incentives and services. Ratepayers receiving these incentives invested $29.9M of their own money to implement these rebated measures. The total customer energy savings from these rebated measures were 139.8 GWh, with yearly bill savings of $29.2M. Over the lifetime of these investments, customer energy savings will be 1,222 GWh, with a bill savings of $255.4M.

Year 2 – During PY10 (ended June 30, 2011), the PBFA delivered $13.7M in ratepayer funds directly to commercial and residential customers in the form of cash incentives and services. Ratepayers receiving these incentives invested $99.7M of their own money to implement these rebated measures. The first-year customer energy savings from these rebated measures were 142.2 GWh, with a bill savings of $48.1M. Over the lifetime of these investments, customer energy savings will be 1,417 GWh with a bill savings of $473.2M.

Year 3 – For PY11 (ended June 30, 2012), the PBFA budgeted $19.9M in ratepayer funds, which were delivered in the form of commercial and residential cash incentives and services to target a total customer energy savings of 143.5 GWh, with a total bill savings of $46.9M. Over the life of these investments, customer energy savings will be 1,268 GWh with a bill savings of $414.7M.[1]

Year 4 – For PY12, the PBFA proposes to deliver $21.6M in ratepayer funds directly to commercial and residential customers in the form of cash incentives and services with a target customer energy savings of 145.0 GWh, with a total bill savings of approximately $46.0M. Over the life of these anticipated investments, customer energy savings would be 1,285 GWh with a bill savings of $405.9M.

Hawaii Energy's plan is to shift emphasis towards investments with longer term savings rather than reliance on one-year or short-term savings. While preliminary plans have targeted an average measure life of 8 years, PY11's detailed plan yielded an average measure life of 8.8 years.

The portfolio design for PY12 yields an average measure life of 9.1 years across the overall portfolio and would result in the cost of lifetime program energy savings of $0.02 per kWh.

[1] Based on $0.327/kWh

On behalf of **SAIC, Energy Environment, & Infrastructure , LLC ("SAIC")** as the Hawaii Public Benefits Fee Administrator (PBFA), the PBFA's Annual Plan for Program Year 2012 (PY12), July 1, 2012 – June 30, 2013, is presented below.

1.1 Vision for PY12 Annual Plan and Beyond

During PY12, Hawaii Energy will continue to lean forward in expanding its long-term vision of making energy conservation and efficiency the most cost-effective, sustainable and utilized of any energy options available. The key elements of this vision include:

- *Minimize free-ridership and eliminate underperforming incentive offerings*
- *Focus incentives on high and persistent savings measures*
- *Ensure hard-to-reach consumers are served well on all islands*
- *Maximize direct customer benefit from each Public Benefits Fee (PBF) dollar collected*
- *Make customers aware that Program incentives offer a great return on their PBF investment*
- *Focus attention and budget on cultural behavior and other transformational energy changes*
- *Use technology to increase consumer awareness of their own real-time energy use*
- *Make energy conservation and efficiency the go-to first choice for every energy consumer*
- *Use all available data to target best opportunities, identify outliers and track performance*
- *Constantly review, modify and diversify portfolio offerings to ensure maximum performance*
- *Explore best practices and new outside-the-box opportunities to keep strong momentum*
- *Educate broader base of customers/decision-makers as to energy conservation and efficiency*
- *Provide critical leadership in EEPS, IRP, HCEI and other clean energy efforts*
- *Give decision-makers better tools to monitor and understand their own energy performance*
- *Reach deeper into consumer energy planning, operations, maintenance and energy use tracking*

This PY12 Annual Plan ("Plan") provides new strategies and a roadmap for administration and delivery of the Hawaii Energy *Conservation and Efficiency Program* ("Program"). This Plan serves the fourth year of the Program and, therefore, will build upon the successes and lessons learned during the first three years. With this new Plan, the PBFA will continue evolution of our overall strategies to increase program participation, maximize cost-effective energy savings, reduce dependence on imported fossil fuel and encourage expansion of energy efficiency, conservation and renewable energy measures throughout the islands. As with last year, the PBFA will also continue to promote the Program's focus on individual behavior change, personal energy awareness and group cultural change regarding energy use and sustainability in Hawaii.

1.2 Key Factors Impacting Annual Plan for PY12

The following are some of the key factors that have impacted the Annual Plan developed for PY12. As the Program continues to adapt to the increased budget, many factors remain the same as PY11. As the Program Year evolves and these and other factors reveal their true impacts on the Program, the PBFA will revise efforts for the benefit of the overall Program goals, with the concurrence of the Contract Manager.

1.2.1 *Diminishing Returns on Program Incentives* – Countering the increased PBF funding, the Program's experience to date suggests that for many reasons, efficiency programs in Hawaii and elsewhere are seeing diminished energy savings returns for each incentive dollar spent compared with previous years. While the future Program offerings will still be cost-effective (Total Resource Benefit/Total Resource Cost > 1), some of the offerings proposed herein will be less cost-effective than before, costing more Program dollars for each kWh and kW saved. In any case the total cost of saved energy is far below the cost of running fossil based generation as well as renewable sources.

1.2.2 *Expanded Roles & Training* – Within the budget for PY12, the Program has created a few new positions and will look to enhance the effectiveness of its staff through mentoring and training opportunities. The Program will also continue to realign its subcontract requirements to ensure maximum cost-effectiveness of all Program activities.

1.2.3 *Compact Florescent Lights (CFL) Impacts on Program Savings* – CFLs have historically accounted for approximately 50% of total Program first-year savings. However, for PY12 the Program will continue to reduce its reliance on CFLs. In order to continue seeing total Program savings numbers at levels experienced in the past, less cost-effective savings measures will have to be employed, requiring increased incentives. Fortunately, these measures tend to have longer lives and will have a greater impact on long range energy efficiency goals.

1.2.4 *Increased Transformational Non-Resource Infrastructure Development* – During PY11, the Program demonstrated the value of Transformational Non-Resource Infrastructure Development activities. The Program will continue to expand on these efforts as proposed in this Plan. These activities include education, training and other similar transformational activities that may not result in immediate quantifiable energy savings, but are likely to contribute to energy savings over time. Guidelines, as provided in the February 10, 2011 letter from James Flanagan Associates (JFA) regarding the Renewal Proposal ("JFA Letter"), allow the Program to spend budgeted incentive funds to engage in such activities and receive credit towards the Program Performance Incentive Goals that may not show any specific energy savings for the current program year.

1.2.5 *Ongoing PBFA Responsibilities* – Over the first three program years, the PBFA responsibilities have expanded dramatically over what had originally been defined. Government support will continue with Commission support, including Integrated Resource Planning (IRP), the EEPS Technical Working Group (TWG) and other Commission activities. Additionally, the State Legislature and the State Energy Office have engaged PBFA technical support regularly for potential legislation and energy issue analysis, participation in state energy programs, the Hawaii Clean Energy Initiative (HCEI), Rebuild Hawaii, the Asia-Pacific Clean Energy Summit (APCES) and others.

1.2.6 *Commercial Sector Reluctance to Invest* –Post-2008 commercial investment saw a rapid decrease in Program participation by businesses. Experience in using the American Recovery and Reinvestment Act (ARRA) 25% project cost incentive in PY11 has demonstrated that it is now taking a significant level of incentives to drive projects off-the-shelf and into reality. Program experience shows that the level of incentive necessary can be from $0.18/kWh to upwards of $0.50 per kWh and more. In addition, the small business sector appears to be particularly reluctant to invest in energy saving measures without substantially higher incentives. In PY12, the Program will continue to expand efforts with enhanced incentive packages, to reach small businesses and other hard-to-reach customers, resulting in decreased cost effectiveness.

1.2.7 *Wavering Consumer Confidence* – Generally, consumer confidence has been down considerably since the 2008 economic recession, the worst in 80 years and has reflected in reduced customer participation in the Program. Recently, consumer confidence is beginning to show an increase and the Program will strive to capitalize on this growth by increased efforts to educate the business community of the benefits of investing in energy efficiency measures. With the increased budget, the Program will offer higher percentage incentives to ensure it captures these potential participants who will be very careful with their investments considering the vulnerability of the economy.

1.2.8 *Equity Among Rate Classes and Among Islands* – In PY12, the Program will continue and expand its efforts to bring Program benefits to small businesses, landlord-tenant situations and other hard-to-reach (HTR) customers. Additionally, the Program will review available mechanisms that promote Island Equity and implement pilot programs where feasible to test for the best equity enhancers for each island's particular circumstances.

1.2.9 *Expand Energy Usage Evaluation & Customer Targeted Offerings* – The Program has found that the use of evaluated and peer compared monthly energy data is a good tool to target and engage interest and participation in energy conservation and efficiency efforts. This provides customers with valuable information about their energy usage, and feedback on prior actions taken that can be used to justify projects to owners and get approval of energy efficiency actions. The Program will expand the effort to automate and make the program more widely available as well as use the peer comparisons and benchmarking to promote the best-of-the-best operational awards. The Program will also utilize time-of-use data, energy use benchmarking, and opportunity screening for in depth review of energy usage patterns to identify savings opportunities.

1.2.10 *Additional Facilitation Activities Included in Program Costs* – The Program will continue to explore energy savings facilitation activities designed to remove barriers to energy savings and encourage energy savings through other eco-friendly means including:

Recycling and Disposal Programs for:

- Residential CFL
- Commercial lamps
- Refrigerant recovery and disposal

Water and Wastewater Department Programs to provide:

- Low flow devices
- Conservation program development

1.2.11 *Turn-Key and Direct Install Programs*– For a second year, the Program demonstrated success in procuring turn-key programs and services from specialty vendors, including OPOWER peer comparison in PY11 (piloted in PY10 through ARRA funding) and NEED.org teaching modules (new to PY11). These turn-key programs have proven to be cost effective methods to securing highly skilled, top-notch services that the Program will continue into PY12. The following are examples of programs under consideration for PY12:

- <u>Educational and Training</u> – Building Operator Certification training
- <u>Small Business and Residential Direct Install Measures</u> – Direct install and audit services from small local energy firms and community-based service organizations to provide energy audit and retrofits will expand beyond lighting.
- <u>Restaurant Exhaust Fan Demand Ventilation Control</u> – Direct install of exhaust fan demand ventilation control for small restaurants
- <u>Air Conditioning & Refrigeration System Tune-Ups</u> – Direct install and retrofit of refrigeration systems.
- <u>Central Plant Metering</u> – Installation of plant kW per ton metering to assist in developing peer group comparison of plant efficiencies as well as to aid

customer commissioning efforts and the evaluation of the sea water air conditioning development.

1.2.12 *Island Equity - Big Island* - The County of Hawaii is concerned that its ratepayers paying into the Public Benefits Fund have not historically gotten their fair share of the Program's incentives. Under the PBFA contract over the past two years, the PBFA has greatly expanded the benefits provided by the Program to the County of Hawaii and all neighbor islands, compared with benefits received prior to Hawaii Energy taking over the Program. But more needs to be done. In PY12, Hawaii Energy will continue to expand the effort to significantly enhance the Big Island's benefits from the Program. Besides dedicating Program Specialists to each neighbor island, including a full-time resident Specialists on the Big Island and Maui, the Program will expand its outreach, education and training for the Big Island, continue with direct install efforts for all neighbor island small businesses and residents, continue with enhanced Energy Star appliance rebates and recycling services, continue working with local neighbor island community groups and continue to provide enhanced solar and other special rebates initiatives targeted to neighbor islands.

1.2.13 *Increasing Program Name Recognition* – As the Program settles into its fourth year, even greater emphasis will be placed on advertising, marketing and public relations to increase the brand name recognition. Advertising can be costly but has shown to increase the Program exposure and recognition. Increased brand recognition will help the Program attract all potential customers and avoid any potential losses due to consumer confusion as to what entity to contact for incentives. In conjunction with this, the Program will continue to expand and upgrade the Program website to increase ease of use and encourage greater participation. The Program will explore methods to measure the effectiveness of advertising where possible to ensure funds are used efficiently.

2.0 PROGRAM STRATEIGES & INITIATIVES for PY12

2.1 Program Strategy – Residential & Business Portfolio

In the second year of a significant budget increase, the Program's overarching strategy will be to continue to accelerate its efforts to educate and motivate ratepayers to implement more aggressive energy conservation and efficiency measures in their personal and business lives.

Besides continuing most of the operational initiatives employed in the first three Program Years, the Program will investigate and test new strategies of engaging broader customer participation in energy conservation and efficiency. This will include getting deeper into customer operations regarding energy conservation and efficiency.

As required by the State, the business program will continue to be allocated 55% of the overall budget in PY12. This continued budget increase will be directed to special new programs and enhanced incentive for existing programs in order to achieve greater energy savings for businesses, particularly small businesses. Specific areas influencing PY12's strategy include the following:

Hard-to-Reach

Throughout this Annual Plan, the term Hard-to-Reach ("HTR") is used to refer to any customer or customer class who is underserved by the Hawaii Energy Conservation and Efficiency Program. That can mean any customer or class that has not had a realistic opportunity to participate in Program offerings as evidenced by the fact that the customer or class has not received back its fair share of the Public Benefits Fees (PBF) paid through its electric utility bills, relative to other customers/classes. Typical HTR customers and customer classes under current Program practice include (but are not limited to): low income, renters, small business and neighbor islanders. HTR customers and classes will be targeted by the Program for special enhanced incentives up to and including no cost direct install efficiency measures so long as they are considered HTR. This appears to be the only effective way to ensure an equitable return of Program benefits to all utility customers who pay into the Public Benefits Fund.

Codes and Standards

The PBFA will explore opportunities to help the State achieve long term goals through new construction codes and standards. Through educational offerings, the PBFA will look to augment existing, but limited training sessions already offered to State and local government employees responsible for codes and standards development, adoption and enforcement. Particular attention will be focused on areas that will yield material energy savings. This may range from specific classes or highly qualified speakers to sponsoring individuals to work within the state or local code departments. In addition to educational offerings, the PBFA will continue to build the Efficiency Inside Home Design offer to demonstrate contemporary designs already being built above code at a competitive price. Leading by example, this empirical evidence can be used to facilitate and guide a conversation across Honolulu, Hawaii and Maui counties to enhance to state of codes in Hawaii.

Home Energy Rating System (Green MLS)

Through both Transformational and Residential programs, the PBFA will explore opportunities to enhance available Multiple Listing Service (MLS) data to include Home Energy Ratings for the residential real estate market. How to best approach the acquisition and presentation of a home's green features and attributes will be determined through collaboration with builders, realtors, bankers, and appraisers along with MLS provider(s) in Hawaii.

Military Communities and Facilities

With regard to the large military sector in the State, the PBFA will take specific steps to reposition its relationship and support of the military sector within its jurisdiction such that the military's participation in the Program is more in line with its contribution to the PBF. This effort would begin by disaggregating military residential energy efficiency initiatives from those targeting military facility operations and then reviewing all known executive orders and Department of Defense mandates requiring the adoption of energy efficiency measures. From this analysis, the PBFA would review program incentives and services and adjust them to ensure any offers target savings above and beyond the military's current directives in a cost-effective manner. Beyond incentives and services, the PBFA recognizes that the military has a significant focus on new technologies albeit renewable. In any event, the PBFA will monitor such activities with an eye on identifying opportunities to transfer lessons learned from the military to the programs targeting the residential and business sectors. While not technology driven, a residential ambassador program being developed for a military community will be considered for non-military communities in PY12.

Sea Water Air Conditioning (SWAC)

The PBFA is responding to this evolving project, while enabling existing program offers. Throughout PY12, the PBFA will be funding the installation of kW/ton metering. This will enable buildings to assess their cooling loads and subsequent evaluation of proposals relating to the Seawater Project. This metering will provide empirical data to enable PBFA facilitated peer group comparisons that will further raise awareness to building owners and operators as to potential energy savings opportunities. If inclined, this metering will also provide a critical stepping stone to participating in programs targeting central plant operations. The Program will support SWAC incentives at the rate directed by the Commission in earlier proceedings and upon installation and startup of the proposed system.

2.2 Program Strategy – Transformational Portfolio

Transformational initiatives emerged with a fast start across several areas in PY11. For a synopsis of PY11 Transformational initiatives and successes, please refer to Appendix D.

2.2.1 Introduction

Due to budgeting requirements, the Transformation Programs will be split into Business and Residential based on the primary customers the initiatives serve, although both residential and business funding sources may be expended to support any one program. Note the following section titles as they will reference the predominant source of funding as [*Residential*] or [*Business*], respectively.

New campaigns are targeted for areas where the community can make significant progress in kWh reduction, or where large, promising market segments need more attention. In cases where existing organizations are serving the need, Hawaii Energy may choose to collaborate if priorities match and funding is sufficient. Hawaii Energy will work to avoid duplicating services.

New Initiatives planned for PY12 expand the offerings in the four focus areas:

- Government
- Business & Industry
- Education
- Residential

These areas aim to fill needs that exist but are not already met by other organizations in the state. Government and Business & Industry programs will be primarily funded by the Business funds, while Education and Residential will largely funded by the Residential funds. Campaigns under consideration follow.

- **Government [*Business*]** – Government Buildings offer great potential as prime candidates for energy audits as well as the opportunity to teach energy reduction behaviors to the employees who work in them. In addition, the Statewide Clean Energy Goals require these buildings to improve their energy efficiency. As stated in HB 1464 enacted in June 2009, by the end of 2010, State agencies must evaluate the energy efficiency of all existing public buildings that are larger than 5,000 square feet or use more than 8,000 kilowatt-hours (kWh) annually, so there is opportunity to leverage this mandate. Hawaii Energy proposes to provide support for the development of strategies and pursuit of initiatives that are needed to accelerate energy efficiency behaviors. These include:

Proposed Offerings	**Comments**
Continue EEPS Support	Continue Support of Department of Hawaiian Homelands and other hard-to- reach individuals on Oahu and neighbor islands.
Continue Energy Efficiency Subject Matter Expert -Legislature	Continue to respond to requests for information or data on energy use, while providing feedback on the effectiveness on current laws or issues.
Continue Energy Efficiency language inclusion in County and State Master Plans	Respond to requests for assistance as appropriate.
Expand HCEI Collaboration and Support	Support for internships if funds available (DBEDT)
NEW - Rebuild Hawaii	Support meetings and overall process funding.
NEW - Education for State and county employees	Hire vendor/ally to teach how to save energy in the workplace.
NEW - Energy Audit and efficiency support for State Government Buildings	Hire vendor/ally or collaborate with organizations to teach and implement energy audits.

- **Business & Industry [*Business*]** – Improving energy efficiency in selected industries as well as small businesses are a priority. Food service (restaurants) and accommodations are target groups, as they are the largest private employer industry at 15.3% of all jobs in Hawaii. These businesses have demonstrated interest in energy efficiency, with 69% using energy efficient lighting and 51% reducing energy usage. The goal is to capture a greater percentage of these markets.

  Additionally, small businesses are a priority. The DLIR Baseline 2010 sampled 4,000 businesses for their energy jobs and practices. Of the over 120,000 private businesses in Hawaii, more than two-thirds have less than 50 employees. For these businesses, every energy dollar matters not only to the bottom line, but also the consumers who are typically charged higher prices for products when operational costs increase.

  Expanding support of green job development and training is a priority which will be in collaboration with University of Hawaii (UH) Community Colleges. The Green Jobs Projection: DLIR Baseline also reported that more than 70% of the businesses responding to the Qualifications and Training section of the survey reported some form of minimum education or training required. This suggests that specialized training is preferred for many green jobs at the community college or vocational level.

  Hawaii Energy's Transformation Program will increase and further support projects that achieve energy reductions, demonstrate energy reduction capabilities, and/or provide on the job training for individuals within energy efficiency and energy conservation fields. Hawaii Energy supports the goal of growing the industry training programs in tandem with the market growth in demand for those jobs. The goal is to expand both in a balanced manner.

Proposed Offerings	**Comments**
Expand Education for Energy Professionals	Expand education for business professionals on the financial and other benefits of energy cost reductions through improved equipment functioning, integration and behavior change. Expand Energy Efficiency Funding Group (EEFG), Certified Energy Manager (CEM), Building Operator Certification (BOC) and Integrated Building Offerings.
NEW - Energy Resource Center(s)	Use interest survey data to create pilot center at one Community College, test results and evaluate expansion or changes. Will lend energy efficiency–related books, videos, and testing equipment to the general public.
NEW - University of Hawaii Community Colleges (UHCC) Green Mechanical Council	Intended to build certification in the energy efficiency building trades. Will begin as pilot at one location, as it shows itself successful, will be expanded to others.

Proposed Offerings (Continued)	Comments
NEW - Energy Audits and Education in Food Service and Accommodations Industry (Restaurants)	Support energy cost reduction efforts within this industry, which is second largest private industry in state.
NEW - Energy Efficiency Education for Private Business Employees	Contract with vendor/ally to establish workplace conservation training programs. Possibly collaborate with Chamber of Commerce or other trade organization with significant reach, using curriculum on energy efficiency in the workplace and train-the trainer model.

- **Education [*Residential*]** – Since dormitories and other Department of Education buildings are some of the biggest users of energy in the State, expansion of the successful PY11 programs to new schools and complexes will be a focus for PY12.

  Educational programs in Middle School through University institutions will work to teach students and teachers about sustainability, renewable energy resources and energy efficiency measures. National Energy Education Development (NEED) Project training will be continued and expanded to additional schools. Energy Audit programs through Student Energy Ambassador Development (SEAD) and Rewarding Internships for Sustainable Employment (RISE) will be expanded, with a focus on energy savings within the school and energy savings within homes from the surrounding neighborhood. Proposed offerings include:

Proposed Offerings	**Comments**
Continue NEED Training	Expand to new complexes, schools, keep at similar funding level.
Continue RISE	Continue funding for interns within schools to assist in implementing energy efficiency projects. Includes current schools Pahoa, Keaau, University of Hawaii.
Expand Kukui Cup	Support repetition of the Kukui Cup at UH Manoa, and expand to Hawaii Pacific University.
Expand Energy Audits in Schools	Fund programs to teach students to conduct energy audits of buildings on school campuses and estimate as well as implement energy savings. (SEAD)

- **Residential [*Residential*]** – Landlord/Tenant initiatives are a priority because approximately 41% of the people in Hawaii are renters, according to the US Census Community Survey, 2011. Establishing cost effective methods for renters and landlords to benefit from energy efficiency, including incentives, policies, and behaviors, will be pursued.

Proposed Offerings	**Comments**
Expand – Financial Literacy and Energy Efficiency	Continue to serve hard-to-reach and Native Hawaiian communities, and expand to other demographic groups such as condo owners and apartment dwellers.
NEW - Landlord/Tenant Incentives and Solutions	Intended to provide methods for landlords and tenants (>40% of Hawaii residents) with feasible methods to reduce energy consumption in units.
NEW – Energy Efficiency Local Resident Experts	Create pilot effort to find ways to help residents influence each other within neighborhood community centers to learn about energy efficiency and compare notes (model after Energy Ambassador).
NEW - Documentary about Energy Efficient Homes	Pilot with O'lelo Community Television and/or other group to demonstrate net zero or energy efficient homes.

2.2.2 Synergies through Linking Hawaii Energy Initiatives

In addition to these proposed initiatives, synergies will be pursued between Transformation and other Hawaii Energy programs based on cross-reach, or support (e.g. follow-on education after CFL exchanges or other incentives).

As was reported in the 2011 Update on "Who should Deliver Ratepayer-Funded Energy Efficiency," such linking is the trend in Transformation across the country:

> *A word about scope: as the practice of consumer funded energy efficiency matures, it prompts more intricate questions. How can these ratepayer-funded energy efficiency programs support and connect with mandatory policies, like building energy codes and appliance and equipment efficiency standards? How can overall building and system efficiency across all energy forms, regulated and unregulated, and all natural resources, like water, be better accomplished?*[2]

Hawaii Energy seeks to maximize the return on investment from ratepayer funding. Now that there are established Transformation offerings, as well as a clearer picture of the need for

[2] "Who Should Deliver Ratepayer-Funded Energy Efficiency? A 2011 Update Based on work for the Colorado Public Utilities Commission," updating a 2003 report by RAP, Author Richard Sedano

demographic groups in which to expand, it is proposed to seek program and offering synergies within Hawaii Energy.

> *An Example of Synergy: An existing program at Pahoa High School teaches students about energy (content similar to the NEED program). At the same school an Energy Audit is undertaken by the Green Club, provided by RISE interns. Family Night at the school teaches the parents of the children in an educational setting, about actions that can be taken in the home. The family exists in a neighborhood where Energy Heroes and other outreach activities can be expanded.*

In PY12, potential synergies between initiatives will be reviewed for opportunities to extend reach. Based on the theory that most individuals do not change their energy habits based on one experience but on several linked experiences, participants in one offering could be encouraged to participate in another, while not negatively impacting the ability to draw in new participants. The potential strength of these linked experiences to achieve behavior change (i.e. kWh reduction) through reducing barriers and increasing enablers is based on social science research that delineates the difficulty in changing habits and the positive role of reinforcing messages and attraction strategies. Possible integration with video, pictures and media from the outreach initiatives of Hawaii Energy could provide increased reinforcement, inspiration and illustration of offerings in a lively, attractive way.

2.2.3 Attracting the Best for Hawaii Energy Participants: Vendor/Ally Process for PY12

In PY11, Hawaii Energy selected exceptional turnkey vendor/allies for its first year of Transformational offerings. These vendor/allies, such as EEFG and NEED.org have set the bar high for performance, transparency, and effectiveness. Building on the lessons learned from PY11, Hawaii Energy is developing a standard proposal process to expand its turnkey vendor/allies in PY12. Specific offerings that are deemed as strategically important to accelerate education and behavior change in large segments of the Hawaii population will be identified for proposal submission. Hawaii Energy will release a Request for Proposal (RFP) and upon evaluation of received proposals, award those which demonstrate:

- Specialized knowledge or connections with the target audiences, to include vendor/allies who are already functioning at a high level and whose expertise is considered trust.
- Project impact expressed in the projected number of participants reached and knowledge imparted;
- Clear scope of work with time and materials clearly specified;
- Scalability of project, so that efforts can be phased in, if needed;
- Explicit deliverables including metrics to evaluate follow-on interest by participants;
- How the vendor/ally may provide in-kind support (e.g. branding, marketing, or resources such as staffing and equipment, without full funding from Hawaii Energy).
- Any sole source selection of vendor/allies will be justified and documented as appropriate based on the above criteria.

By standardizing Hawaii Energy's solicitation of proposals and subsequent award of projects to vendor/allies, the Program seeks to ensure that local vendors vying to deliver services to the Program are made aware of how to successfully bid for Program funding and understands the collaborative aspect of the relationship. Approaching the selection of vendors in this manner will enhance the Program's ability to attract vendor/allies that are respected in the community that is cost effective and transparent.

The collaborative nature of the vendor/ally relationship will enable Hawaii Energy to integrate program offerings with vendor/ally-provided services. A number of current offers present this opportunity. For example, the EEFG training would lead to more skilled sales professionals that could successfully sell better and bigger projects that would further benefit through Program incentives. Within schools, opportunities exist to engage children with CFL Exchanges and subsequently tap audiences of parents to further educate them in energy efficiency and financial literacy class.

2.3 Outreach & Marketing Initiatives

Hawaii Energy plans to expand its Outreach & Marketing initiatives in PY12 to develop proactive support from every citizen in Hawaii, Honolulu and Maui counties. This includes:

- Partnering with new and existing initiatives and allies in energy conservation and efficiency to achieve HCEI goals.
- Increasing efforts to reiterate and explain conservation messages and information through the creation of supporting documents, helpful videos and other tools.
- Expanding the brand awareness of Hawaii Energy through multiple approaches blending traditional media, grassroots and creative delivery methods.

Hawaii Energy's outreach and marketing initiatives will support the Residential, Business and Transformational activities to achieve the maximum impact in communicating the mission and offerings of the Program. The Program will strive to create reliable methods to measure the effectiveness of outreach and marketing efforts in PY12.

2.3.1 Outreach

The Program will continue to expand the outreach activities to communicate and engage with the decision makers both in the business and residential sectors as well as educate vendors to encourage them to market our incentives. A few highlights of our outreach program will include:

- **Traditional Outreach** – Hawaii Energy will seek out or establish events, meetings and other opportunities to promote the Program goals to trade organizations, clubs, professional organizations, community boards, retirement groups, military groups, and labor unions. The Program will seek to sponsor or participate in as many ally and trade expo events as reasonably possible that demonstrate a reasonable return on program investment in time, resources and funding (i.e. likely participants reached). In addition, Program personnel will join and participate in professional organizations as an active member that can be justified as important for the Program to support (there can be no question of conflict of interest, if so, the Program will not proceed).

- **Outreach Through Community Allies** – The Program will continue to seek and partner with organizations that share a common or similar objective to help the community. The Program has had success partnering with various "green" and sustainably minded organizations as well as community organizations. Faith-based organizations are a large segment that the Program will approach in PY12 to develop a relationship that will enhance the public to learn about and participate in energy efficiency and conservation activities.

- **Collaborate with Hawaii Businesses and Organizations** – Hawaii Energy will increase collaboration with private businesses and non-profit organizations to help participants receive and understand information about energy efficiency and conservation. Ideas include, but are not limited to: (1) partnering with businesses to distribute messages containing easy office conservation tips, (2) creating joint advertising and/or messaging with energy-saving tips, and (3) soliciting business to support Transformational programs offered in their areas with prizes and/or sponsorships. These measures will include references to our website, and although focused on conservation, are intended to promote and lead to interest in our efficiency offerings.

2.3.2 Marketing

To encourage greater participation and awareness of the Program, we will focus on the larger mission of sustainability and the positive effects of energy conservation and efficiency in reducing oil consumed within the state. An emphasis will be placed on the hard-to-reach demographics that may not follow the "trendy" media that typically are based on expensive technologies. In addition to increasing general program awareness, campaigns to promote individual offerings and program enhancements will be launched as well. Highlights of elements of our marketing will include:

- **Mass & Survey Emails** – The Energy Program Management Information System (EPMIS) has been enhanced to track mass emails announcing new offerings and Program information. This provides the capability to report and take action based on targeted information to and from our customers. The Program plans to define a process, policy and method to track the effectiveness of this medium. In addition, Hawaii Energy will be enhancing the functionality of our customer tracking system by adding a survey feature that will send a targeted survey to approved rebate participants. Surveys will include questions as to the effectiveness of our marketing campaigns as well as questions about the rebate process. It will enable instantaneous feedback from customers as to their opinions on energy and the Program.

- **Hawaii Energy Website** – For PY12, the Program will refine the usability of the website, adding interactive functionally, as well as additional energy related widgets. An emphasis will be placed on refinements that will broadly appeal to the many segments of potential participants in Hawaii, while also expanding support for the technical community. Supporting the technical community (e.g. plumbers and electricians) will support the Program's "door to door" outreach initiatives which can be very effective in engaging the hard-to-reach, less computer and technology literate segments. In addition, videos explaining how and where to find energy savings in residences and business and a "how to buy" section will be added to the site. Objectives include:
    - Create a section especially for engineers, architects, trade allies and others who already understand the benefit of implementing energy-saving measures to help them to engage with their customers as a champion of Hawaii Energy.

- Establish a listing of “Trade Allies” for both residential and commercial markets, where people can find help to implement energy efficiency and conservation measures.
- Develop a “clearinghouse” of no-cost energy-saving behaviors and actions for both residential and commercial use buildings, where people can share their success.
- Produce video(s) about no-cost energy-saving tips filmed by students or others.
- Develop a resource listing of common household Hawaii items with kWh, CO2 and dollar savings. This information will be derived from on-going Transformational endeavors.
- Enhance the Event Calendar with filtering.
- Improve reporting metrics on the effectiveness of the Website in general.

- **Social Media** – As part of our integrated marketing plan, the Program will develop and implement a social media strategy. Objectives include a stronger online presence to better penetrate the business sector by exploring business based media (i.e. LinkedIn®) and to explore the rapidly expanding landscape of social media platforms available to the broader residential market (i.e. OPower, C# Energy, etc.).

- **Collateral Material** – The Program will create and smartly distribute collateral to audiences that respond to or simply have better success with hardcopy materials rather than digital (e.g. the computer illiterate or those lacking easy online access, as well as those who do not respond to other forms of media). All collateral will include the website address and call center phone numbers to encourage further exploration online or in person. Collateral will be targeted to the following markets:
  - Residential
  - Business (Non-technical)
  - Business (Technical)
  - Government (elected officials, politicians and policymakers)

  Brief, attractive information cards will be created with targeted information using language the audience will understand and will create a positive response towards the Program.

2.3.3 Advertising

The core marketing messages of the Program will be crafted to increase public awareness of energy efficiency and conservation in the State, emphasizing behavior change. The Program recognizes the great value of repetition to foster the adoption of new ideas and change in behavior. Therefore, the majority of the Program’s advertising will be in paid television, print and radio. Other more targeted advertising and marketing tools will be employed to reach smaller, niche markets. Paid television, radio and print media spots are instrumental in reaching the hard-to-reach segment and will serve impart a new way of thinking about energy efficiency and conservation and if successfully executed, drive action (e.g. replace an incandescent light bulb with a CFL or LED). Each of these media has varying success rates dependent on numerous geographic and socio-economic demographics and factors which will be further considered as media buys are executed. The Program will utilize a unique mix of media that best aligns with the consumption of television, print and radio on each particular island or targeted community. The program plans to develop metrics to gauge and track advertising and marketing efficacy.

2.3.4 Public Relations

Hawaii Energy will increase its public relations efforts in conjunction with HCEI's efforts to achieve greater impact. Public relations will coordinate with advertising and marketing to ensure effective, cohesive messaging to exponentially increase Program awareness for the residents and businesses of Hawaii. The Program will seek feedback from the community as to effectiveness of this approach. The Program plans to showcase a project to demonstrate the benefits of working with Hawaii Energy from concept to completion in PY12.

3.0 RESIDENTIAL PROGRAM STRATEGY & DETAILS FOR PY12

3.1 Overview

For PY12, Hawaii Energy will maintain programmatic changes adopted in PY11, specifically the incentive categories:

- **Residential Energy Efficiency Measures (REEM)** – This incentive category is the core of Hawaii Energy's residential portfolio and undergoes incremental developments responding to market conditions (i.e. retail pricing) and consumer need.

- **Custom Energy Solutions for the Home (CESH)** – This incentive category provides a measure of flexibility within the prescriptive portfolio to accommodate unforeseen market opportunities. The budget and unit cost targets provide financial efficacy guidance to the Program and allies who champion these opportunities.

- **Residential Energy Services & Maintenance (RESM)** - This incentive category targets ally-driven service offerings to enhance energy savings persistence and bootstrap fledgling energy services businesses trying to secure a toehold in Hawaii.

- **Residential Hard-to-Reach (RHTR)** – This incentive category will seek to secure various projects among geographies and demographics that have been traditionally underserved. Efforts in PY11 to pierce the landlord/tenant barrier of installing SWH systems were unsuccessful despite enhanced incentive offers. However, geographic barriers are seen as an opportunity for PY12.

A summary listing of the new Residential Program offerings can be found in the table below followed by a brief summary of additions and changes. A detailed description of the Residential Program offerings follows in section 3.1 through 3.4. Appendix B contains a projection of potential energy savings for the planned programs.

Residential Programs

Program	Category / Measures
REEM	***Residential Energy Efficiency Measures***
	High Efficiency Water Heating
	High Efficiency Lighting
	High Efficiency Air Conditioning
	High Efficiency Appliances
	Energy Awareness, Measurement and Control Systems
CESH	***Custom Energy Solutions for the Home***
	Target Cost Request for Proposals
RESM	***Residential Energy Services & Maintenance***
	Residential Direct Installation
	Residential Design and Audits
	Residential System Tune-Ups
RHTR	***Residential Hard to Reach***
	Energy Efficiency Equipment Grants
	Landlord, Tenant, AOAO Measures

3.1.1 New Program Offerings of Residential Energy Efficiency Measures (REEM)

High Efficiency Lighting

- LED Lighting – While not new to the residential portfolio, Hawaii Energy anticipates the availability of EnergyStar® compliant products to surge, particularly for popular A19 bulbs, while retail prices fall, providing an attractive energy savings option to residential consumers. The Program will closely follow availability (rising) and pricing (decreasing) in order to maintain adequate incentive levels.

High Efficiency Air Conditioning

- Hawaii Energy plans to discontinue the $110 incentive for Split System AC (created prior to Hawaii Energy) in favor of bringing focus to the existing $200 incentive for VRF Split System AC (introduced in PY11). While these systems are expensive and therefore an option to a limited residential population in Hawaii, retaining this rebate will provide an incentive to those who can afford this kind of technology to install the most efficient product available.

- Hawaii Energy plans to continue all other offers from PY11, while strengthening ally relationships and pre-post verification.

High Efficiency Appliances

- High Efficiency Pool Filtration Pump Systems – This is an incentive for residential pool pumping techonolgies which offer 40% to 60% savings when using newer pump technology including variable speed/flow controls, improved motors and pump designs.

- Freezer Trade-In – In particular areas of Hawaii, it has come to Hawaii Energy's attention that many families have dedicated freezers to accommodate their lifestyle. Hawaii Energy will explore a Freezer Trade-In offer, modeled after the successful Refrigerator Trade-In offer believing it may meet a specific need of Hawaii families, particularly in rural areas.

- Clothes Washer (Tier II/III) – Enhanced for PY11 from any EnergyStar® washing machine to a more efficient EnergyStar model, the Program increased the rebate from $50 to $75 in order to reflect the increased purchase price. For PY12, the Program will maintain the Tier II/III requirement, but return to the $50 incentive level. Close attention to the offer will be dedicated to assess the true value of this offer among the many drivers leading consumers to purchase these high efficiency models.

- Hawaii Energy plans to continue all of PY11's offers, while improving retail merchandising.

Energy Awareness, Measurement and Control Systems

- Peer Comparison – Hawaii Energy plans to continue the OPOWER Home Energy Report peer comparison program, which was expanded to the Neighbor Islands in PY11. The market for peer comparison initiatives is rapidly evolving to include social media and consumer-based rewards programs. Hawaii Energy's strategy will look for ways to affect measurable energy savings through behavior change in both residential and transformational portfolios by evaluating the evolving options arising in this market.

The latest results for OPOWER Home Energy Report program…

In May 2012, the most recent results available, homes in Oahu's Ewa region receiving the Home Energy Report consumed 1.9% less energy than their peers not receiving the report. This translates to savings of 163,250kWh for the month of May.

While not new to the residential portfolio, the market approach to promoting the following offers will evolve, specifically:

- Room Occupancy Sensors – Hawaii Energy will explore the Energy Hero Audit as the primary means of residences leveraging this technology, which may include motion sensors for garages.

- Whole House Energy Metering – Hawaii Energy will explore targeting specific high-use households to consider this measure. This measure will undergo a review of qualifications.

3.1.2 New Program Offerings of Custom Energy Solutions for the Home (CESH)

Target Cost per KWh Request for Proposals

- Custom Packaged Proposals – This program will target and encourage contractors, home auditors, and energy vendors to develop cost-effective projects that focus on high energy consumption homes. The program will be a call for projects that meet a total dollar per kWh savings target and allow the market to be creative in the actions and measures that achieve the targeted cost per kWh energy savings. The projects will use utility metered data and be sub-metered if required to ensure savings performance.

Residential Design and Audits

- Hawaii Energy Hero Audits – Hawaii Energy will explore incentivizing home audits based on the progress of collaboration with the Kupu YEAH assessment program and interest in developing a Green Multiple Listing Service (MLS). Hawaii Energy will consider a limited market-based incentive as well as a grant-based home audit (see Residential Hard-to-Reach).

Residential System Tune-Ups

- SWH System Tune-Up – Hawaii Energy will craft a seasonal offer based on the results of the Solar Tune-Up Pilot conducted in PY11.

- Central AC Maintenance – Hawaii Energy will continue its current offer and collaborate with allies to explore the viability of AC tune-ups, specifically with regard to split systems. The cost effectiveness of this activity is in question; therefore the basis to incentivize this measure is under consideration.

3.1.3 New Program Offerings of Residential Hard-to-Reach (RHTR)

Energy Efficiency Equipment Grants

- CFL Exchange – While not new to the Program, budgeting has been doubled to accommodate the market appetite to participate in this high energy-saving program. Funding will also enable more opportunities to integrate with Transformational initiatives, which are particularly focused on residential hard-to-reach participants as well.

- Hawaii Energy Hero Audits – See Custom Energy Solutions for the Home (CESH).

- Energy Hero Landlord Program – This program will be targeted at landlords who own affordable rental units. The program will offer such landlords a comprehensive audit, RFP and other support to help with projects that will drive the energy cost of their renters down. The program will work with local lenders to provide project financing support in conjunction with the program.

3.1.4 Additional Residential Program Initiatives

- Residential Financing – A common request that Hawaii Energy receives from customers and vendors is that we provide financing or relief from the significant up front capital costs of major conservation and efficiency measures such as residential solar water heating. Hawaii Energy will continue to work with local financing institutions to develop ways to provide affordable financing through the PBFA, notably through the "Hot Water, Cool Rate" solar interest buy-down program and other opportunities should they arise. The result of these efforts will be used to develop a permanent plan for financing energy efficiency measures in the future.

- Program Promotion of Professional Recycling and Disposal – Hawaii Energy is continuing to expand program offerings that incentivize recycling and disposal to take less efficient appliances off the grid. Through these initiatives, we are also supporting local small businesses to handle the recycling or appropriate disposal. As LED lighting options continue to increase, Hawaii Energy will explore opportunities to expand CFL recycling options, particularly on the Neighbor Islands.

- Point of Purchase (POP) Rebates – During PY10 and PY11, Hawaii Energy expanded the highly successful POP rebates of CFLs to other incentivized products. Hawaii Energy will continue to explore viable options to continue this offering that makes it easier for the customer to obtain their rebate and lead to greater penetration of consumers.

3.1.5 Residential Program Details Table of Contents

To follow, in Sections 3.2 through 3. 5, is an overview summary of Residential Program Offerings followed by detailed descriptions and energy savings. The Overall Program Details are provided on the following page, preceding the individual Program summaries.

3.2 All Residential Programs Overview

3.3 Residential Energy Efficiency Measures (REEM)
- 3.3.1 *High Efficiency Water Heating*
- 3.3.2 *High Efficiency Lighting*
- 3.3.3 *High Efficiency Air Conditioning*
- 3.3.4 *High Efficiency Appliances*
- 3.3.5 *Energy Awareness, Measurement and Control Systems*

3.4 Custom Energy Solutions for the Home (CESH)
- 3.4.1 *Target Cost Request for Proposals*

3.5 Residential Energy Services & Maintenance (RESM)
- 3.5.1 *Residential Direct Installation*
- 3.5.2 *Residential Design and Audits*
- 3.5.3 *Residential System Tune-Ups*

3.6 Residential Hard-to-Reach (RHTR)
- 3.6.1 *Energy Efficiency Equipment Grants*
- 3.6.2 *Landlord, Tenant, AOAO Measure*

Program Category	**3.2 All Residential Programs Overview** **Overview of All Categories**
Target Market	• Homeowners, Landlords, Tenants and Property Managers • Manufacturers, Distributors, Dealers and Retailers. • Solar Contractors, Plumbing Contractors and General Contractors • Architect and Engineers
Projected Impacts	Demand 10,007 kW Energy 71,819,271 kWh Incentive Budget $9,736,673 Cost per kWh $0.136 /kWh TRB $72,451,707
Technologies	**Incentivized Measures** — **<u>Incentive Forecast</u>** **Residential Energy Efficiency Measures** $7,718,682 **Custom Energy Solutions for the Home** $10,500 **Residential Energy Services & Maintenance** $847,500 **Residential Hard-to-Reach** <u>$1,159,990</u> $9,736,673 • Solar Water Heating Systems $750 • Solar Water Heater Interest Buy Down $1,000 • Solar Water Heater Hero Giftpacks $35-$40 • Heat Pumps $200 • CFLs $ 0.98 • LED $7 • VRF Split System AC $200 • Ceiling Fans $40 • Solar Attic Fans $50 • Whole House Fans $75 • Refrigerator (<$600) $50 • Refrigerator with Recycling $125 • Chest Freezer with Recycling* $125 • Garage Refrigerator/Freezer Bounty* $75 • Clothes Washers (Tier II / III) $50 • Pool VFD Controller Pumps $150 • Room Occupancy Sensors $5 • Peer Group Comparison $11.84/HH • Whole House Energy Metering $100

Program Category	3.2 All Residential Programs Overview Overview of All Categories
	• Efficiency Inside Home Design $1,000 • Hawaii Energy Hero Audits $100-$250 • Central AC Maintenance $50 • Solar Water Heater Tune Up $100 • Solar Inspections (WAP) $95 • CFL Exchange(s) $2.49/bulb *New or expanded measures

Program Category	**3.3 Residential Energy Efficiency Measures (REEM)** **3.3.1 High Efficiency Water Heating**
Target Market	• Homeowners, Landlords, Tenant, and Property Managers • Manufacturers, Distributors, Dealer, and Retailers • Solar Contractors, Plumbing Contractors, and General Contractors • Architect and Engineers
Impacts	Demand 1,594 kW Energy 7,304,272 kWh Incentive Budget $3,166,500 (15%) Cost per kWh $0.434 /kWh TRB $17,153,970
Technologies	**Incentivized** — <u>Incentive</u> / <u>Units</u> • Solar Water Heater (SWH) Incentive — $750 / 3,750 • Solar Water Heater Interest Buydown — $1,000 / 250 • Solar Water Heater Energy Hero Gift Packs — $35 / 400 • Heat Pumps — $200 / 450 **Under Review for Potential Incentives** • Peak demand reduction timers for water heaters • New manufacturers including select evacuated tubes (The following Solar Water Heater Systems budgets are included in the plan under the Landlord/Tenant, AOAO Measures. See section 4.6.2) • Custom SWH Proposals — $0.65 / kWh — 1,000,000 kWh *(equivalent to 484 systems) ***Total Solar Water Heating Systems*** — ***$3,712,500*** — ***4,000+*** 38% of Residential Budget
Market Barriers	**General** • Large up-front cost • Strong demand for PV / Low awareness of cost-effective SWH • Trust and credibility of technology providers • Quality of system design, equipment and installation • Knowledge operation and maintenances of technologies **Owner Occupant** • Access to and/or understanding of financial options • Time between purchase and tax refunds (carrying cost)

Program Category	**3.3 Residential Energy Efficiency Measures (REEM)** **3.3.1 High Efficiency Water Heating**
Market Barriers (continued)	**Landlords and Property Managers** • May not pay for electricity cost • Reluctance to invest without a financial return • Short term investment **Renters and Lessees** • Do not have the authority or responsibility for the hot water system • Renter lease term shorter than simple payback

Program Category	3.3 Residential Energy Efficiency Measures (REEM) 3.3.1 High Efficiency Water Heating
Description & Implementation Strategies	**Solar Water Heating** *Solar Water Heater (SWH) Incentive* The program will provide a $750 rebate for solar hot water systems installed by qualified participating contractors. The process is: • Customers contact a contractor from a list of participating contractors on Hawaii Energy's website • Contractor comes to the home, reviews site conditions, interviews the customer to analyze hot water usage then provides a written proposal for a complete installation; Contractor's proposed sale price reflects the inclusion of the $750 rebate • Contractor fills out the Program's system sizing form • Contractor provides rebate form and helps customer to fill it out • Contractor provides Hawaii Energy with building permit number • Contractor installs solar water heating system • Contractor reviews system operation and maintenance with customer • Hawaii Energy will conduct sample post-installation inspections (25% on Oahu, 100% on Maui and Hawaii Counties) to make sure the systems have been installed properly • Upon successful inspection, Hawaii Energy will rebate the contractor $750 *Solar Water Heater Interest Buydown* The program provides an incentive to buy down the interest charges for a solar water heater loan from a participating lending institution made on solar hot water systems that are installed by qualified participating contractors. This incentive will cover the first 6 points of the loan interest up to a total maximum of $1,000. The process includes: • The customer contacts a participating lender from a list of participating lenders on Hawaii Energy's website • The customer enters into a financing agreement with the lender that indicates the sale price, loan amount, interest component and the Hawaii Energy Incentive. • The customer executes the "Standard" installation process

Program Category	3.3 Residential Energy Efficiency Measures (REEM) 3.3.1 High Efficiency Water Heating
Description & Implementation Strategies (continued)	**Heat Pumps** Residential heat pump rebates are available at $200. Rebate applications for water heaters are provided by the retailers at the time of purchase or a customer can visit our website and download the form. Rebate applications must include an original purchase receipt showing brand and model number. **Trade Allies** The program will conduct outreach with key allies including the Solar Technical Advisory Group, solar contractors, suppliers, government and housing agencies; financial institutions; and housing, apartment, and contractor associations. This team will promote the program, solicit feedback for more efficient program operation, and identify opportunities for implementation and coordination of efforts
Key Changes	• Contractor or customers may request the inspection if one is not selected to be done • Continual solicitation of new participating lenders to offer loan interest buy down incentive • Recognizing the growing product availability and sales efforts regarding residential heat pumps, increase educational efforts
Marketing Strategies	• Direct contact with participating solar contractors • Community event promotion of High Efficiency Water Heating • Comprehensive marketing initiative • Listing of participating contractors on our website • Integration with Home Energy Report (Peer Group Comparison)

<table>
<tr><td>Program Category</td><td>3.3 Residential Energy Efficiency Measures (REEM)
3.3.2 High Efficiency Lighting</td></tr>
<tr><td>Target Market</td><td>• Homeowners, Landlords, Tenants, and Property Managers
• Manufacturers, Distributors, Dealers, and Retailers</td></tr>
<tr><td>Impacts</td><td>Demand 5,862 kW
Energy 42,527,335 kWh
Incentive Budget $2,082,682 (10%)
Cost per kWh $0.049 /kWh
TRB $35,405,286</td></tr>
<tr><td>Technologies</td><td><u>Incentive</u> <u>Units</u>
CFLs $0.98 1,410,900
LED $7.00 100,000</td></tr>
<tr><td>Market Barriers</td><td>General
• Lack of understanding about how energy is used in the home
• Disposal concerns
• Lack of understanding as to which technology is the most effective to reduce energy consumption
• Product availability of specialty and dimmable LEDs within the customer shopping area

Owner Occupant
• Ability to self-install
• Ability to find appropriate CFLs for fixture or ceiling fan
• Disposal concerns
• May not pay for electricity cost (condominiums)

Landlords and Property Managers
• No control over the hours used for lighting
• May not pay for electricity cost
• Reluctance to invest without a financial return
• Short term investment

Renters and Lessees
• Do not have the authority or responsibility for the lighting fixtures
• May not pay for electricity</td></tr>
</table>

Program Category	**3.3 Residential Energy Efficiency Measures (REEM)** **3.3.2 High Efficiency Lighting**
Description & Implementation Strategies	The CFL and LED rebates are offered through manufacture direct incentives which are provided as point of sale cost reductions. The process includes: • Distributors, retailers and manufacturers complete a Memorandum of Understanding (MOU) cooperative agreement in which they provide funds for the advertising, promotion for instant rebates for the CFL and LEDs to customers • Retailers signing the MOU agree to display signage showing the rebate has been provided by the Program, provide assistance in ordering and stocking qualifying products, and provide sales staff training • Retailers agree to promote consumer education, undergo staff training and follow proper procedures. • Retailers with the ability to track incentives using sales data are given the option for issuing rebates without the use of coupons, provided they can demonstrate the ability of providing accurate, timely data on point of purchase information by store by SKU **Trade Allies** The program is implemented through strong working relationships between the program, the major CFL/LED manufacturers and the national retailers. The participating CFL manufacturers are: GE, FEIT, Sylvania, TCP and Philips. Participating retailers include: Ace Hardware, City Mill, Costco, Don Quijote, Foodland, Home Depot, Longs Drugs/CVS, Lowes, Safeway, Sam's Club, Times and Wal-Mart who have all utilized their buying power to offer a better blend of quality, affordable CFLs across the State.
Key Changes	• Development and introduction of a custom lighting rebate offer targeting customers who engage with lighting designers and specialty shops. With a growing selection of EnergyStar® qualified specialty LED products, Hawaii Energy has a small but growing number of small businesses serving this clientele, with no option to benefit from lighting incentives. • Reducing incentive levels for LEDs particularly for new lower cost / higher lumen A19s. • Provide for increased recycling options for CFLs.
Marketing Strategies	• Significant focus on merchandising, including more requirements for in-store signage featuring Hawaii Energy brand and incentive amounts • Advertisements to explain how to select a CFL • Educational information online and in the media • Leverage allies to share CFL information and increase participation • Encourage an increase in selection of CFLs available • Social media

Program Category	**3.3 Residential Energy Efficiency Measures (REEM)** **3.3.3 High Efficiency Air Conditioning**
Target Market	• Homeowners, Landlords, Tenants and Property Managers • Manufacturers, Distributors, Dealers and Retailers. • HVAC and General Contractors • Architect and Engineers
Impacts	Demand 200 kW Energy 964,398 kWh Incentive Budget $162,500 (1%) Cost per kWh $0.168 /kWh TRB $1,705,580
Technologies	**Units** **Incentive** VRF Split System AC 200 $200 Ceiling Fans 2,500 $40 Solar Attic Fans 150 $50 Whole House 200 $75
Market Barriers	**General** • Lack of understanding of how energy is used in the home • Lack of information about product energy efficiency • Lack of understanding as to which are the most effective ways to reduce energy consumption **Owner Occupant** • Inability to self install • Existing air conditioning opening prevents the proper selection for energy savings • Home owner association rules **Landlords and Property Managers** • No control over the hours tenant/units use of air conditioning. • May not pay for electricity cost • Reluctance to invest without a financial return • Short term investment **Renters and Lessees** • Do not have the authority or responsibility for the HVAC system • May not pay for electricity

Program Category	**3.3 Residential Energy Efficiency Measures (REEM)** **3.3.3 High Efficiency Air Conditioning**
Description & Implementation Strategies	The program will continue to provide prescriptive incentives to residential customers who purchase and install energy efficiency measures that meet or exceed ENERGY STAR® standards. The process includes: • The customer purchases a qualified high efficiency air conditioner, ceiling fan, solar attic fan or whole house fan. • The customer obtains an application through the program's website, in hard copy from Hawaii Energy, or through point of sale retailer displays. **Trade Allies** We will continue to build relationships with manufactures, distributors and dealers by offering workshop and events to train Allies on Hawaii Energy's offerings and processes while seeking input on how to create additional offerings and refinements to existing programs.
Key Changes	• Discontinue incentives for split AC without VRF technology. • Continue to encourage variable refrigerant flow (VRF) inverter split system units only.
Marketing Strategies	• Provide cost of ownership information on rebate application forms • Provide more information on the website explaining how to properly use HVAC systems • Advertise to explain how to select an HVAC system • Find organizations to assist with HVAC outreach • Integration with Home Energy Reports (Peer Group Comparison) • Social media

Program Category	**3.3 Residential Energy Efficiency Measures (REEM)** **3.3.4 High Efficiency Appliances**
Target Market	• Homeowners, Landlords, Tenants, and Property Managers • Manufacturers, Distributors, Dealers and Retailers • Wholesalers and General Contractors • Architect and Engineers
Impacts	Demand 359 kW Energy 6,834,218 kWh Incentive Budget $1,342,500 (6%) Cost per kWh $0.196 /kWh TRB $8,646,154
Technologies	(see table below)
Market Barriers	**General** • Lack of understanding of how energy is used in the home • Lack of information about energy efficient products • Lack of understanding as to which are the most effective ways to reduce energy consumption • Lack of understanding of the importance of size and operation for energy savings • Large up-front cost **Owner Occupant** • Ability to self install • Home owner association rules • Availability of product when needed **Landlords and Property Managers** • No control over the hours of use • May not pay for electricity cost • Reluctance to invest without a financial return • Short term investment

Technologies

	Units	Incentive
Refrigerator (<$600)	750	$50
Refrigerator with Recycling	6,000	$125
Chest Freezer with Recycling*	1,000	$125
Garage Refrigerator/Freezer Bounty	1,500	$75
Clothes Washer (Tier II / III)	5,000	$50
Pool VFD Controller Pumps	450	$150

Program Category	**3.3 Residential Energy Efficiency Measures (REEM)** **3.3.4 High Efficiency Appliances**
Market Barriers (continued)	**Renters and Lessees** • Do not have the authority or responsibility for the appliances • May not pay for electricity
Description & Implementation Strategies	The program will continue to provide prescriptive incentives to residential customers who purchase and install energy efficiency measures that meet or exceed ENERGY STAR® standards. Hawaii Energy will explore point of purchase rebates for appliances this year. The process includes: • The customer purchases a qualified high efficiency appliance. • The customer obtains an application through the program's website, in hard copy from Hawaii Energy, or through point of sale retailer displays. **Implementation** We will continue to build relationships with manufacturers, distributors and dealers through store visits where we train allies on Hawaii Energy's offerings and processes while seeking input on how to create additional offerings and refinements to existing programs. We will leverage the relationships that were created with retailers across the State through the Trade Up for Cool Cash offering. We will work with Sears and Best Buy to explore point of purchase rebates that enable retailers to deduct the rebate at time of purchase.
Key Changes	• Expand Bounty offer to include Lanai (achieved May 2012) and Molokai • Pilot an Energy Star® Chest Freezer Trade-In offer for the neighbor islands • Reduce incentive amount for Washing Machines from $75 to $50 • Formerly launch Pool VFD Controller Pump offer • Continue to improve quality control and reporting of recyclers • Potential to count Water Utility energy savings from washing machine installations.
Marketing Strategies	• Provide point of purchase (POP) signage and information supported by quality control (merchandising) • Provide cost of ownership information on rebate application forms • More information on the website explaining good practices on how to use ENERGY STAR appliances • Advertising explaining how to select and use appliances for the best energy savings • Find organizations to assist with appliance outreach

Program Category	**3.3 Residential Energy Efficiency Measures (REEM)** **3.3.5 Energy Awareness, Measurement and Control Systems**
Target Market	**General** • Homeowners, Landlords, Tenants and Property Managers • Manufacturers, Distributors, Dealers and Retailers
Impacts	Demand 838 kW Energy 7,431,808 kWh Incentive Budget $964,500 (4%) Cost per kWh $0.130 /kWh TRB $1,104,588
Technologies	<u>**Incentive**</u> <u>**Units**</u> Room Occupancy Sensor $5 300 Units Peer Group Comparisons $11.84 75,000 Homes Whole House Energy Metering $100 750 Units
Market Barriers	**General** • Awareness of technologies • Understanding of best application • Installation • Proper application of room occupancy sensors
Description & Implementation Strategies	**Room Occupancy Sensors** These sensors control the use of lighting in areas around the home with infrequent use such as laundry, storage, garage or spare areas. They are not intended for high use areas or CFLs. **Peer Group Comparison** Hawaii Energy plans to continue the Home Energy Report offered through OPOWER in the Ewa region on Oahu (which was formerly funded with ARRA) and across the neighbor islands (Hawaii, Maui, Lanai and Molokai). Our strategy will look for ways to affect measurable energy savings through behavior change. **Whole House Energy Metering Devices Mail-in Rebate** These devices collect energy data by induction and transmit the information to a display unit which can be carried anywhere throughout the house or viewed via the internet.

Program Category	3.3 Residential Energy Efficiency Measures (REEM) 3.3.5 Energy Awareness, Measurement and Control Systems
Description & Implementation Strategies (continued)	**Implementation** The placement of Room Occupancy Sensors will be reliant on the Hawaii Energy Hero Audits, where a certified auditor will make specific recommendations. The rebate will enhance the likelihood of adoption for this measure. The Home Energy Report will be renewed with subtle refinements on participant selection, tips provided in the reports and specific promotions coordinated with our marketing and outreach initiatives. Particular attention will be given to customers who take the time to contact Hawaii Energy with concerns of the report's validity and/or desperate for help. It is foreseen that the Hawaii Energy Hero Audit will be of particular value to these customers. The Whole House Energy Metering offer will benefit from marketing to high use households, where visibility of how electricity is being used will lead to subsequent investments in energy efficiency.
Key Changes	• Integration of Hawaii Energy Hero Audit to drive adoption of Room Occupancy Sensors • Specific marketing of Whole House Energy Metering
Marketing Strategies	• Public relations and media opportunities stemming from Home Energy Reports.

Program Category	**3.4 Custom Energy Solutions for the Home (CESH)** **3.4.1 Target Cost Request for Proposals**
Target Market	• Homeowners, Landlords, Tenants and Property Managers • Manufacturers, Distributors, Dealers and Retailers. • Mechanical and Solar Service Contractors
Impacts	Demand 28 kW Energy 28,284 kWh Incentive Budget $10,500 (<1%) Cost per kWh $0.371 /kWh TRB $59,727
Technologies	Custom Packaged Proposals — <u>**Incentive**</u>: $0.30 — <u>**Units**</u>: 35,000 kWh
Market Barriers	There were previously no mechanisms to accept "customized" residential energy efficiency proposals.
Description & Implementation Strategies	**Custom Packaged Proposals** This program that will target the contractor / home auditors / energy vendors and encourage them to develop cost-effective projects that focus on high energy consumption homes. The program will be a call for projects that meet a total dollar per kWh savings target and allow the market to be creative in the actions and measures that achieve the targeted cost per kWh energy savings. The projects will use utility metered data and submetered if required to insure savings performance.
Key Changes	• New
Marketing Strategies	• Direct contact with participating energy professionals • Direct contact with Property Managers and AOAOs

Program Category	**3.5 Residential Energy Services & Maintenance (RESM)** **3.5.1 Residential Direct Installation**
Target Market	• Homeowners, Landlords, Tenants and Property Managers • Manufacturers, Distributors, Dealers and Retailers. • Mechanical and Solar Service Contractors
Impacts	Demand 20 kW Energy 20,203 kWh Incentive Budget $12,500 (<1%) Cost per kWh $0.619 /kWh TRB $57,405
Technologies	<u>**Incentive**</u> <u>**Units**</u> TBD $0.50 25,000 kWh
Market Barriers	There are energy efficiency measures that are not supported by current industry and/or are new or unfamiliar with the public.
Description & Implementation Strategies	The use of a direct installation process can achieve energy savings at a higher than average program cost initially to evaluate the energy savings and program implementation results in order to develop either cost-effective direct install programs or to promote the successes and then transfer to the private sector for implementation. **TBD** Hawaii Energy will pursue additional residential direct install programs targeted at $0.50 per kWh.
Key Changes	• New
Marketing Strategies	• Direct contact with participating energy professionals • Direct contact with Property Managers and AOAOs

Program Category	**3.5 Residential Energy Services & Maintenance (RESM)** **3.5.2 Residential Design and Audits**
Target Market	• Residential Home Developers
Impacts	Demand 251 kW Energy 1,406,111 kWh Incentive Budget $780,000 (2%) Cost per kWh $0.555 /kWh TRB $2,511,414
Technologies	<u>Incentive</u> <u>Units</u> Efficiency Inside Home Design $1,000 750 Homes Hawaii Energy Hero Audits $100 300 Audits
Market Barriers	**Home Developers** • Need to design and equip homes to respond to home buyer market forces • Homes are not competitive for sale in Hawaii if not designed with A/C • Prior prescriptive components were not typically developer installed. **Home Audits** • Nascent market for home audits; number of certified professionals growing, limited market awareness of availability
Description & Implementation Strategies	**Efficiency Inside Home Design** • Based on the use of computer energy modeling programs to compare a code-built home to the developer's home design offerings • Modeling allows the developer maximum flexibility in designing their homes to dovetail with the existing federal tax credits and Energy Star® programs • Encourage interaction with the developer to maximize utilization of incentives through comparing model scenarios • Allow a limited number of developer-constructed net-zero homes with PV systems to be considered as an efficiency measure. • Demonstrate to the home building industry the value of building above code leading to a more energy efficient and cost-effective home **Home Audit** • Collaborate with the few qualified Home Energy Raters in the state of Hawaii and recent graduates of green training programs.
Key Changes	• Implementation of an incentivized home audit is new.

Program Category	3.5 Residential Energy Services & Maintenance (RESM) 3.5.2 Residential Design and Audits
Marketing Strategies	**Efficiency Inside Home Design** • Direct contact with home developers and the BIA • Promotion of the participating developers in trade-publications such as the BIA, Parade of Homes, and Hawaii Home Remodeling and Design • Recognition of the awardees and description of the changes made to the homes on the Hawaii Energy website • Energy Hero Awards to be placed in the model homes and available for use in the developer's marketing materials **Home Audits** • Leverage customer inquiries primarily through the Home Energy Reports to drive incentivized home audits. These customers typically have very high electric bills, but do not qualify for a utility-provided investigation.

Program Category	**3.5 Residential Energy Services & Maintenance (RESM)** **3.5.3 Residential System Tune-Ups**
Target Market	• Homeowners, Landlords, Tenants and Property Managers • Manufacturers, Distributors, Dealers and Retailers • Mechanical and Solar Service Contractors
Impacts	Demand 18 kW Energy 126,712 kWh Incentive Budget $55,000 (<1%) Cost per kWh $0.434 /kWh TRB $72,416
Technologies	<table><tr><td></td><td><u>**Incentive**</u></td><td><u>**Units**</u></td><td></td></tr><tr><td>Central AC Maintenance</td><td>$50</td><td>100</td><td>Tune-Ups</td></tr><tr><td>Solar Water Heater Tune-Up</td><td>$100</td><td>500</td><td>Tune-Ups</td></tr></table>
Market Barriers	**General** • Lack of awareness of need for maintenance • Resistance to engage unknown contractors
Description & Implementation Strategies	**Home AC Annual Tune-up and Solar Water Heater Tune-up** • Demonstrate the benefits of tune-ups • Educate customer of potential savings and system longevity • Utilize the participating contractors to contact the customers and have them arrange for the service work • Participating contractors will use the Hawaii Energy Checklist to inspect and record the pre and post conditions • Participating contractor's invoice must show that checklist requirements have been met and signed by the servicing technician • Customers can have two incentives per location annually
Key Changes	• None
Marketing Strategies	• Direct contact with Mechanical and Solar Contractors • Provide collateral to Trade Allies offering this service • Distribute educational materials at community events, neighborhood board meetings and homeowners association meetings • Provide cost of ownership information on rebate application forms and benefits of ownership on our website

Program Category	3.6 Residential Hard-to-Reach (RHTR) 3.6.1 Energy Efficiency Equipment Grants
Target Market	• Low income, physically isolated and traditionally underserved Residential Markets
Impacts	Demand 609 kW Energy 4,363,608 kWh Incentive Budget $508,688 (2%) Cost per kWh $0.117 /kWh TRB $3,533,116
Technologies	**Incentive** / **Units** Solar Inspections (WAP) $95 450 Inspections Energy Hero Gift Packs $40 2,000 Packs CFL Exchange $2.49/Lamp 125,000 Lamps Hawaii Energy Hero Audits $250 300 Audits
Market Barriers	• Customer lack of access to capital for energy improvements • Lack of understanding of energy efficiency benefits • Renter and Lessee reluctance to invest in property
Description & Implementation Strategies	• Work through state and local agencies serving the needs of low income families to identify qualified customers who will receive energy efficiency goods and services at no cost (“direct install”) • Continue to work with community action organizations to develop and deliver program services for low-income customers to include direct install and delivery of appropriate energy saving technologies • Continue to provide solar hot water inspections for RLI solar grant recipients • Provide up to $250 per home audit (anticipated to be provided as a no cost service) for those hard-to-reach segments in the most need
Key Changes	• Increased focus and penetration of direct install and educational outreach • Implementation of an incentivized home audit is new.
Marketing Strategies	• Continue to target low-income and hard-to-reach customers through existing state and local agencies who service the needs of low income families • Develop working relationships with more community action and similar local groups to increase market penetration

Program Category	**3.6 Residential Hard-to-Reach (RHTR)** **3.6.2 Landlord/Tenant, AOAO Measures**
Target Market	• Associations of Apartment Owners • Landlord/Tenants
Impacts	Demand 227 kW Energy 812,322 kWh Incentive Budget $651,303 (3%) Cost per kWh $0.802 /kWh TRB $2,202,051
Technologies	**Incentive** / **Units** Hawaii Energy Hero Landlord $0.25 5,212 kWh Custom SWH Proposals $0.65/kWh 1,000,000 kWh
Market Barriers	• Lack of understanding of energy efficiency benefits • Renter and Lessee reluctance to invest in property
Description & Implementation Strategies	• Energy Hero Landlord Program – This program will be targeted at landlords who own affordable rental units. The program will offer such landlords comprehensive audit, RFP and other support to help with projects that will drive the energy cost of their renters down. The program will work with local lenders to provide project financing support in conjunction with the program. • Custom SWH Proposals – With a lack of projects generated from solicitation through a tiered or split incentive, the plan to offer more flexibility within a custom proposal framework was favored for PY12. This offer is budgeted for the equivalent of 484 SWH systems.
Key Changes	• New • Will pursue implementation of pilot projects for heat pump water heaters to test cost effectiveness and market acceptance.
Marketing Strategies	• Direct contact with participating solar contractors • Community event promotion of High Efficiency Water Heating • Listing of participating contractors on our website • Print advertising and Social media

4.0 BUSINESS PROGRAM STRATEGY & DETAILS FOR PY12

4.1 Overview

For PY12, Hawaii Energy will maintain programmatic changes adopted in PY11, specifically the incentive categories:

- Business Energy Efficiency Measures (BEEM) – This category offers incentives for standard, known energy efficiency technologies in the form of prescriptive incentives in a streamlined application and grant award process.

- Custom Business Energy Efficiency Measures (CBEEM) – This category offers incentive for non-standard energy efficiency technologies often needed for commercial and industrial customers who need to invest in energy efficiency opportunities specific to unique project specific processes and designs, for example. Incentive award amounts are determined via calculations performed to quantify specific energy savings related to unique applications.

- Business Energy Service and Maintenance (BESM) – This incentive category focuses on developing viable projects through collaboration, competition and direct support in the form of expertise and/or equipment (i.e. metering).

- Business Hard-to-Reach (BHTR) - This incentive category aims to secure various projects among geographies and demographics that have been traditionally underserved such as retail, restaurants and other small businesses.

A summary listing of the new Business Program offerings can be found in the table below followed by a brief summary of additions and changes. A detailed description of the Business Program follows in sections 5.2 through 5.5. Appendix B contains a projection of potential energy savings for the planned programs.

Business Programs		
Program	Category	Measures
BEEM	**Business Energy Efficiency Measures**	
	High Efficiency Lighting	
	High Efficiency HVAC	
	High Efficiency Water Heating	
	High Efficiency Water Pumping	
	High Efficiency Motors	
	Commercial Industrial Processes	
	Building Envelope Improvements	
	Energy Star Business Equipment	
	Energy Awareness, Measurement and Control Systems	
CBEEM	**Custom Business Energy Efficiency Measures**	
	Customized Project Measures	
BESM	**Business Service and Maintenance**	
	Business Direct Installation	
	Business Design, Audits and Commissioning	
BHTR	**Business Hard to Reach**	
	Energy Efficiency Equipment Grants	
	Landlord, Tenant, AOAO Measures	

4.1.1 New Program Offerings of Business Energy Efficiency Measures (BEEM)

High Efficiency HVAC

- High Efficiency Chillers – The savings produced by high efficiency chillers is very specific for the location and the dependence of the "balance of system," pumps, controls etc. These incentives will be modified to encourage a methodical selection method and the savings calculated using modeling or spreadsheet analysis with appropriate system conditions (condenser water, flow rates etc.). This offer will require kW/ton metering.

Commercial Industrial Process

- Waste Water – Wastewater facilities are 24/7 facilities that have specific technical requirements, high capital costs and long procurement process. This targeted program will target the two highest energy consumers in the plants, Air Systems & UV Lighting through process improvements. A list of private waste water facilities will be leveraged in targeting opportunities in PY12. This measure will be in the $0.25/kWh range.

- Compressed Air – This program is to encourage the newer VFD rotary and screw air compressor systems that provide 25% to 30% savings. The program will be vendor driven to provide them direct incentives and the support of Hawaii Energy technology papers and sales call assistance. This measure will be in the $0.25/kWh range

Energy Star Business Equipment

- Energy Star® Kitchen Equipment – This program will focus on raising awareness of energy efficiency options when replacing equipment at end of life. This measure will be in the $0.18/kWh range.

Energy Awareness, Measurement and Control Systems

- PY11 will end with a backlog of condo and small business projects heading into PY12. The long AOAO approval process has caused this delay.

Sea Water Cooling

- Hawaii Energy will continue to support this evolving project in PY12 through metering and providing ad hoc resources as needed. The Program will pay incentives as directed in earlier proceedings upon installation and start up of the SWAC system.

4.1.2 New Program Offerings of Customized Business Energy Efficiency Measures (CBEEM)

Customized Project Measures

- Target Cost per KWh Request for Proposals - This program will provide an open opportunity for achieving energy efficiency by developing cost-effective projects that focus on high energy consumption businesses. The program will be a formal call for projects that meet a total dollar per kWh savings target and allow the market to be creative in how it is achieved. The projects will use utility metered data and if needed, will be sub-metered to ensure savings performance. This offer will be in $0.15 to $0.22/kWh program cost range.

4.1.3 New Program Offerings of Building Energy Services and Maintenance (BESM)

Business Design, Audit and Commissioning

- Building Engineer Challenge - This is an extension of the Central Plant Optimization program. The program will provide a challenge for building engineers to provide proposed projects that meet cost per kWh cost criteria and the PBFA will provide incentives if approved. The intention is to identify projects that the building engineers are confident will work but cannot receive funding through traditional processes within their systems or organizations.

Business Design, Audits and Commissioning

- Energy Study Project Implementation - This program will provide full cost of an energy study provided the customer commits to implementing projects with a dollar value of at least 50% of the total study, within a one year time frame. The specific measures implemented will be eligible for qualifying incentive offers. If customers do not follow through with their commitment, the energy study incentive money will have to be repaid to the Program.

  This is “skin in the game” and demonstrates an owner’s commitment to following through on the study recommendations. This approach demonstrated an effectiveness to move projects forward, specifically with the High Technology Development Corporation (HTDC) and Hawaii Energy’s effort in PY11 to drive manufacturing businesses to perform Energy Studies and implement projects in a very short time frame.

- Cooling Tower Optimization - This program combines the water and energy savings potential of cooling towers. The water treatment processes drive both water consumption and the persistence of energy savings by keeping the heat exchange processes in the chillers and in the tower itself at optimum levels. The program will work with the local water departments, water treatment companies and mechanical service contractors to drive the program.

- Decision Maker: Real-Time Submeters – There are individuals within business organizations who have influence over a large number of employees whose behavior within the work environment drive unnecessary energy consumption (e.g. leaving on lights, additional electronic equipment, etc.). This offer is the direct installation of a web-based electrical metering device. This metering will be monitored by the decision maker(s) within the organization to identify usage patterns and be the basis of peer group competitions within the organization.

- Technology & Project Assistance – This program will bring financial resources and technical due diligence to demonstration projects that demonstrate the efficacy of technology, its application and benefits. The Program will continue to engage with several solar thermal air conditioning technology providers and their prospective customers in PY12. Another prospective project involves a LED street lighting technology.

4.1.4 New Program Offerings of Business Hard-to-Reach (BHTR)

Energy Efficiency Equipment Grants

- Small Business Direct Install – This program will identify small businesses that are considered "hard-to-reach" due to their geographic location or economic condition. Hawaii Energy will work with trade organizations and complementary institutions (i.e. Board of Water Supply) to address mechanical and water systems. This initiative is an expansion of PY11's Small Business Direct Install Lighting offer. The program will also introduce kitchen exhaust hood controls and ECM motors which are often found in point of sale refrigeration units and small hotel room/apartment air conditioning fan coil units. Hawaii Energy's experience has been similar to other programs across the United States, in that such retrofits would not otherwise happen without this direct installation grant approach.

4.1.5 Business Program Details Table of Contents

To follow, in Sections 4.2 through 4. 5, is an overview summary of Residential Program Offerings followed by detailed descriptions and energy savings. The Overall Business Program Details are provided on the following page, preceding the individual Program summaries.

4.2 All Business Programs Overview

4.3 Business Energy Efficiency Measures (BEEM)
- *4.3.1 High Efficiency Lighting*
- *4.3.2 High Efficiency HVAC*
- *4.3.3 High Efficiency Water Heating*
- *4.3.4 High Efficiency Water Pumping*
- *4.3.5 High Efficiency Motors*
- *4.3.6 Commercial Industrial Processes*
- *4.3.7 Building Envelope Improvements*
- *4.3.8 Energy Star Business Equipment*
- *4.3.9 Energy Awareness, Measurement and Control Systems*

4.4 Custom Business Energy Efficiency Measures (CBEEM)
- *4.4.1 Customized Project Measures*

4.5 Business Energy Service & Maintenance (BESM)
- *4.5.1 Business Direct Installation*
- *4.5.2 Business Design, Audits and Commissioning*

4.6 Business Hard to Reach (BHTR)
- *4.6.1 Energy Efficiency Equipment Grants*
- *4.6.2 Landlord, Tenant, AOAO Measures*

Program Category	4.2 All Business Programs Overview Overview of All Business Programs
Target Markets	**Competitive Commercial** o Office Buildings o Retail **Governmental** o City o State o Federal **Industrial Sector** o Warehousing o Cold Storage o Water Pumping o Manufacturing **Multi-Site** o Convenience Stores o Restaurants **High Load Factor Customers** o Hospitals o Hotels o Super Markets o Data Centers **Multi-Family Commercial Rate** o AOAO o AOAO - Mixed Use
Projected Impacts	Demand 6,889 kW Energy 46,163,535 kWh Incentive Budget $ 11,900,377 Cost per kWh $0.258 /kWh TRB $62,581,908
Incentives	**Measure Categories** — **Incentives** 5.3 Business Energy Efficiency Measures $ 6,222,730 5.4 Custom Business Energy Efficiency Measures $ 974,000 5.5 Business Service and Maintenance $ 3,513,647 5.6 Business Hard-to-Reach $ 1,190,000 $ 11,900,377

Program Category	**4.2 All Business Programs Overview** **Overview of All Business Programs**
Market Barriers	**General** • Lack of familiarity with availability of energy efficient technology and the vendors offering these services and products • Trust and creditability of technology providers • Unaware of business benefits of reducing exposure to cost of energy changes • High initial up-front cost • Life Cycle Cost vs. Simple Payback decision analysis • Need for a cash positive investment • Access to and/or understanding of financial options • Lack of knowledge of operation and maintenance of technologies **Landlords and Property Managers** • May not pay for electricity cost • Reluctance to invest without a financial return • Property is a short term investment **Renters and Lessees** • Do not have the authority or responsibility for the systems • Renter lease term shorter than simple payback for a measure
Description & Implementation Strategies	**Technology Based Categories** **High Efficiency Lighting, HVAC Water Heating Water Pumping Motors** **Building Envelope Improvements, Energy Star Business Equipment** The technology based incentives are provided for energy efficiency products that provide reliable energy savings for a wide array of customers. These incentives are developed to be based on fixed amounts per technology with performance adjustments to reflect the savings potential to ensure program cost-effectiveness set based on expected savings. Measures are selected and reviewed to determine that the energy savings can be reliably deemed, or calculated using simple threshold criteria.

Program Category	4.2 All Business Programs Overview **Overview of All Business Programs**
Description & Implementation Strategies (continued)	The implementation process includes: • Program performs outreach and promotions to inform customers of incentive opportunities. • Customer selects and approves purchase and installation of energy efficiency measures • Customer sends in completed application forms with scheduling and supporting documentation • Customer provides evidence of installation and/or program will verify the installation Hawaii Energy processes the incentive on approved applications on an as-funds available basis **Energy Awareness, Measurement, and Control Systems** • Provide peer groups with Customized Hawaii specific Energy Use Intensity reports. These comparisons show their usage in comparison to their peers currently on an entire facility basis and as the program progresses we will disaggregate the comparisons down to the technologies "categories." • Provide self-assessment forms that the customer can complete on their own to identify potential savings. • Increase the use of incentives such as the Condominium Submetering that combine cash incentives with the requirement for educational components and the execution of audits to promote further energy savings activity in the facilities.
Key Changes	• Program baseline efficiency thresholds will be adjusted for new IEER AC ratings and review of efficiency levels as necessary to coincide with the adoption of IECC 2006 and IECC 2009 energy codes • Expand prescriptive selections for LED lamps that achieve ENERGY STAR status. • Chiller incentives based on kWh savings, Chiller selection model and kW/ton BTU metering. • Kitchen Exhaust Hood Incentive • Electronically Commutated Motors (ECM) for fan coil and evaporative fans. • Provide budget to match cofounded energy projects. This was developed with Hawaii Energy's work with HTDC (High Technology Development Corporation) to move projects in targeted industries. • ENERGY STAR Commercial Kitchen Equipment.

Program Category	4.2 All Business Programs Overview Overview of All Business Programs
Marketing Strategies	• Web-based application forms will be advertised and made available to customers and their channel allies (lighting, cooling, motors, and controls). • Train and recruit program allies from various channels as program partners to enhance sales of their energy efficiency equipment • Maintain direct contact with key market players to understand the markets and decision points and to leverage their marketing resources to inform members • Email informational campaigns • Award and publish success of customer and ally partners to demonstrate highest level leadership in an effort to pull the market.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **BEEM Programs Overview**
Projected Impacts	Demand 5,916 kW Energy 36,399,205 kWh Incentive Budget $ 6,222,730 (29%) Cost per kWh $0.17 /kWh TRB $ 51,226,632
Incentives	**Incentives** High Efficiency Lighting $3,371,900 High Efficiency HVAC $1,731,000 High Efficiency Water Heating $113,500 High Efficiency Water Pumping $213,200 High Efficiency Motors $33,300 Commercial Industrial Processes $450,000 Building Envelope Improvements $84,830 Energy Star Business Equipment $93,750 Energy Awareness, Measurement and Control Systems $131,250

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.1 High Efficiency Lighting**
Projected Impacts	Demand 4,009 kW Energy 26,571,559 kWh Incentive Budget $ 3,371,900 (16%) Cost per kWh $0.126 /kWh TRB $34,271,070
Incentives	see table below

	Incentive	Units
CFL	$2.00	16,100 Lamps
CFL – Military Homes	$1.00	32,900 Lamps
T12 to T8 (2&3 foot lamps)	$6.00	5,000 Lamps
T12 to T8 Low Wattage	$15.00	30,000 Lamps
T8 to T8 Low Wattage	$7.50	115,200 Lamps
Delamp	$7.50	5,000 Lamps Removed
Delamp/Reflector	$15.00	2,500 Lamps Removed
LED Refrigerated Case Light	$75.00	2,000 Lamps
ENERGY STAR LED		
-non-dimmable existing	$15.00	40,000 Lamps
-dimmable w/controls existing	$20.00	26,090 Lamps
-non-dimmable new	$10.00	12,000 Lamps
-dimmable w/controls new	$15.00	10,000 Lamps
-non-dimmable A19 existing	$10.00	5,000 Lamps
-dimmable A19 new	$10.00	3,000 Lamps
LED Exit Signs	$25.00	1,000 Signs
HID Pulse Start	$60.00	600 Lamps
Sensors	$20.00	4,000 Sensors
Stairwell bi-level dimming fluorescent	$50.00	1,000 Fixtures
Daylighting w/active Controls	$0.150	500,000 kWh

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.2 High Efficiency HVAC**
Projected Impacts	Demand 1,197 kW Energy 6,272,307 kWh Incentive Budget $ 1,731,000 (8%) Cost per kWh $0.276 /kWh TRB $10,803,708
Incentives	see below

	Incentive	**Units**
Chillers – kW/ton meter and Chiller Curve Optimization	$0.25	1,500,000 kWh
VFD – HVAC Chilled Water / Condenser Water	$80	500 hp
VFD – HVAC AHU	$50	1,200 hp
Garage Active Ventilation Control	$0.14	3,400,000 kWh
Package Units	$200	900 Tons
VFR Split Systems - Existing	$300	1,500 Tons
VFR Split Systems – New Construction	$250	600 Tons

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.2 High Efficiency HVAC** **4.3.2.1 Chillers**
Projected Impacts	Demand 242 kW Energy 1,212,165 kWh Incentive Budget $ 375,000 (2%) Cost per kWh $0.31 /kWh TRB $2,837,767
Incentives	**Incentive** / **Units** Chillers $0.25 1,500,000 kWh
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY The use of variable speed drives, oil-free magnetic bearings, large heat exchangers, lower condenser water and other modern design features, new chillers are 20-40% more efficient than older machines. Much of the savings is at part-load conditions where chillers operate the majority of the time. The chiller selection process is an important element prior to chiller purchase and the BTU metering will allow the optimization and maintenance of savings over time. TARGET AUDIENCE Who – Property Managers, Facilities Directors, Chief Engineers and Governmental Facilities Departments What – Large Commercial facilities INCENTIVE & TARGETED ECONOMICS The incentive directly rewards the expected energy reduction produced through careful selection and procurement of the machine. It is the intention that the incentive provide 100% of the cost premium to achieve these high efficiency levels. CUSTOMER QUALIFICATIONS Eligible chillers include centrifugal, screw, scroll and reciprocating compressors at 15% improvement over IECC 2006. APPLICATION PROCESS The following will be completed and submitted for review • Rebate Application , AC Chiller Rebate Worksheet • Chiller Equipment type (centrifugal, screw, reciprocating) • Retrofit or burnout • Integrated Part Load Value (IPLV) • Manufacturer and Model Number COMPLEMENTARY PROGRAMS: • Customized Project Measures • Central Plant Optimization

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.2 High Efficiency HVAC** **4.3.2.2 VFD – Chilled Water / Condenser Water** **4.3.2.3 VFD – AHU**
Projected Impacts	Demand 293 kW Energy 822,066 kWh Incentive Budget $ 100,000 (<1%) Cost per kWh $0.12 /kWh TRB $2,106,479
Incentives	**Incentive** / **Units** VFD – Chilled Water / Condenser Water $80 500 hp VFD – AHU $50 1,200 hp
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY The use of variable frequency drives to vary motor speeds to control flow in response to changes to loads provides significant savings in HVAC applications of supply, return and exhaust fans as well as chilled water and condenser water pumps. TARGET AUDIENCE Who – Property Managers, Facilities Directors, Chief Engineers and Governmental Facilities Departments, Mechanical Engineers and Contractors. What – All Commercial Facilities INCENTIVE & TARGETED ECONOMICS HVAC Fans (VFD): The offering of a prescribed $50 per fan HP controlled (3-100 HP for existing facilities and 3-25 HP for new facilities) incentive. HVAC Pumps (VFD): The offering of a prescribed $80 per pump HP controlled (3-100 HP and 3-50 HP for new facilities) incentive for both existing and new construction facilities. CUSTOMER QUALIFICATIONS The application must have a load and system design and controls (two way valves, VAV boxes etc.) that respond to varying loads.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.2 High Efficiency HVAC** **4.3.2.2 VFD – Chilled Water / Condenser Water** **4.3.2.3 VFD – AHU**
Description & Implementation Strategies (continued)	APPLICATION PROCESS A HVAC Fan or Pump VFD rebate worksheet will be completed and submitted for review. • Require pre-notification before projects begin. • Existing equipment must not have a VFD. • The VFDs must actively control and vary the fan or pump speed. • Motor HP • Motor quantity

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.2 High Efficiency HVAC** **4.3.2.4 Garage Active Ventilation Control**
Projected Impacts	Demand 314 kW Energy 2,747,574 kWh Incentive Budget $ 476,000 (2%) Cost per kWh $0.17 /kWh TRB $2,762,122
Incentives	**Incentive** **Units** Garage Active Ventilation Control $0.14 3,400,000 kWh
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Enclosed parking garages that are mechanically ventilated 24/7 in order to remove the carbon monoxide (CO) created by gasoline powered vehicles. The ventilation systems are designed for maximum capacity conditions and there are opportunities to reduce both operating speed and fan runtimes during times of lower traffic periods to achieve fan energy savings of 60% to 90% with active CO monitoring systems control. The addition of Variable Speed Drives (VFDs) can also be incorporated if not already present. TARGET AUDIENCE Who - Property Managers & Private and Public Facilities Directors. Air Conditioning/Mechanical Contractors Facilities Maintenance Companies What – Office/Retail Buildings with mechanically ventilated parking garages. INCENTIVE & TARGETED ECONOMICS The $0.14/kWh incentive is directly provided to the metered savings resulting from the retrofit. APPLICATION PROCESS 1. A garage fan savings worksheet will be competed and submitted for review • Exhaust Fan/Motor Inventory • Map of Locations • Motor Horsepower & Runtimes • Sample set of fans must be spot metered to determine operating power consumption. 2. A pre/post inspection will be performed for systems totaling over 75 hp. This inspection may include metering of current fan horsepower. COMPLEMENTARY PROGRAMS: • High Efficiency Lighting – Induction / T8 / T5 / Occupancy Sensors /Timers

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.2 High Efficiency HVAC** **4.3.2.5 Package Units**
Projected Impacts	Demand 68 kW Energy 401,615 kWh Incentive Budget $ 180,000 (<1%) Cost per kWh $0.45 /kWh TRB $732,137
Incentives	**Incentive** **Units** Package Units $200 900 Tons
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY The air-cooled package units are most often found in small commercial facilities as they are least first-cost and maintenance intensive of HVAC options to this market. The units are often roof-top mounted and feed constant volume distribution systems. The most cost effective opportunity to reduce energy consumption in these units are to replace them with the highest efficiency unit available and potentially convert at the same time to a VAV distribution system to increase both comfort and reduce cooling loads. A higher cost option is to convert to VRF split systems. TARGET AUDIENCE Who – Property Managers & Private and Public Facilities Directors. Air Conditioning/Mechanical Contractors, Mechanical Engineers What – Small Commercial facilities. INCENTIVE & TARGETED ECONOMICS The offering of prescriptive incentives based on the EER of the units starting at a 15% higher than IECC 2006 / ASHRAE 2004 standards. The incentives increase with higher efficiency levels. This level of incentive should eliminate the incremental difference between a standard efficiency unit. APPLICATION PROCESS 1. A prescriptive worksheet will be competed and submitted for review • Unit size, model, efficiency rating, operational hours • Map of Locations 2. A sample of sites have pre/post inspections COMPLEMENTARY PROGRAMS • Window Tinting • Package and Split AC Tune-Up • VRF Split Systems

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.2 High Efficiency HVAC** **4.3.2.6 VRF Split Systems - Existing Systems** **4.3.2.7 VRF Split Systems - New Construction**
Projected Impacts	Demand 280 kW Energy 1,088,888 kWh Incentive Budget $ 600,000 (<1%) Cost per kWh $0.55 /kWh TRB $2,365,203
Incentives	**Incentive** **Units** VFR Split Systems – Existing Systems $300 1,500 Tons VFR Split Systems – New Construction $250 600 Tons
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Inverter driven variable refrigerant flow (VRF) air conditioning systems are direct expansion AC systems that utilize variable speed evaporator/condenser fans, and a combination of fixed and variable speed compressors along with most often multiple individual zone evaporators to provide the ability to more closely match the AC system's output with the building's cooling requirements. A potential of 20 to 35% energy savings come from: • *Part Load Efficiencies*: Increased part-load efficiency operation • *High Efficiency Motors*: Many systems use ECM motors • *Higher Room Temperatures*: The capacity matching allows for better humidity control through longer cooling operation. • *Reduction of Distribution Losses*: Duct losses are reduced with DX systems. This may be offset by dedicated outside air distribution systems when needed. TARGET AUDIENCE Who – Property Managers & Private and Public Facilities Directors. Air Conditioning/Mechanical Contractors, Mechanical Engineers What – Commercial facilities. INCENTIVE & TARGETED ECONOMICS The offering of prescriptive incentives based on the tonnage of the VRF system. This level of incentive should reduce 25% of the incremental difference between a VRF and an alternative single or two-speed standard efficiency unit.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.2 High Efficiency HVAC** **4.3.2.6 VRF Split Systems - Existing Systems** **4.3.2.7 VRF Split Systems - New Construction**
Description & Implementation Strategies (continued)	APPLICATION PROCESS 1. A prescriptive worksheet will be completed and submitted for review • Unit size, model, efficiency rating, operational hours • Map of Locations 2. A sample of sites have pre/post inspections COMPLEMENTARY PROGRAMS • Window Tinting, Package and Split AC Tune-Up

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.3 High Efficiency Water Heating**
Projected Impacts	Demand 235 kW Energy 377,913 kWh Incentive Budget $ 113,500 (<1%) Cost per kWh $0.30 /kWh TRB $1,300,437
Incentives	

	Incentive	**Units**
Commercial Solar Water Heaters		
-Electric Resistance	$250	250 Tons
-Heat Pump	$100	75 Tons
Heat Pumps		
-Conversion – Electric Resistance	$120	200 Tons
-Upgrade	$65	300 Tons

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.3 High Efficiency Water Heating** **4.3.3.1 Commercial Solar Water Heaters Electric Resistance** **4.3.3.2 Commercial Solar Water Heaters Heat Pump**
Projected Impacts	Demand 225 kW Energy 197,219 kWh Incentive Budget $70,000 (<1%) Cost per kWh $0.355 /kWh TRB $1,114,369
Incentives	**Incentive** / **Units** Commercial Solar Water Heaters -Electric Resistance $250 250 Tons -Heat Pump $100 75 Tons
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Commercial solar water heaters can provide a renewable energy source of water heating. The systems can reduce electrical consumption for water heating by providing supplemental pre-heating all the way to 100% of the water heating needs limited by the hot water demand characteristic and the site's physical constraints on storage tank and panel locations. TARGET AUDIENCE Who – AOAOs, Property Managers, Private and Public Facilities Directors. Mechanical Contractors, Mechanical Engineers. What – Hotel, Condominium and Apartments & Government housing. INCENTIVE & TARGETED ECONOMICS The offering of a $250 / 12,000 BTU prescriptive incentive based on the derated installed capacity of the solar water heating system. The base system must have been electric resistance, heat pump or heat recovery off an electric chiller. Conversion to a gas backup system is permitted to eliminate any potential electrical demand from the system and allow quick peak recovery. The economic impact of this incentive will depend on the ability for the customer to take advantage of tax credits and the site specific system costs. The level will achieve a $0.33/kWh savings for the program. It is the desire to adjust the incentive to a point where it will lower the payback for the system to 5 years.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.3 High Efficiency Water Heating** **4.3.3.1 Commercial Solar Water Heaters Electric Resistance** **4.3.3.2 Commercial Solar Water Heaters Heat Pump**
Description & Implementation Strategies (continued)	APPLICATION PROCESS 1. A prescriptive worksheet/saving calculator will be competed and submitted for review • Unit sizes, model, derating rating, operational hours • System diagram 2. A sample of sites will have pre/post inspections COMPLEMENTARY PROGRAMS • Water saving showerheads, spray-rinse valves, and fixtures.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.3 High Efficiency Water Heating** **4.3.3.3 Heat Pump – Conversion – Electric Resistance** **4.3.3.4 Heat Pump Upgrade**
Projected Impacts	Demand 10 kW Energy 180,693 kWh Incentive Budget $ 43,500 (<1%) Cost per kWh $0.241 /kWh TRB $186,067
Incentives	**Incentive** **Units** Heat Pumps -Electric Resistance $120 200 Tons -Upgrade $65 300 Tons
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Heat pump water heaters can provide a highly efficient source of water heating. Water-Source Heat pumps are the most efficient when used to supplement the heat rejection from chilled water return loops and condenser water systems to heat a facilities' domestic water needs or swimming pools. Heat pumps can also be air-source and provide heat mitigation in areas such a commercial kitchen and serve pools as a stand-alone water heater. The systems can reduce electrical consumption for water heating by providing supplemental pre-heating all the way to 100% of the water heating needs limited by the hot water demand characteristic and the site's physical constraints on heat pump storage tanks. TARGET AUDIENCE Who – AOAOs, Property Managers, Private and Public Facilities Directors. Mechanical Contractors, Mechanical Engineers. What – Commercial Pools, Hotel, Condominium and Apartments & Government housing. INCENTIVE & TARGETED ECONOMICS The offering of a $120 or 65 per ton prescriptive incentive based on the installed capacity of the heat pump. The base system must have been electric resistance, failing heat pump (10 year or older) or heat recovery off an electric chiller. Conversion/remaining on a gas backup system are permitted to eliminate any potential electrical demand from the system and allow quick peak recovery.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.4 High Efficiency Water Pumping - Summary of Programs**
Projected Impacts	Demand 91 kW Energy 985,215 kWh Incentive Budget $ 213,200 (1%) Cost per kWh $0.216 /kWh TRB $1,502,462
Incentives	

	Incentive	Units
VFD Dom. Water Booster Packages – VFD	$700	100 hp
VFD Dom. Water Booster Packages – added HP Reduction	$80	40 hp reduced
VFD Pool Pump Packages	$350	400 hp

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.4 High Efficiency Water Pumping** **4.3.4.1 VFD Dom. Water Booster Packages – VFD** **4.3.4.2 VFD Dom. Water Booster Packages – added HP Reduction**
Projected Impacts	Demand 46 kW Energy 444,105 kWh Incentive Budget $ 73,200 (<1%) Cost per kWh $0.165 /kWh TRB $696,542
Incentives	**Incentive** / **Units** VFD Dom. Water Booster Packages – VFD: $700, 100 hp VFD Dom. Water Booster Packages – Added HP Reduction: $80, 40 hp reduced
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY The replacement of single speed staged domestic water booster pumps can provide up to 70% energy savings by: • providing constant pressure regardless of flow • reducing pump speed during low use periods increases system efficiency TARGET AUDIENCE Who – Property Managers, Facilities Directors, Chief Engineers and Governmental Facilities Departments, Mechanical Contractors and VFD Pump Package suppliers. What – Apartments, Office Buildings, Hotels, Hospitals INCENTIVE & TARGETED ECONOMICS The offering of a prescribed $80 per HP reduction and for booster pump system with VFD, add $700 per HP. The incentive is targeted to achieve a 10 to 15% reduction in the system cost. All pump motors must meet CEE Premium Efficiency standards. CUSTOMER QUALIFICATIONS Booster Pump applications require pre-notification before equipment is purchased and installed. • The new booster pump system's total horsepower must be equal to or less than that of the existing system. • The system horsepower reduction must be between 0 to 129 hp. For projects with greater than 129hp, please contact the program • Booster Pump applications do not apply to New Constructions.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.4 High Efficiency Water Pumping** **4.3.4.1 VFD Dom. Water Booster Packages – VFD** **4.3.4.2 VFD Dom. Water Booster Packages – added HP Reduction**
Description & Implementation Strategies (continued)	APPLICATION PROCESS The following will be completed and submitted for review • Rebate Application • Booster Pump Rebate Worksheet • Manufacturer's specification sheets or Name Plate Information including: • Manufacturer • Model Number • Serial Number • Motor Size (nominal hp) – All pump motors must meet CEE Premium Efficiency standards • Pump Type • Identify Pump with VFD or without VFD • Existing System hp minus New System hp COMPLEMENTARY PROGRAMS • Customized Project Measures • Central Plant Optimization Competition • CEE Listed Premium Efficiency Motors

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.4 High Efficiency Water Pumping** **4.3.4.3 VFD Pool Pump Packages**
Projected Impacts	Demand 45 kW Energy 541,110 kWh Incentive Budget $ 140,000 (1%) Cost per kWh $0.26 /kWh TRB $805,920
Incentives	**<u>Incentive</u>** **<u>Units</u>** VFD Pool Pump Packages $350 400 hp
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Pool pumps often run much longer than necessary. A variable speed commercial pool pump motor in place of a standard single speed motor can save energy and maintain a comfortable swimming pool temperature and chemical circulation by using a smaller, higher efficiency pump and by operating it less. TARGET AUDIENCE Who – Property Managers, Facilities Directors, Chief Engineers and Governmental Facilities Departments What – Commercial facilities with swimming pool. INCENTIVE & TARGETED ECONOMICS The offering of a prescribed $350 per HP installed. CUSTOMER QUALIFICATIONS Existing single speed pool pump APPLICATION PROCESS The following will be completed and submitted for review • Rebate Application • VFD Pool Pump Rebate Worksheet • Manufacturer's specification sheets • Name Plate - Manufacturer, Model Number, Serial Number • Motor Size–pump motors must meet NEMA Premium Efficiency • Pump Type • Proof of installation and purchase COMPLEMENTARY PROGRAMS • Customized Project Measures • Central Plant Optimization Competition

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.5 High Efficiency Motors** **4.3.5.1 CEE Premium Efficiency Motors** **4.3.5.2 ECM w/ Controller- Evaporator Fan Motors** **4.3.5.3 ECM- Fan Coil Fans**
Projected Impacts	Demand 78 kW Energy 391,141 kWh Incentive Budget $ 33,300 (<1%) Cost per kWh $0.085 /kWh TRB $758,903
Incentives	<u>**Incentive**</u> / <u>**Unit**</u> CEE Tier 1+ Premium Efficiency Motors — $6/hp — 1,800 hp ECM w/ Controller- Evaporator Fan Motors — $85/motor — 200 Motor ECM- Fan Coil Fans — $55/motor — 100 Motor
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY CEE LISTED MOTORS There is an opportunity to save energy with motors designed to utilize less power for the same horsepower of work. Motors in many applications (Water pumping and air handing) have long operational hours and are often out of sight and mind until they fail. The CEE Premium Efficiency Specification will be the qualification level for motors. This is driven by the December 2010 implementation of the Energy Independence and Security Act of 2007 (EISA) requiring the vast majority of new electric motors to meet NEMA Premium Efficiency standards. ECM There is an opportunity to save energy with ECM motors that have higher electrical efficiency (Electronically Commutated Motor, 70 percent efficient) than PSC (Permanent split capacitor, 49 percent efficient) or shaded-pole (32 percent efficient). In addition, “cooler” motor operation creates less heat load on the conditioned space. When motors fail there is often an operational urgency to replace them at the lowest first-cost as the replacement was not budgeted. TARGET AUDIENCE Who – Property Managers, Mechanical & Electrical Contractors, Motor Repair/Rewind Shops, Motor Distributor and Supply houses What – All Refrigeration and PTAC units

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.5 High Efficiency Motors** **4.3.5.1 CEE Premium Efficiency Motors** **4.3.5.2 ECM w/ Controller- Evaporator Fan Motors** **4.3.5.3 ECM- Fan Coil Fans**
Description & Implementation Strategies (continued)	INCENTIVE & TARGETED ECONOMICS The current $6/hp incentive will be transformed with the intention to eliminate the cost premium for the listed CEE Premium efficiency motors up to 200 hp. The $85 and $55/motor incentives are aimed at 20% of installed cost. APPLICATION PROCESS 1. A contractor or customer submitted application and savings worksheet. • Unit size, model, • Unit location description • Operational hours 2. A sample of sites will have post inspections COMPLEMENTARY PROGRAMS • High Efficiency HVAC • Central Plant Optimization • Target Cost per kWh Request for Proposals

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.6 Commercial Industrial Processes – Summary of Programs**
Projected Impacts	Demand 154 kW Energy 789,342 kWh Incentive Budget $ 450,000 (2%) Cost per kWh $0.570 /kWh TRB $1,180,009
Incentives	(see below)

Incentives	Incentive	Unit
Waste Water	$0.50 /kWh	100,000 kWh
Compressed Air	$0.25 /kWh	100,000 kWh
Kitchen Exhaust Hood Demand Ventilation	$300	500 hp
ENERGY STAR Commercial Kitchen Equipment	$0.30 /kWh	750,000 kWh

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.6 Commercial Industrial Processes** **4.3.6.1 - Waste Water Process Improvements**
Projected Impacts	Demand 16 kW Energy 80,811 kWh Incentive Budget $ 50,000 (<1%) Cost per kWh $0.62 /kWh TRB $157,359
Incentives	**Incentive** **Unit** Waste Water Process Improvements $0.50 /kWh 100,000 kWh
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Wastewater facilities are 24/7 facilities that have specific technical requirements, high capital costs and long procurement process. This targeted program will hit the two highest energy consumers in the plants. Air Systems & UV Lighting through process improvements TARGET AUDIENCE Who – Waste Water Treatment Plant Operators What – Private and Public Wastewater Treatment Plants INCENTIVE & TARGETED ECONOMICS TBD APPLICATION PROCESS This program process will be developed by direct discussions with the effected customers. COMPLEMENTARY PROGRAMS • Target Cost per kWh Request for Proposals • Air Compressor Technologies and Operations

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.6 Commercial Industrial Processes** **4.3.6.2 Air Compressor Technologies and Operations**
Projected Impacts	Demand 16 kW Energy 80,811 kWh Incentive Budget $ 25,000 (<1%) Cost per kWh $0.31 /kWh TRB $117,358
Incentives	<u>**Incentive**</u> <u>**Unit**</u> **Air Compressor Tech. and Ops.** $0.25 /kWh 100,000 kWh
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY There are newer VFD rotary and screw air compressor systems that provide 25% to 30% savings. TARGET AUDIENCE Who – Industrial and Commercial facilities operators, Suppliers of Air Compressor technologies, mechanical contractors, mechanical engineers What – Process Air Compressor systems INCENTIVE & TARGETED ECONOMICS TBD APPLICATION PROCESS The program will develop a vendor driven program that will provide them direct incentives and the support of Hawaii Energy technology papers and sales call assistance. COMPLEMENTARY PROGRAMS • Target Cost per kWh Request for Proposals

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.6 Commercial Industrial Processes** 4**.3.6.3 - ENERGY STAR Commercial Kitchen Equipment**
Projected Impacts	Demand 121 kW Energy 606,083 kWh Incentive Budget $ 225,000 (1%) Cost per kWh $0.37 /kWh TRB $880,186
Incentives	<u>**Incentive**</u> <u>**Unit**</u> Commercial Kitchen Equipment $0.30 /kWh 750,000 kWh
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY This program will start with direct installation of variable exhaust ventilation systems that adjust to the cooking exhaust loads. TARGET AUDIENCE Who – Restaurants and commercial kitchens What – Commercial Kitchen Equipment INCENTIVE & TARGETED ECONOMICS This program will have a variety of incentives for dozens of equipment types. It is expected that the average cost per kWh will be $0.30 /kWh. We will work with Fishnick and CEE to develop equipment types and incentive levels. APPLICATION PROCESS. This program will be implemented through specialty contractors on a dollar per kWh capture basis. The program will also develop vendor driven program that will provide them direct incentives and the support of Hawaii Energy technology papers and sales call assistance. COMPLEMENTARY PROGRAMS • Target Cost per kWh Request for Proposals

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.7 Building Envelope Improvements**
Projected Impacts	Demand 86 kW Energy 308,429 kWh Incentive Budget $ 84,830 (1%) Cost per kWh $0.275 /kWh TRB $520,058
Incentives	

	Incentive	Unit
Window Tinting	$1/sq.ft.	74,830 sq.ft.
Cool Roof Technologies	$0.20/sq.ft	50,000 sq.ft.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.7 Building Envelope Improvements** **4.3.7.1 Window Tinting**
Projected Impacts	Demand 79 kW Energy 296,307 kWh Incentive Budget $ 74,830 (<1%) Cost per kWh $0.25 /kWh TRB $487,053
Incentives	**Incentive** / **Unit** Window Tinting $1/sq.ft. 74,830 sq.ft.
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Window tinting can save energy by reducing the heat gain through windows as well as preventing lowering of temperature set points by occupants near the windows. Modern tints can provide the rejection of infrared energy while not blocking visible light. This expands the tinting opportunities in view sensitive locations such as hotel and office buildings. TARGET AUDIENCE Who – AOAOs, Property Managers, Private and Public Facilities Directors. Window Tinting Companies What – Hotel, Office, Condominium and Apartments & Government housing. INCENTIVE & TARGETED ECONOMICS The offering of a $1 / sq. ft. prescriptive incentive based on the film's Solar Heat Gain Coefficient (SHGC) < 0.435. • *Warranty* – Film must have a minimum five-year manufacturer's warranty and one-year installer's warranty • *Conditioned Space* – Rebates shall be paid on actual square footage of glass in a conditioned space on the east, west, and south facing windows. • *Eligible Types* – Windows may be clear or factory tinted, single or double pane, but must not have reflected glass. All orientations are eligible. • *Unshaded* – Windows significantly shaded by buildings, trees or awnings are not eligible for rebates. • *Replacement Film* – Replacement of deteriorated window film is eligible for 50% of the rebate if the customer did not receive a rebate for the existing film. This incentive is targeted to provide a 25% cost reduction for the installation.

Program Category	4.3 Business Energy Efficiency Measures (BEEM) 4.3.7 Building Envelope Improvements 4.3.7.1 Window Tinting
Description & Implementation Strategies (continued)	APPLICATION PROCESS 1. A prescriptive worksheet will be completed and submitted for review • Square footage of tinting • HVAC system Information • Site Layout • Exterior Photo of the south, east and west of the facility 2. Manufacturer specification sheets. 3. A request for a manufacturer's energy savings model run based on the location specific site conditions. 4. All sites will have pre/post inspections COMPLEMENTARY PROGRAMS • High Efficiency HVAC Measures • Central Plant Optimization

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.7 Building Envelope Improvements** **4.3.7.1 Cool Roof Technologies**
Projected Impacts	Demand 8 kW Energy 12,122 kWh Incentive Budget $ 10,000 (<1%) Cost per kWh $0.82 /kWh TRB $33,005
Incentives	**Incentive** / **Unit** Cool Roof Technologies $0.20/sq.ft 50,000 sq.ft.
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Cool Roofs increase the reflectivity of the roof and reduce cooling loads by either the reflective white or silver color and/or by "stealth" technologies such as ceramic and titanium oxide particles embedded in the material. The cool roof technologies allow a wide range of roof colors. TARGET AUDIENCE Who – AOAOs, Property Managers, Private and Public Facilities Directors. Roofing Companies, Architects What – All Commercial Facilities INCENTIVE & TARGETED ECONOMICS The offering of a $0.20 / sq. ft. prescriptive incentive based on Energy Star Qualified roofing products. • *Warranty* – Roof must have a minimum fifteen-year manufacturer's warranty and one-year installer's warranty • *Conditioned Space* – Rebates shall be paid on actual square footage of roof covering a conditioned space. • *Unshaded* – Roofs significantly shaded by buildings, trees or awnings are not eligible for rebates. This is targeted to incentive will provide a 25% of the incremental cost of moving from standard to Energy Star roofing materials.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.8 Energy Star Business Equipment** **4.3.8.1 Energy Star Refrigerators w/Recycling**
Projected Impacts	Demand 21 kW Energy 496,382 kWh Incentive Budget $ 93,750 (<1%) Cost per kWh $0.19 /kWh TRB $626,914
Incentives	**Incentive** **Unit** Energy Star Refrigerators w/Recycling $125/unit 750 units
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY There is a 32 to 62% energy reduction opportunity in the replacement of the “old” office refrigerator with a modern Energy Star model. TARGET AUDIENCE Who – Property Managers, Executive Level Company Officers What – All Commercial INCENTIVE & TARGETED ECONOMICS The offering of a $125 incentive for Energy Star units bought and delivered by participating retailers. This incentive is a 10 to 25% reduction in the cost of a new Energy Star model. APPLICATION PROCESS 1. A retailer submitted application and recycling verification worksheet. • Unit size, model, • Confirmation of Pickup and Recycling. • Unit location description 2. A sample of sites will have post inspections COMPLEMENTARY PROGRAMS • High Efficiency HVAC and Lighting Measures

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.9 Energy Awareness, Measurement and Control Systems**
Projected Impacts	Demand 46 kW Energy 206,917 kWh Incentive Budget $ 131,250 (1%) Cost per kWh $0.63 /kWh TRB $263,069
Incentives	see below

	Incentive	Unit	
Condominium Submetering	$150	750	units metered
Small Business Submetering	$150	125	units metered

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.9 Energy Awareness, Measurement and Control Systems** **4.3.9.1 Condominium Submetering**
Projected Impacts	Demand 35 kW Energy 165,461 kWh Incentive Budget $ 112,500 (1%) Cost per kWh $0.68 /kWh TRB $204,752
Incentives	**Incentive** **Unit** Condominium Submetering $150 750 units metered
Description & Implementation Strategies	PROGRAM OBJECTIVE • This program is designed to assist master-metered condominiums and their Association of Apartment Owners (AOAO) to install billing sub meters for their units and common areas to drive energy conservation and ensure equity and fairness in allocating energy costs to tenants and/or owners of their condominium units. The knowledge of personal energy usage and the responsibility to pay for it can result in energy usage behavior modification and reward those making investments in energy efficient equipment. • The combination of billing sub meters, along with education, peer group comparisons and special equipment offerings, will assist the owner or tenant to achieve significant energy conservation and efficiency. • Provides the AOAO an opportunity to receive an energy audit of the property and participate in other Hawaii Energy incentives for conservation in all common areas. Possible incentives could include A/C, lighting, pool pumps, domestic water pumps and parking garage exhaust fans. INCENTIVE • The payment of this $150 per unit metered incentive is payable to the AOAO towards the purchase and installation of a third party sub metering system. The metering system is to be used for billing purposes so that each owner or tenant of the unit metered will be responsible for the payment of their own electric consumption. • Incentive payment will be made upon completion of: installation of each meter and billing system, tenant education sub metering workshop, energy audit of the AOAO property and commencement of real time billing to individual tenants. • Incentive payment cannot exceed 50% of total project cost.

Program Category	4.3 Business Energy Efficiency Measures (BEEM) 4.3.9 Energy Awareness, Measurement and Control Systems 4.3.9.1 Condominium Submetering
Description & Implementation Strategies (continued)	ENERGY SAVINGS • It is expected there will be at least a 10% reduction in energy usage; however, there is no minimum reduction in electrical use required to retain the incentive. • Currently the M&V Review suggests 3.8% this will be reviewed as compared to actual project performance. REQUIREMENTS • The metering system must remain in place and billing to occur for a period of at least five (5) years or a pro-rated portion of the incentive will be recovered by Hawaii Energy. • Energy meter data (sub metered billing statements) must be provided to Hawaii Energy for analysis purposes. • A joint educational and monitoring program will be undertaken with AOAO to assist in the verification of savings and development of an ongoing energy incentive offering for other condominiums in Hawaii. Components of the Pilot Program: • Physical verification review of meters serving the building. Review monthly billing history • AOAO to provide monthly individual data collection for a two month period after meter installation to Hawaii Energy. This would be the mock billing information that is supplied to the tenant. • Sub Metering system installation inspection review • Identification of Top (T) and Bottom (B) 5 energy users for the purpose of peer comparison. All information will be anonymous. • AOAO to host sub metering and energy conservation and efficiency workshops presented by Hawaii Energy. A free energy efficient power strip will be given to encourage attendance. (If power strips are not available, Hawaii Energy reserves the right to offer a comparable promotional item.) • CFL's and LED's can be purchased utilizing the point of purchase rebates made available by Hawaii Energy in retail outlets throughout the state. • AOAO owners/tenants are eligible for Energy Star Appliance rebates and can purchase Energy Star appliances through major retailers throughout the state.

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.9 Energy Awareness, Measurement and Control Systems** **4.3.9.1 Condominium Submetering**
Description & Implementation Strategies (continued)	• AOAO to perform energy audit/Vendor Project Proposals with Hawaii Energy assistance on the following: 1. Common Area Lighting 2. HVAC 3. Domestic Water Pumping 4. Domestic Water Heating

Program Category	**4.3 Business Energy Efficiency Measures (BEEM)** **4.3.9 Energy Awareness, Measurement and Control Systems** **4.3.9.2 Small Business Submetering**
Projected Impacts	Demand 12 kW Energy 41,456 kWh Incentive Budget $ 18,750 (<1%) Cost per kWh $0.45 /kWh TRB $58,317
Incentives	<u>**Incentive**</u> <u>**Unit**</u> Small Business Submetering $150 125 units metered
Description & Implementation Strategies	• Small Businesses ongoing efforts to reduce energy consumption and support the current submetering proposal as one that will insure both fairness in allocating energy costs as well as encouraging energy conservation through direct feedback of business energy use to the tenants. • Combining the submetering program with education and audits as proposed will complete developing the tenant's newfound desire for energy conservation with the how to achieve it. • $150 per unit metered, payable to the owner or small business • The payment of the incentive will be based on owner installing and utilizing the submeters for billing purposes as well as participating in the actions proposed below. • It is expected there will be at least 10% reduction in energy use, however, there is no minimum reduction in electrical use to be required by owner to retain the incentive. • We do require that the system remain in place and billing to occur for a period of at least five years or a pro-rated portion of the incentive will be recovered by Hawaii Energy. • A joint educational and monitoring program will be undertaken with owner to assist in the verification of savings and development of an ongoing energy incentive offering for other condominiums in Hawaii. • This will be a pilot program subject to review and approval of how savings will be determined. Savings methodology to be included in the TRM for 2012 Programs.

Program Category	4.4 Custom Business Energy Efficiency Measures (CBEEM) Customized Programs Overview
Projected Impacts	Demand 529 kW Energy 5,293,121 kWh Incentive Budget $974,000 (5%) Cost per kWh $0.18 /kWh TRB $5,974,917
Incentives	This program provides for incentives for all energy-savings actions that are not already covered by the prescribed incentives. Custom incentives will not be limited to a certain list of measures. Customized Project Measures <5 yrs. — Incentive $0.10 — Units 1,500,000 kWh Customized Project Measures >5 yrs. — Incentive $0.16 — Units 4,250,000 kWh Co-funding Leveraged Project Assistance — Incentive $0.18 — Units 800,000 kWh

Program Category	**4.4 Custom Business Energy Efficiency Measures (CBEEM)** **4.4.1 Customized Project Measures** **4.4.1.1 Customized Project Measures <5 yrs.** **4.4.1.2 Customized Project Measures >5 yrs.**
Projected Impacts	Demand 464 kW Energy 4,646,633 kWh Incentive Budget $830,000 (1%) Cost per kWh $0.178 /kWh TRB $5,347,466
Incentives	<u>Incentive</u> / <u>Units</u> Customized Project Measures <5 yrs. $0.10 1,500,000 kWh Customized Project Measures >5 yrs. $0.16 4,250,000 kWh
Market Barriers	• Risk Avoidance • Market acceptance of new technologies • Lack of familiarity with availability of energy efficient technology • High initial up-front cost • Life Cycle Cost vs. Simple Payback decision analysis • Need for a cash positive investment • Access to and/or understanding of financial options • Lack of knowledge of operation and maintenance of technologies
Description & Implementation Strategies	**Customized Application Process** This program will provide a custom application and granting process for participants to receive incentives for installing non-standard energy efficiency technologies. The intent of this structure is to enable customers to invest in energy efficiency processes and technology measures that may require calculations of energy savings for specific, unique applications. Incentive awards will be based on calculated savings that ensure program cost-effectiveness. The process includes: • Program performs outreach and promotions to inform customers of incentive opportunities • Customer learns about the program offerings through various channels • Customer may call the program to request assistance. Customer or his agent must submit a brief proposal that describes the project and includes estimates of energy savings and payback • Engineering calculations are required and may be reviewed either internally or with a third-party engineering firm • Program provide feedback on the project to clarify if needed

Program Category	4.4 Custom Business Energy Efficiency Measures (CBEEM) 4.4.1 Customized Project Measures 4.4.1.1 Customized Project Measures <5 yrs. 4.4.1.2 Customized Project Measures >5 yrs.
Description & Implementation Strategies (continued)	• Program provides pre-inspection and/or arranges for pre-metering of existing equipment if required • Customers select and approve purchase and installation of energy efficiency measures **Customized Project Criteria** • Payback of greater than one year or 6 months for LED projects. • Pass the utility benefit-cost test, Total Resource Cost Ratio (TRC) based on the value of the Utility avoided demand (kW) and avoided energy (kWh) that the project produces • Incentive rate will not exceed the 50 percent of incremental cost of the energy efficiency improvement **Customized Worksheet of Decision Criteria** We listened to feedback that the prior customized application process was mysterious and subjective. A customized worksheet was developed and implemented in PY2009 that incorporates all the information required to screen the project: • Base case and enhanced case scenarios • Project savings • Project costs The worksheet calculates and we are able to screen based on the following: • Simple Payback (>1 year or 6 months or greater for LED projects) • Incentive Amount (<=50% of incremental cost) • Total Resource Cost Ratio(>=1) Encouraged technology categories • Fresh Water Pumping / Waste Water Pumping • Data Centers - Airflow Optimization • Data Centers - Server Virtualization and Related Technologies • Parking Garages - Perimeter Dimming • Parking Ventilation Control • Demand Control Ventilation (CO2 Sensors in return airstream) • LED Refrigeration Case Lighting • LED Interior Lights

Program Category	4.4 Custom Business Energy Efficiency Measures (CBEEM) 4.4.2 Customized Project Measures 4.4.2.1 Customized Project Measures <5 yrs. 4.4.2.2 Customized Project Measures >5 yrs.
Description & Implementation Strategies (continued)	• LED Traffic Lights and Exterior Lighting • Commercial Refrigeration Measures • Advanced Energy Management Controls • Variable Refrigerant Flow Air Conditioning • High Performance Commercial Lighting • Bi-Level Stairwell and Parking Garage Lighting • EC Motors and Controllers
Key Changes	**Tiered Incentives by Payback** • Projects that have longer life measures often have longer paybacks that businesses have a harder time gaining approval for. These projects can be pushed into reality by offering increases in the incentive levels in order to enhance feasibility and get them to a point where the customers will implement them.
Marketing Strategies	• Offer program ally custom incentive training and workshops to ensure program allies are comfortable with utilizing all aspects of the custom incentive program to sell more energy-efficient options to their respective customers • Maintain direct contact with key market players to understand the markets and decision points and to leverage their marketing resources to inform members • Email informational campaigns • Award and publish success of customer and ally partners to demonstrate highest level leadership in an effort to pull the market

Measure Life	*Reduction in Energy use Incentive*
<= 5 years	$0.10 /kWh
> 5 years	$0.16 /kWh

Program Category	**4.4 Custom Business Energy Efficiency Measures (CBEEM)** **4.4.1 Customized Project Measures** **4.4.1.2 Co-funding Leveraged Project Assistance**
Projected Impacts	Demand 65 kW Energy 646,488 kWh Incentive Budget $144,000 (1%) Cost per kWh $0.18 /kWh TRB $627,451
Incentives	<u>**Incentive**</u> <u>**Units**</u> Co-funding Leveraged Project Assistance $0.18 800,000 kWh
Description & Implementation Strategies	The program will provide an open opportunity for achieving energy efficiency by developing cost-effective projects that focus on high energy consumption businesses. The program will be a formal offer of matching or leveraging funds for projects that have other sources of funding that still do not allow the project to move forward. The example were the HTDC (High Technology Development Corporation) funds for energy studies that were not fully subscribed due to the customer not having the remainder of the funding to execute. This co-funded work resulted in 2010 in eight energy studies resulting in at least one immediately implemented project. The projects will use utility metered data and if needed, will be submetered to ensure savings performance.

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **BESM Program Overview**
Projected Impacts	Demand 359 kW Energy 3,611,875 kWh Incentive Budget $3,513,647 (16%) Cost per kWh $0.97 /kWh TRB $4,134,711
Incentives	see below

	Incentive	Units
4.5.1 Business Direct Installation		
Small Business Direct Lighting Retrofits	$0.75	2,666,667 kWh
4.5.2 Business Design, Audits & Commissioning		
Central Plant Performance Competition	$0.80	900,000 kWh
Cooling Tower Optimization	$0.25	250,000 kWh
Decision Maker – Real-Time Submeters	$12,000	5 groups
Energy Study Project implementation	$30,000	6 Studies
Energy Study Assistance – 50%	$15,000	10 Studies
Design Study Assistance	$15,000	6 Studies
Energy Project Catalyst	$0.40	627,868 kWh

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **4.5.1 Business Direct Installation** **4.5.1.1 Small Business Direct Lighting Retrofits**
Target Market	Small Business Customers receiving electric power under a Schedule "G" rate are eligible under this program. Small customers similar to Schedule "G" customers that are under master-metered accounts would also be eligible. The program will target the 50,000 customers within the small business market that have limited time and expertise within their organizations to research lighting technology options, obtain financing and contract with lighting contractors to replace their older less efficient lighting technologies.
Projected Impacts	Demand 215 kW Energy 2,154,960 kWh Incentive Budget $ 2,000,000 (2%) Cost per kWh $0.93 /kWh TRB $3,194,738
Incentives	Incentive / Units Small Business Direct Lighting Retrofits — $.75 — 2,154,960 kWh
Technologies	Small Business Lighting Retrofit providing a "Turnkey" program consisting of audits, 100% incentivized lighting measures, installation by participating Hawaii Energy Participating contractors and 6 month financing of lighting retrofit costs of custom measures beyond the cost per kWh incentive.

Schedule "G" Customers	
Oahu	29,117
Big Island	12,614
Maui	8,503
Lanai	194
Molokai	498
Totals	50,926

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **4.5.1 Business Direct Installation** **4.5.1.1 Small Business Direct Lighting Retrofits**
Technologies (continued)	The following lighting technology changes will be 100% incentivized under this measure:

	Measure Description		Measure Description
28W Retrofits	Two 8 ft. T12HO 110W to Four 4 ft. T8 28W Normal BF / Reflector	25W Retrofits	Two 8 ft. T12HO 110W to Four 4 ft. T8 25W Normal BF / Reflector
	One 8 ft. T12HO 110W to Two 4 ft. T8 28W High BF		One 8 ft. T12HO 110W to Two 4 ft. T8 25W High BF
	Two 8 ft. T12HO 110W to Two 4 ft. T8 28W High BF / Reflector		Two 8 ft. T12HO 110W to Two 4 ft. T8 25W High BF / Reflector
	Two 8 ft. T12 75W to Two 4 ft. T8 28W Normal BF		Two 8 ft. T12 75W to Two 4 ft. T8 25W Normal BF
	One 8 ft. T12 75W to Two 4 ft. T8 28W Normal BF		One 8 ft. T12 75W to Two 4 ft. T8 25W Normal BF
	Four 4 ft. T12 40W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T12 40W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T12 40W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T12 40W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T12 40W to One 4 ft. T8 28W Normal BF		One 4 ft. T12 40W to One 4 ft. T8 25W Normal BF
	Four 4 ft. T12 34W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T12 34W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T12 34W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T12 34W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T12 34W to One 4 ft. T8 28W Normal BF		One 4 ft. T12 34W to One 4 ft. T8 25W Normal BF
	Four 4 ft. T8 32W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T8 32W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T8 32W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T8 32W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T8 32W to One 4 ft. T8 28W Normal BF		One 4 ft. T8 32W to One 4 ft. T8 25W Normal BF

	Two 4ft. FB40 T8 to Three 2 ft. F17	Refrigerated Case Lighting	6 ft. T12HO Refrigerated Case to LED - Center
			6 ft. T12HO Refrigerated Case to LED - Single/Ends
LED Retrofit	PAR20 Halogen 50W to LED		6 ft. T12 Refrigerated Case to LED - Center
	PAR30 Halogen 75W to LED		6 ft. T12 Refrigerated Case to LED - Single/Ends
	PAR38 Halogen 75W to LED		6 ft. T8HO Refrigerated Case to LED - Center
	PAR38 Halogen 90W to LED		6 ft. T8HO Refrigerated Case to LED - Single/Ends
	MR16 Halogen 20W to LED		
	MR16 Halogen 50W to LED		5 ft. T12HO Refrigerated Case to LED - Center
	Par20 CFL to LED		5 ft. T12HO Refrigerated Case to LED - Single/Ends
	Par30 CFL to LED		5 ft. T12 Refrigerated Case to LED - Center
	Par38 CFL to LED		5 ft. T12 Refrigerated Case to LED - Single/Ends
			5 ft. T8HO Refrigerated Case to LED - Center
CFL	A19 Incandescent 100W to CFL 26W		5 ft. T8HO Refrigerated Case to LED - Single/Ends
	A19 Incandescent 60W to CFL 13W		
	A19 Incandescent 75W to CFL 19W		LED Refrigerated Case Light Drivers
Exit	Incandescent Exit Sign Retrofit with LED Kit		
	Incandescent Exit Sign to New LED Fixture		

Market Barriers

- Trust in equipment vendors/contractors
- Lack of familiarity with energy efficient lighting technologies
- Inability to obtain project financing
- Lack of time and expertise to seek and select lighting contractors
- Life Cycle Cost vs. Simple Payback decision analysis

Program Category	4.5 Business Energy Services & Maintenance (BESM) 4.5.1 Business Direct Installation 4.5.1.1 Small Business Direct Lighting Retrofits
Description & Implementation Strategies	• Provide complete process to provide direct installation of lighting retrofits for small business customers. • Participating Hawaii Energy Participating contractors will offer six month payment plans for the lighting retrofits • Use of workforce development groups and grass roots volunteer organizations to generate leads and perform initial audits to lower cost of sales for Lighting contractors • Quick Inventory worksheet to ID potential targeting for future mechanical measures (AC/Water heating/Appliances/Refrigeration)
Marketing Strategies	• Direct contact with participating lighting contractors • Direct contact with Small Business Administration • Direct contact and printed materials to Property Management groups • Door-to-Door contact through Grassroots Action Groups • Website listing of participating lighting contractors

Program Category	4.5 Business Energy Services & Maintenance (BESM) 4.5.2 Business Design, Audits and Commissioning 4.5.2.1 Central Plant Optimization Competition
Projected Impacts	Demand 73 kW Energy 727,299 kWh Incentive Budget $ 720,000 (1%) Cost per kWh $0.99 /kWh TRB $469,710
Incentives	Incentive / Unit Central Plant Optimization Competition $0.80/kWh 900,000 kWh

Incentive	Amount	Responsibilities
Systems Commissioning Program	50% incentive up to $0.20 per sq. ft.	• Preliminary Systems Review • Metering & Commissioning Plan • Development of Sequence of Operations • Recommended Operational Improvements • Recommended System Upgrades • Maintenance and Operations Plan • Operational Training • Owner commitment to implement recommendations and participate in the Optimization Competition
Metering System	100% incentive for approved metering equipment and data collection systems	• Access to performance data for five years. • Owner commitment to perform operational and system upgrade recommendations with less than 2 year paybacks up to the cost of the metering incentive within two years or forfeit metering incentive
Energy Reduction	$0.10 per kWh saved for one year	• 50% upon implementation • 25% for performance at sixth month • 25% for performance at one year

Description & Implementation Strategies

Develop criteria for plant efficiency measurement to determine Top 10 Central Plants in Hawaii Competition based on:

- Requirement for permanent monitoring equipment installed and recorded.
- Points for Retro-Commissioning Report in Hawaii Energy Format
- Points for Lowest kW/Ton Chilled Water delivered.
- Points for allowing Hawaii Energy access to EMCS data.
- Completeness and equipment level detail of Input Data (Flows, approach temperatures, pump curve etc.)

Program Category	4.5 Business Energy Services & Maintenance (BESM) 4.5.2 Business Design, Audits and Commissioning 4.5.2.1 Central Plant Optimization Competition
Description & Implementation Strategies (continued)	• Work with ASHRAE and PAMCA Hawaii to develop training seminars and promote program with their members • Determine cost of critical performance metering such as plant BTU, Delta T across AHUs, air and water distribution pressures, power metering • Develop worksheets for the typical costs to install • Work with mechanical contractors to provide package deals to participants • Incentive payments will be made based on actual savings resulting from the pre and post actions. • Provide peer groups with Customized Hawaii specific Energy Use Intensity reports based on the data collected; these comparisons show their usage in comparison to their peers currently on an entire facility basis, Central Plant and as the program progresses we will disaggregate the comparisons down to the individual technologies • Prizes for encouragement (service and commissioning tools) • Promotion of Property Management Companies, Chief Engineers, Consultants, and Service Contractors
Marketing Strategies	• Direct contact with Mechanical Services companies, chief engineers, property managers and manufacturers representatives, • Collaborate with Service and Industry Trade Organizations • Award and publish success of customer and ally partners to demonstrate highest level leadership

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **4.5.2 Business Design, Audits and Commissioning** **4.5.2.2 Cooling Tower Optimization**
Projected Impacts	Demand 20 kW Energy 202,028 kWh Incentive Budget $ 62,500 (<1%) Cost per kWh $0.31 /kWh TRB $27,861
Incentives	<u>**Incentive**</u> <u>**Units**</u> Cooling Tower Optimization $0.25/kWh 250,000 kWh
Description & Implementation Strategies	This program will bring together the water and energy savings potential of cooling towers. The water treatment processes drive both water consumption and the persistence of energy savings by keeping the heat exchange processes in the chillers and in the tower itself at optimum levels. The program will work with the local water departments, water treatment companies and mechanical service contractors to drive the program.

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **4.5.2 Business Design, Audits and Commissioning** **4.5.2.3 Decision Maker – Real-Time Submeters**
Projected Impacts	Demand 0 kW Energy 20,203 kWh Incentive Budget $60,000 (<1%) Cost per kWh $2.97 /kWh TRB $2,029
Incentives	<u>**Incentive**</u> <u>**Units**</u> Decision Maker – Real-Time Submeters $12,000/group 5 Groups
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY There are individuals within business organization who have influence over large numbers of employees whose behavior within the work environment drive unnecessary energy consumption. Examples can be leaving on lights, additional electronic equipment, and items such as foot heaters and additional fans that mask larger energy efficiency issues etc. This will be a pilot program subject to review and approval of how savings will be determined. Savings methodology to be included in the TRM for 2012 Programs. TARGET AUDIENCE Who – Property Managers, Executive Level Company Officers What – All Commercial INCENTIVE & TARGETED ECONOMICS The offering of the direct installation or materials with in-house installation of web-based electrical metering. This metering will be monitored by decision makers within the organization to identify usage patterns and be the basis of peer group competitions within the organization. APPLICATION PROCESS An MOU will be developed with the customer that will outline the purpose and process of setting up education and peer group competitions within their businesses. COMPLEMENTARY PROGRAMS • High Efficiency HVAC • High Efficiency Lighting Measures

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **4.5.2 Business Design, Audits and Commissioning** **4.5.2.4 Energy Study Project Implementation - 100%**
Projected Impacts	Demand 0 kW Energy 0 kWh Incentive Budget $ 180,000 (<1%) Cost per kWh n/a TRB n/a
Incentives	<u>**Incentive**</u> <u>**Units**</u> Energy Study Assistance $30,000/study 6 studies
Description & Implementation Strategies	• 100% Funded up to $30,000 • Customer agrees to implement reccomendations with less than 2 year paybacks within 1 year up to the value of the energy study or pays back 50% of the energy study cost. • Load / Existing Performance Measurements • Modeling new systems • Actionable recommendations

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **4.5.2 Business Design, Audits and Commissioning** **4.5.2.5 Energy Study Assistance**
Projected Impacts	Demand 0 kW Energy 0 kWh Incentive Budget $ 150,000 (<1%) Cost per kWh n/a TRB n/a
Incentives	<u>**Incentive**</u> <u>**Units**</u> Energy Study Assistance $15,000/study 10 studies
Description & Implementation Strategies	• 50% matching up to $15,000 • Load / Existing Performance Measurements • Modeling new systems • Actionable recommendations

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **4.5.2 Business Design, Audits and Commissioning** **4.5.2.6 Design Assistance**
Projected Impacts	Demand 0 kW Energy 0 kWh Incentive Budget $ 90,000 (<1%) Cost per kWh n/a TRB n/a
Incentives	**Incentive** / **Units** Energy Study Assistance $15,000/study 6 studies
Description & Implementation Strategies	• 50% matching up to $15,000 for projects exceeding code requirements • Meet targeted energy efficiency levels • Actionable recommendations
Marketing Strategies	• Direct interaction with potential customers and mechanical engineers • Promote measure information on the website • Promote successful projects in the media and events

Program Category	**4.5 Business Energy Services & Maintenance (BESM)** **4.5.2 Business Design, Audits and Commissioning** **4.5.2.7 Energy Project Catalyst**
Projected Impacts	Demand 51 kW Energy 507,386 kWh Incentive Budget $ 251,147 (1%) Cost per kWh $0.40 /kWh TRB $440,373
Incentives	<u>**Incentive**</u> <u>**Units**</u> Energy Project Catalyst $0.40/kWh 327,868 kWh
Description & Implementation Strategies	The objective of the catalyst program is to accelerate stalled high impact energy efficiency projects from an idea to reality as follows: • *Full Cost Incentives* - Provide up to 30% cost incentive to proposals that fulfill program needs • *Commitment to Implement* - Recipients must commit to implementing all projects with less than a 1 year payback including incentives. • *Desired Project Profiles* o High potential for energy savings (>30% reduction in consumption). o Commitment and high probability of owner taking action on Site Audit / Commissioning / Energy Study report o Typical site that can be repeated, such as chain convenience stores o Sites with Energy Usage Density over 2.5 kWh/Sq. ft./month o Site with Peak Demand Density over 6.0 kW/ Sq. ft. o Control System Recommissioning - Sequence of operation documentation, review, testing. o Demonstrate usefulness of the addition of critical system efficiency metering such as total central plant kW/ton.

Program Category	**4.6 Business Hard-to-Reach (BHTR)** **BHTR Program Overview**
Target Market	Restaurants This sector has a low participation rate, low saturation of high efficiency equipment and high potential for energy savings. The Small Business Direct Installation (SBDI) method has shown to be effective to get attention and participation with the ability to then gather information on the restaurant equipment and operations that can lead to greater energy savings through other programs such as the ENERGY STAR Kitchen equipment program. Landlords The landlord/tenant relationship provides challenges to making energy efficiency capital investments in properties and operations such as air conditioning and lighting upgrades. This funding is to create a program that works with landlords that are taking This program will be targeted to provide landlords of small business schedule "G" customers with comprehensive audit, RFP and other support for energy saving projects that will drive down the energy cost of their tenants.
Projected Impacts	Demand 85 kW Energy 859,334 kWh Incentive Budget $1,190,000 (5%) Cost per kWh $1.38 /kWh TRB $1,245,649
Incentives	see below

	Incentive	Units
4.6.1 Energy Efficiency Equipment Grants		
SBDI - Kitchen Exhaust Hood Demand Ventilation	$1,700	250 hp
SBDI - Restaurant Lighting	$0.75	1,000,000 kWh
4.6.2 Landlord, Tenant, AOAO Measures		
Energy Hero Landlord	$0.30	50,000 kWh

Program Category	**4.6 Business Hard-to-Reach (BHTR)** **4.6.1 Energy Efficiency Equipment Grants** **4.6.1.1 SBDI - Kitchen Exhaust Hood Demand Ventilation**
Target Market	• Restaurants
Projected Impacts	Demand 0 kW Energy 10,819 kWh Incentive Budget $425,000 (2%) Cost per kWh $39.28 /kWh TRB $12,553
Incentives	**<u>Incentive</u>** **<u>Unit</u>** SBDI - Kitchen Exhaust Hood Demand Ventilation $1,700 250 hp
Market Barriers	• Familiarity with technology • Vendor/Contractor sales and support in Hawaii for technology • Customer lack of access to capital for energy improvements • Renter and Lessee reluctance to invest in non-owned property
Description & Implementation Strategies	ENERGY REDUCTION OPPORTUNITY Kitchen Exhaust hoods run typically at full speed during the operating hours of the restaurant. These controller systems monitor the cooking surfaces for heat and/or particulates in the air to run the fans only when needed. Saving the energy that is wasted during idle periods. This will be a pilot program subject to review and approval of how savings will be determined. Savings methodology to be included in the TRM for 2012 Programs. The modest savings value is based on a single project monitored in PY2011. TARGET AUDIENCE Who – Restaurant Owners, Hawaii Restaurant Association What – Restaurants INCENTIVE & TARGETED ECONOMICS The offering of the direct installation 100% Cost Incentive. Work to be performed by participating contractors/manufacturers. APPLICATION PROCESS • Targeted Anticipation and Vendor Driven leads drive interest. • Application and site audit information • Agreement to allow marketing/promotions in Restaurant regarding work performed and savings achieved.

Program Category	**4.6 Business Hard-to-Reach (BHTR)** **4.6.1 Energy Efficiency Equipment Grants** **4.6.1.2 SBDI - Restaurant Lighting**
Target Market	• Restaurants
Projected Impacts	Demand 81 kW Energy 808,110 kWh Incentive Budget $750,000 (3%) Cost per kWh $.93 /kWh TRB $1,198,027
Incentives	<u>Incentive</u> <u>Units</u> Small Business Direct Installation $0.75 1,000,000 kWh
Market Barriers	• Customer lack of access to capital for energy improvements • Renter and Lessee reluctance to invest in non-owned property
Description & Implementation Strategies	• Provide complete process to provide direct installation of lighting retrofits for small business customers. • Participating Hawaii Energy Participating contractors will offer six month payment plans for the lighting retrofits • Use of workforce development groups and grass roots volunteer organizations to generate leads and perform initial audits to lower cost of sales for Lighting contractors • Quick Inventory worksheet to ID potential targeting for future mechanical measures (AC/Water heating/Appliances/Refrigeration)
Marketing	• Direct contact with participating lighting contractors • Direct contact with Small Business Administration • Direct contact and printed materials to Property Management groups • Door-to-Door contact through Grassroots Action Groups • Website listing of participating lighting contractors

Program Category	4.6 Business Hard-to-Reach (BHTR) 4.6.1 Energy Efficiency Equipment Grants 4.6.1.2 SBDI - Restaurant Lighting
Technologies	A "Turnkey" program consisting of audits, 100% incentivized lighting measures, installation by participating Hawaii Energy Participating contractors and 6 month financing of lighting retrofit costs of custom measures beyond the cost per kWh incentive. The following lighting technology changes will be 100% incentivized under this measure:

	Measure Description		Measure Description
28W Retrofits	Two 8 ft. T12HO 110W to Four 4 ft. T8 28W Normal BF / Reflector	25W Retrofits	Two 8 ft. T12HO 110W to Four 4 ft. T8 25W Normal BF / Reflector
	One 8 ft. T12HO 110W to Two 4 ft. T8 28W High BF		One 8 ft. T12HO 110W to Two 4 ft. T8 25W High BF
	Two 8 ft. T12HO 110W to Two 4 ft. T8 28W High BF / Reflector		Two 8 ft. T12HO 110W to Two 4 ft. T8 25W High BF / Reflector
	Two 8 ft. T12 75W to Two 4 ft. T8 28W Normal BF		Two 8 ft. T12 75W to Two 4 ft. T8 25W Normal BF
	One 8 ft. T12 75W to Two 4 ft. T8 28W Normal BF		One 8 ft. T12 75W to Two 4 ft. T8 25W Normal BF
	Four 4 ft. T12 40W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T12 40W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T12 40W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T12 40W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T12 40W to One 4 ft. T8 28W Normal BF		One 4 ft. T12 40W to One 4 ft. T8 25W Normal BF
	Four 4 ft. T12 34W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T12 34W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T12 34W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T12 34W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T12 34W to One 4 ft. T8 28W Normal BF		One 4 ft. T12 34W to One 4 ft. T8 25W Normal BF
	Four 4 ft. T8 32W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T8 32W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T8 32W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T8 32W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T8 32W to One 4 ft. T8 28W Normal BF		One 4 ft. T8 32W to One 4 ft. T8 25W Normal BF
	Two 4ft. FB40 T8 to Three 2 ft. F17	Refrigerated Case Lighting	6 ft. T12HO Refrigerated Case to LED - Center
LED Retrofit	PAR20 Halogen 50W to LED		6 ft. T12HO Refrigerated Case to LED - Single/Ends
	PAR30 Halogen 75W to LED		6 ft. T12 Refrigerated Case to LED - Center
	PAR38 Halogen 75W to LED		6 ft. T12 Refrigerated Case to LED - Single/Ends
	PAR38 Halogen 90W to LED		6 ft. T8HO Refrigerated Case to LED - Center
	MR16 Halogen 20W to LED		6 ft. T8HO Refrigerated Case to LED - Single/Ends
	MR16 Halogen 50W to LED		5 ft. T12HO Refrigerated Case to LED - Center
	Par20 CFL to LED		5 ft. T12HO Refrigerated Case to LED - Single/Ends
	Par30 CFL to LED		5 ft. T12 Refrigerated Case to LED - Center
	Par38 CFL to LED		5 ft. T12 Refrigerated Case to LED - Single/Ends
CFL	A19 Incandescent 100W to CFL 26W		5 ft. T8HO Refrigerated Case to LED - Center
	A19 Incandescent 60W to CFL 13W		5 ft. T8HO Refrigerated Case to LED - Single/Ends
	A19 Incandescent 75W to CFL 19W		LED Refrigerated Case Light Drivers
Exit	Incandescent Exit Sign Retrofit with LED Kit		
	Incandescent Exit Sign to New LED Fixture		

Market Barriers	• Trust in equipment vendors/contractors • Lack of familiarity with energy efficient lighting technologies • Inability to obtain project financing • Lack of time and expertise to seek and select lighting contractors • Life Cycle Cost vs. Simple Payback decision analysis

Program Category	**4.6 Business Hard–to-Reach (BHTR)** **4.6.2 Landlord, Tenant, AOAO Measures** **4.6.2.1 Energy Hero Landlord**
Target Market	• Property Managers, Landlords, BOMA
Projected Impacts	Demand 4 kW Energy 40,406 kWh Incentive Budget $15,000 (<1%) Cost per kWh $0.37 /kWh TRB $35,069
Incentives	**Incentive** **Units** Energy Hero Landlord $0.30 50,000 kWh
Market Barriers	The landlord/tenant relationship provides challenges to making energy efficiency capital investments in properties and operations such as air conditioning and lighting upgrades. The tenant energy usage can be accounted for by: 1. Paying a flat rate per square foot based on a lease agreement 2. Costs Incorporated in CAM 3. Third-Party submetered 4. Separate Utility submeter Energy savings project may: • not have a direct financial incentive for either party • have simple payback beyond lease term
Description & Implementation Strategies	**Energy Hero Landlord - Major Project Support** This program will be targeted to provide landlords of small business schedule “G” customers with comprehensive audit, RFP and other support for energy saving projects that will drive down the energy cost of their tenants. The program will work with local lenders to provide project financing support in conjunction with the program.

5.0 TRANSOFRMATION PROGRAM STRATEGY & DETAILS FOR PY12

5.1 Overview

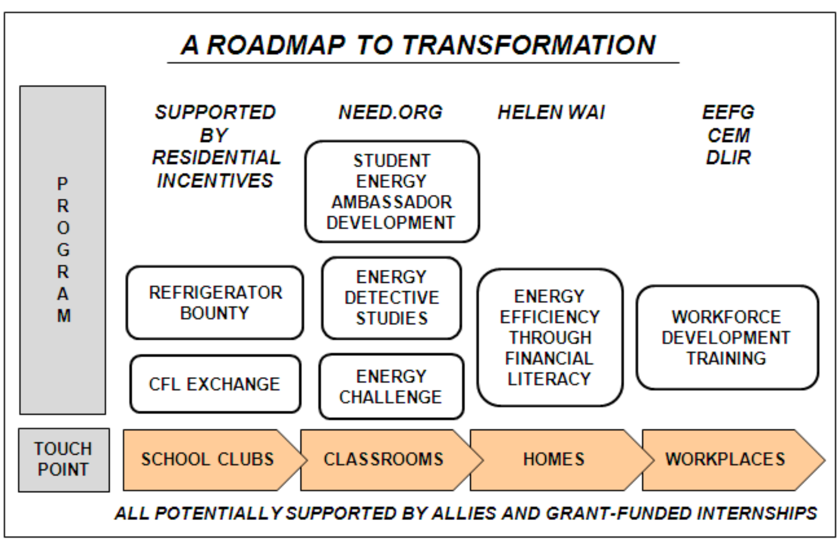
Though in the fourth year of the PBFA administration of the Hawaii Energy Program, this will be the second year the offerings include a Hawaii Energy Transformational Program. In this second year, the Transformational Program will benefit from established relationships and experience in a number of "pilot" projects completed in PY11. The experience gained and the relationships established provide Hawaii Energy with a solid foundation for continuing and expanding its transformational role within the State of Hawaii.

During this the second transformational program year Hawaii Energy will continue to test new projects through pilots and expand other established pilot projects into broader programs. In addition, Hawaii Energy will continue to seek and evaluate concepts that may be considered in future.

5.1.1 Transformational Program Vision

Hawaii Energy will not currently seek to develop its own signature projects but will, through collaboration, work to develop relationships with organizations that are working to achieve energy conservation and behavior change within the State.

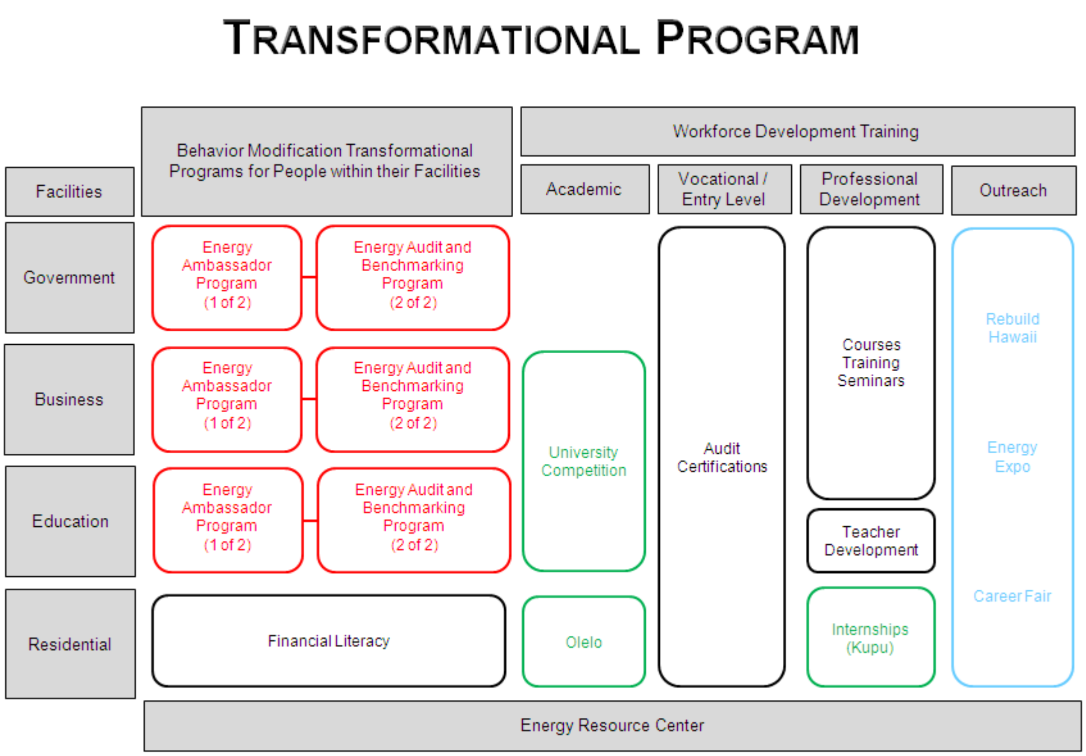
The following diagram attempts to relay a vision whereby simple energy-saving projects can bootstrap and support deeper involvement by the community, starting with students and teachers that in turn engages parents and adults at large. Through this approach, offerings from simple energy conservation projects to professional development can gain further traction across the State.



Hawaii Energy can implement projects that build on and support one another as presented in the roadmap above. From the left, incentive-funded projects a CFL Exchange, Refrigerator Bounty program or energy “challenge” like that of Kanu Hawaii or Hawaiian Electric can engage schools, students and their communities. The success of this kind of project can open the door to energy education programs such as the National Energy Education Development project (NEED.org) or projects that make use of the Kokua Hawaii Foundation Energy Detective kits to engage teachers and educate students while sending energy information and measurement activities into the home. With program activities and information reaching the home, families can be solicited for energy educational training opportunities such as the course on Energy Efficiency through Financial Literacy. From this base Hawaii Energy will offer workforce development training opportunities that will engage and train individuals within the workforce. While participation can begin at any point along the roadmap, efforts will be made to build sustained engagement on the topic of energy efficiency and conservation with the public.

5.1.2 Transformational Program Strategy

The summary project diagram below graphically depicts the proposed PY12 projects of the Hawaii Energy Transformational Program. This diagram identifies the groups that the Transformational Programs will target and identifies target audiences for Behavioral Modification, Education and Workforce Development Training. For detailed description of each program, please refer to Section 5.2 forward.



Hawaii Energy will seek to establish programs within schools that perform energy audits within homes while applying math and science in computation of energy use within the classroom. Student Energy Ambassador Programs will be performed where students and faculty are engaged for the purpose of reducing energy consumption within schools through training and audit of plug load, lighting and air conditioning. All of these programs benefit from the basic energy education provided by NEED.org efforts to educate Teachers with science of energy and energy management programs (illustrated on left).

Through school programs the families of the children and the communities at large can be engaged for energy conservation and efficiency. The Energy Efficiency through Financial Literacy workshop (illustrated in lower-left) hosted by Hawaii Energy at schools is targeting residential low income households. Other examples include: an evening event at a school with families and communities invited for presentations or a school fundraiser that provides CFLs for exchange within the school and the neighboring communities.

These programs have a broad impact in communicating energy as an important and tangible issue. Students have the ability to influence their parents and their communities. Children are the single most influential group within the State. They can influence change within their households and within the community at large.

Hawaii Energy will seek to establish Workforce Development projects and Training programs (illustrated at right) that provide training in use of tools which are made available through Lending Libraries. Hawaii Energy plans to leverage internship programs where interns develop skills through training and direct application of that which they learn while performing audits using tools from lending libraries.

5.1.3 Transformational Program Grants

Every dollar brought into the State for the purpose of energy conservation and efficiency or sustainability is an additional dollar that helps to achieve the long-term sustainability of the State and helps to achieve the goals of the Hawaii Clean Energy Initiative (HCEI). Therefore, Hawaii Energy will help draw additional funding into the State by contributing to and support efforts to write and obtain grant funding, philanthropic or corporate funding.

Through grants, Hawaii Energy also will seek to support and facilitate the work of the Department of Business Economic Development and Tourism (DBEDT), the Department of Labor and Industrial Relations (DLIR) and other organization where energy conservation and efficiency or energy related workforce development efforts are being performed.

5.1.4 Transformational Program Efforts to Collaborate

The Hawaii Energy Transformational Program will seek opportunities to collaborate with organizations throughout the State. Within the area of work force development, contacts with State organizations such as DLIR – The Department of Labor and Industrial Relations, DBEDT – The Department of Business, Economic Development and Tourism as well as the State and County Energy Offices will provide opportunities to achieve broader reach of all programs. The Program will seek to work with trade unions that have established training facilities and collaborate with the Universities and Community Colleges that are working to establish energy efficiency and sustainability courses. Hawaii Energy will explore collaboration that will enable training to take place within existing facilities while seeking to expand the types of energy efficiency training that are offered. Opportunities to collaborate with Building and Architectural groups and associations will be sought. Collaboration with non-profit organizations will continue.

Through the use of established, reliable program vendors, coupled with the ability to establish and maintain relationships, Hawaii Energy Transformational efforts will continue to be successful. The collaborative model is cost and schedule efficient compared with in-house development of courses and initiatives, and will ensure the broadest possible reach into the community.

5.1.5 Transformational Program – Improvement through Analysis

As each project is implemented, progress and results will be monitored. Analysis of project methods will be used to determine program effectiveness and determine where improvement is possible. Other attention will include:

- Analysis of projects based on well known behavioral analysis techniques and community based social marketing methods;
- Analysis of projects for the purpose of project improvement and enhancement through use of commitment based social behavior studies;
- Analysis of projects for opportunities to establish connections through to the Hawaii Energy incentive programs.

5.1.6 Transformational Program – Financial Summary

The following summary budget table outlines projects and budget details of the Transformational Program as illustrated in Section 5.3. For further detail specifying the Business and Residential budget, please refer to Appendix E.

Transformational Offering	Market Sector	Budget
Behavior Modification		
Energy Ambassador Development		
State, Federal, Civil Defense, National Guard	Government	$261,780
Small Business Workforce Development	Government	$52,356
Hawaii State Department of Education	Business & Industry	$261,780
Energy Audit & Benchmarking, Tools & Support		
State, Federal, Civil Defense, National Guard	Business & Industry	$83,770
Commercial Facilities	Business & Industry	$83,770
Educational	Education	$20,942
Workforce Development Training		
Academic Level		
University Targeted interactive Education, Competition – Kukui Cup	Business & Industry	$47,120
Video Programming Net Zero, PSAs, etc. (O'lelo)	Business & Industry	$47,120
Vocational / Entry Level		
University of Hawaii Community Colleges – Residential Audit Certifications	Residential	$188,482
Professional Development		
Workforce Development – Courses, Certification, Application	Business & Industry	$418,848
Teacher Workforce Development – Energy Education Development	Education	$209,424
Residential Home Grading System Analysis and Pilot	Education	$78,534
Workforce Development – Internships	Business & Industry	$104,712
Outreach & Education		
Sustainable Energy Career Fair(s), Energy Expo, Rebuild Hawaii	Business & Industry	$78,534
Energy Efficiency through Financial Literacy	Residential	$209,424
Supporting Services and Resources		
Energy Resource Centers		$136,489
Workforce Development Course Marketing, Project Outreach and Communication(s)		$0
Project Assessment, Directed Improvement, Analysis		$94,241
Engineering Research, Development, Energy Consumption Analysis		$0
Sub-Total: Transformational Program Budget for PY12		$2,377,326

These programs may be expanded should surplus PY11 funds be rolled over, notably the few that remain unfunded.

5.1.7 Transformational Table of Contents

The project pages that follow provide details for each program, including description, effort(s) and applicable market sector and funding category (i.e. Business or Residential with the first one mentioned being the dominant funding source), to which the project applies. Where Appendix F is specifically referenced, more detailed targets are provided.

5.2 Government Programs

- *5.2.1 State, Federal, Civil Defense, National Guard Energy Ambassador Development / Audits*
- *5.2.2 State, Civil Defense, National Guard Energy Audit & Benchmarking Tools and Support*

5.3 Business & Industry Programs

- *5.3.1 Workforce Development - Business*
- *5.3.2 Commercial Facility Energy Audit & Benchmarking Tools and Support*
- *5.3.3 Energy Resource Centers*
- *5.3.4 Hawaii State – Department of Education “Energy Ambassador” Development*
- *5.3.5 Sustainable Energy Career Fair(s), Energy Expo, Rebuild Hawaii*
- *5.3.6 University Targeted Interactive Education, Competition – Kukui Cup*
- *5.3.7 Video Programming Net Zero, PSAs, etc. (O’lelo)*

5.4 Education Programs

- *5.4.1 Teacher Workforce Development – Energy Education Development*
- *5.4.2 Educational Energy Audit & Benchmarking Tools and Support*

5.5 Residential Programs

- *5.5.1 University of Hawaii Community Colleges – Audit Certifications*
- *5.5.2 Energy Efficiency through Financial Literacy*
- *5.5.3 Residential Home Rating System Analysis & Pilot*

5.6 Program Support

- *5.6.1 Workforce Development Course Marketing, Project Outreach and Communications*
- *5.6.2 Project Assessment, Directed Improvement, Analysis*

5.2 Government Programs

Government related activities will work to raise the level of energy awareness within the government work environment with the expectation that energy savings will be achieved both through identified energy efficiency measures and behavioral changes that achieve energy conservation.

5.2.1 State, Federal, Civil Defense, National Guard Energy Ambassador Development / Audits

Program Category	**Transformational** Business, Residential **State, Federal, Civil Defense, National Guard** **"Energy Ambassador" Development / Audits**
Target Projects	An emerging area of focus, Hawaii Energy will seek opportunities to collaborate with State and County Government organizations, the Civil Defense and National Guard for the purpose of creating and implementing programs that provide educational training that results in audits within facilities throughout the State. These programs will engage employees and members of the service for the purpose of educating and engaging individuals and inspiring them to action. Engaging individuals in this way will produce energy savings both through identification of energy efficiency measures that are possible and the resulting energy awareness and behavioral changes for energy conservation.
Program Impacts	Transformational Budget $ 261,780
Collaborative Groups	Hawaii Energy, DBEDT, State of Hawaii Office of the Adjutant General, Hawaii State National Guard.
Project Goals	Perform training that engages occupants and members of the service in energy auditing techniques that result in behavioral change and kWh savings. This program will identify barriers to change and assess which messages and methods are most likely to ensure change will occur.

Program Category	**Transformational** Business, Residential **State, Federal, Civil Defense, National Guard** **Energy Ambassador Development / Audits**
Project Milestones	The Hawaii Energy Energy Ambassador Development / Audits program will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy has established One (1) or more collaborative relationship(s) with organizations interested in participating in this program. ☐ Hawaii Energy has established One (1) or more collaborative relationship(s) with organizations capable of performing training under this program ☐ Hawaii Energy provides materials in support of Two (2) or more facilities or 6 or more large buildings (more than 100,000 square feet) within the state ☐ At a minimum, Two (2) facilities will be located within Maui or Hawaii counties. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.2.2 State, Civil Defense, National Guard Energy Audit & Benchmarking Tools and Support

Program Category	**Transformational** Residential, Business **State, Civil Defense, National Guard** **Energy Audit & Benchmarking Tools & Support**
Program Target	This project will focus on Hawaii State, Civil Defense and National Guard facilities. Purchase of materials including the kill-a-watt, light meters, temperature sensors and other tools that provide opportunities for building analysis and audits within the facilities. These tools will provide additional support for educational audits described previously and facilitate expansion of projects that provide exposure to and experience with energy efficiency and conservation. We will seek to provide tools that create and facilitate energy projects that allow members of these organizations to integrate energy audits and energy conservation into their daily routine.
Program Impacts	Transformational Budget $ 83,770
Collaborative Groups	Hawaii Energy, DBEDT, State of Hawaii Office of the Adjutant General, Hawaii State National Guard
Program Goals	This project, together with other Government based programs discussed, will seek to create energy based awareness within State organizations. The goal is to set targets for employees to reduce energy use consistently while establishing new habits.

Program Category	**Transformational** Residential, Business **State, Civil Defense, National Guard** **Energy Audit & Benchmarking Tools & Support**
Project Milestones	The State, Civil Defense, National Guard Energy Audit & Benchmarking Tools & Support project will be considered a success when the following milestones have been achieved: ☐ Hawaii Energy has established Two (2) or more collaborative relationship(s) with State, Civil Defense and National Guard organizations implementing energy efficiency and conservation within facilities within the State. ☐ Hawaii Energy will provide materials in support of Four (4) or more facilities within the State. ☐ At a minimum, One (1) facility will be located within the counties of Maui or Hawaii. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program.

5.3 Business & Industry Programs

5.3.1 Workforce Development - Business

Workforce development efforts will focus on development of skills for current and future Energy Efficiency Service Sector (EESS) workforce individuals.

The Program will engage and collaborate with non-profit organizations, corporations, government entities and public institutions throughout the State. Training opportunities will be provided for individuals and groups. Internships will be funded. Funding for purchase of equipment will be provided where collaborative partnerships provide for individual education, growth and training based on equipment use.

Projects will seek energy savings; however the primary objective is development of knowledge, skills and interest in EESS individuals, for application within the current and future workforce. Where feasible, EESS participants will be trained to positively influence others in their sphere of influence regarding how to save energy

5.3.1.1 Workforce Development – Courses, Certification, Application

Program Category	**Transformational** Business **Workforce Development Courses, Certification, Application**
Target Project(s)	In addition to the audit certification programs to be offered by the UH Community College system, workforce development courses including but not limited to Learning to S.E.E. (Sell Efficiency Effectively), AEE – CEM (Certified Energy Manager Certification), BOC (Building Operator Certification) and other courses resulting in certification of participants will be continued, and others will be considered to the extent that they achieve the criteria of expanding the pool of professional talent available locally to support energy efficiency. Opportunities to offer or extend participation in such courses will be sought. Hawaii Energy will seek to increase and measure the increase of the knowledge of individuals in the EESS sector and expand the knowledge levels of those interested in entering this sector. In addition, Hawaii Energy will consider opportunities to work with the University of Hawaii system in support of courses or projects where workforce development benefits will be realized.
Program Impacts	Transformational Budget $ 418,848
Collaborative Groups	Hawaii Energy, University of Hawaii, Hawaii Community Colleges, Johnson Controls, Sustainable Living Institute of Maui (SLIM), Pacific Center for Advanced Technology Teaching (PCATT), Association of Energy Engineers, Energy Efficiency Funding Group, and/or the Department of Labor and Industrial Relations and Trade Unions within the State of Hawaii or other training organizations.
Project Goals	Business community workforce knowledge and skills development through: • Certification Courses, Coursework, and Seminar offerings • Sponsorship and Scholarship for Training events hosted by others • Partnership with organizations that provide certification training • Hawaii Energy hosted training events

Program Category	**Transformational** Business **Workforce Development Courses, Certification, Application**
Project Milestones	The Hawaii Energy Workforce Development Courses project will be considered a success when the following milestones have been achieved: ☐ Hawaii Energy has established Three (3) or more collaborative relationship(s) with organizations that implement energy efficiency training. ☐ Hawaii Energy, in partnership with this/these organizations will provide training opportunities, and possibly internships, for individuals within or seeking to enter the energy efficiency service sector. According to the State of Hawaii Department of Labor and Industrial Relations (DLIR) Research & Statistics Office, an estimate of the statewide size of the energy efficiency sector in the next year or two is 1,300 professionals, scientists and technicians, and 4,800 in construction, and 3,000 administrative positions. Currently there are approximately 2,500 Energy Efficiency jobs in Hawaii. Hawaii Energy will target both current energy efficiency professionals and also work to educate those who will enter the workforce over the next few years. Hawaii Energy will target training of 500 to 1,000 of these individuals within PY 2012. ☐ Hawaii Energy will target holding 1/3 of the training days within Maui or Hawaii counties. In addition, travel stipends will be provided to individuals located within Maui or Hawaii counties to facilitate their participation in Oahu based courses. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.3.1.2 Workforce Development – Small Business Energy Ambassador Development

Program Category	**Transformational** Business **Workforce Development** **Small Business "Energy Ambassador" Development**
Target Project(s)	A new focus area, "Energy Ambassador" Development programs will work to certify knowledgeable individuals who make themselves available as a resource to others who are passionate about energy efficiency and are interested in helping others in *their* business community. With the Small Business "Energy Ambassador" Development project, Hawaii Energy will create a process to identify working professionals within Small Business districts, such as the Fort Street Mall, Kahala Mall, Hilo business district or Kihei business district, for example. These owners, operators, and managers will receive training and be provided with funds for projects that will educate and train others within their communities. Community Based Social Marketing (CBSM) techniques will be examined for application within these business communities, facilitated by the Energy Ambassador or professional advisor trained in CBSM. CBSM scientifically assesses barriers to defined target behavioral change, and evaluates through a pilot effort a control group versus pilot group to ensure best options are utilized for behavior change, CBSM techniques include measuring cost-effectiveness of the program versus results. Whenever possible projects will be designed and developed as "turnkey" projects for easy implementation and application in other similar communities, assuming barriers and results from the pilot can be generalized in a valid manner.
Program Impacts	Transformational Budget $ 52,356
Collaborative Groups	Hawaii Energy, Maui Economic Development Board, Organizations, others on Oahu and Hawaii Island
Project Goals	Establish a group of "Energy Ambassadors" within small business communities. Provide training, projects and funding that will achieve energy savings.

Program Category	**Transformational** Business **Workforce Development** **Small Business Energy Ambassador Development**
Project Milestone	The Hawaii Energy Small Business Energy Ambassador Development project will be considered a success when the following milestones have been achieved ☐ Hawaii Energy has established Two (2) or more collaborative relationship(s) with organizations to provide services in this arena. ☐ Hawaii Energy, in partnership with this/these organizations will provide training opportunities, and possibly internships, for energy ambassadors within target business districts. ☐ At a minimum, One (1) energy ambassador residing within Maui or Hawaii county will be trained. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.3.1.3 Workforce Development – Internships

Program Category	**Transformational** Business, Residential **Kupu – Rewarding Internships for Sustainable Employment (RISE)** **Kupu – Youth Energy Assessment Hawaii (YEAH)**
Target Project(s)	A continuing and expanding focus area is green jobs transition through use of internship experience. Kupu is a Hawaii based non-profit providing a home organization for the Hawaii Youth Conservation Corps (HYCC), Urban Corps, RISE and YEAH programs. The Kupu programs are a hands-on set of programs aimed at educating Hawaii's youth on the many conservation issues that threaten Hawaii's unique environment. Hawaii Energy will continue to work with the Kupu RISE and YEAH programs. Kupu - RISE, Rewarding Internships for Sustainable Employment, is an internship program that provides the first green job experience to advanced college students and recent college graduates who are entering the green workforce. Kupu - YEAH, Youth Energy Assessment Hawaii, is a program that will create teams of youth who will go into the community to perform energy audits. Hawaii Energy will contract with Kupu and potentially other groups funding interns, who develop skills applicable to the Energy Efficiency Service Sector, perform work that achieves energy efficiency within homes and small businesses and provides a broader knowledge of energy efficiency skills and career opportunities.
Program Impacts	Transformational Budget $ 104,712
Collaborative Groups	Hawaii Energy, Kupu – R.I.S.E., Kupu – YEAH
Project Goals	University and High School level workforce knowledge and skills development through: • Employment of a number of RISE interns working on energy efficiency projects within the State • Partnership with the YEAH program for development of curriculum and training materials used to train Kupu-RISE energy auditing teams.

Program Category	**Transformational** Business, Residential **Kupu – Rewarding Internships for Sustainable Employment (RISE)** **Kupu – Youth Energy Assessment Hawaii (YEAH)**
Project Milestones	The project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will continue and expand the partnership with Kupu Hawaii for the purpose of engaging Kupu – RISE interns. Hawaii Energy will also consider other vendors who can provide these services if expansion warrants it. ☐ With Kupu – RISE, Hawaii Energy will establish Four (4) or more internships that enable development of energy efficiency service sector skills. The project focus area and application of the Kupu – RISE interns is yet to be determined. ☐ With Kupu – YEAH, Hawaii Energy will facilitate energy audit training and funding for interns who perform energy audits in residential homes. The number of training sessions, number of YEAH interns and number of audits performed is yet to be determined. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.3.2 Commercial Facility Energy Audit & Benchmarking Tools and Support

Program Category	**Transformational** Business **Commercial Facility Energy Audit & Benchmarking Tools & Support**
Program Target	A new focus area, this project will focus on Hawaii Commercial Facilities. The Program will include purchase of materials including kill-a-watt meters, light meters, temperature sensors and other items that will support projects for education and training in energy efficiency measures and conservation behavior. Training will be provided for use of these tools. Tools will be placed within lending libraries or in certain instances given or loaned to commercial facilities for their application in energy saving measures. Facilitating Energy Star Benchmarking of Commercial Buildings will be an area of focus.
Program Impacts	Transformational Budget $ 83,770
Collaborative Groups	Hawaii Energy, TBD – Commercial Facilities
Program Goals	This project, together with other business & industrial projects will seek to provide tools that create energy efficiency awareness and energy conservation behavior changes. EnergyStar Benchmarking of commercial buildings within the State will be a goal.

Program Category	**Transformational** Business **Commercial Facility Energy Audit & Benchmarking Tools & Support**
Project Milestones	The Hawaii Energy Tools & Support project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will establish One (1) or more collaborative relationship(s) with organizations that will provide Energy Audit & Benchmarking Tools for the purpose of educating or achieving energy savings. ☐ Hawaii Energy will provide materials in support of Two (2) or more large, or Three (3) or more small commercial facilities within the State. ☐ Hawaii Energy will facilitate expansion of EnergyStar Benchmarking programs currently being pursued by DBEDT and others within the State. ☐ At a minimum, One (1) facility will be located within Maui or Hawaii counties. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program.

5.3.3 Energy Resource Centers

Program Category	**Transformational** Business **Energy Resource Centers – Business**
Target Project	This is an emerging focus area where background study has been completed. This project will assist businesses who provide energy efficiency services to other businesses (BTB) or private homeowners, through funding for creation of energy resource centers. These Centers, based upon successful models from other communities, will provide facilities managers and businesses with access to equipment that can be used for audit and analysis of facility energy consumption. Equipment that provides benefit to business or residential customers will be considered for inclusion. Collaborative relationships will be sought when equipment resource availability can draw people in for additional contact. Economic Development Boards who actively reach out to community businesses will be considered as their activities provide opportunities for outreach and education related to resource availability. Other Hawaii Energy projects and programs may advertise resources available through the Energy Resource Centers, incorporating these resources when appropriate.
Program Impacts	Transformational Budget $ 136,489
Collaborative Groups	Hawaii Energy, Kuha'o Business Center, Island Economic Development Center. Others TBD
Project Goals	Provide support for Facilities, Building Managers and Businesses wishing to characterize and monitor facilities and equipment within facilities. Provide equipment useful to Transformational Projects including people involved with workforce development and facilities audit activities. Become established as a feature/capability that is viewed as a necessary benefit to attract businesses in to these facilities.

Program Category	**Transformational** Business **Energy Resource Centers – Business**
Project Milestones	The Energy Resource Centers project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will establish Two (2) or more energy resource centers that will make energy efficiency resources available to the community. ☐ Equipment will be identified, purchased, inventoried and placed in service. ☐ Hawaii Energy will document an inventory process and teach equipment holders its use. ☐ Hawaii Energy will establish a connection between training offered within other projects, such as Workforce and Education development projects, where Energy Resource Center items will be utilized, and education regarding proper usage provided. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.3.4 Hawaii State – Department of Education "Energy Ambassador" Development

Program Category	**Transformational** Business, Residential **Hawaii Department of Education** **Energy Ambassador Development**
Target Project	A new focus area, this program is being developed in which Students and Teacher/Mentors are engaged, within schools throughout the State, for the purpose of auditing school facilities. Tools and training are made available for the purpose. Education of students regarding energy auditing techniques will develop both a level of knowledge and awareness regarding energy conservation. While the direct benefit of this program is the school, through energy audit, Hawaii Energy will seek opportunities to extend the education and training that occurs within this program into energy conservation and behavioral changes within the home.
Program Impacts	Transformational Budget $ 261,780
Collaborative Groups	Hawaii Energy, Hawaii DOE, High & Intermediate School(s), Kupu, others TBD
Project Goals	Energy audits of schools throughout the State of Hawaii with actual energy savings opportunities identified. Linkages incorporated and provided to facilitate use of Hawaii Energy incentive funds to achieve savings opportunities identified.

Program Category	**Transformational** Business, Residential **Hawaii Department of Education** **Energy Ambassador Development**
Project Milestones	The Department of Education "Energy Ambassador" Development Project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will establish partnerships with Five (5) or more schools or complexes throughout the State. ☐ Participants of the Transformational Program Workforce Development project will be included to be eligible to receive hands on energy audit training. ☐ Where possible, facility wide electrical consumption data will be captured and real-time display will be made available and used within the program. ☐ Members of the identified school group(s), students, will be trained to understand and identify energy consumers within school facilities. ☐ Energy saving opportunities will be identified at each school. ☐ Energy saving behavioral opportunities will be considered and opportunities for change explored. Community Based Social Marketing will be considered as a means of properly conducting the pilot to achieve behavior change. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program.

5.3.5 Sustainable Energy Career Fair(s), Energy Expo, Rebuild Hawaii

Program Category	**Transformational** Business, Residential **Sustainable Energy Career Fair(s), Energy Expo, Rebuild Hawaii**
Target Project	A continuing focus, Hawaii Energy will seek partners to provide a career fair for Energy Efficiency Service Sector potential employees and employers. Government organizations such as DBEDT – The Department of Business Economic Development and Tourism along with DLIR – The Department of Labor and Industrial Relations, Vendors and Non-Profit Organizations will be sought as partners. The career fair will provide individuals with opportunities to talk with perspective employers. In addition, training sessions will be considered which provide instruction for job seekers as well and educational opportunities for those in the industry. Training will be provided to employers that increases their awareness and understanding of value in hiring individuals with knowledge in energy efficiency and conservation.
Program Impacts	Transformational Budget $ 78,534
Collaborative Groups	Hawaii Energy, DLIR - Department of Labor and Industrial Relations, UH Manoa, UH Community College(s), DBEDT – Department of Business Economic Development and Tourism
Project Goals	Hawaii Energy will collaborate with a community college for the purpose of sponsoring a career fair, much like the one held at LCC during PY 2011. This career fair will provide an opportunity for employers and employees to connect and will provide training to both for the purpose of increasing energy efficiency and conservation awareness. In addition, Hawaii Energy will facilitate the on-going success of Rebuild Hawaii.

Program Category	**Transformational** Business, Residential **Sustainable Energy Career Fair(s), Energy Expo, Rebuild Hawaii**
Project Milestones	The Hawaii Energy, Energy Efficiency Service Sector Career Fair project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will establish a partnership with Two (2) or more organizations for the purpose of hosting an EESS career fair. ☐ The career fair will connect training programs with business and individuals. ☐ At least Two (2) Educational "modules" will be provided during the event. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.3.6 University Targeted Interactive Education, Competition – Kukui Cup

Program Category	**Transformational** Business, Residential **University Targeted Interactive Education, Competition** **Kukui Cup**
Program Target	This project, begun with limited support in PY11, will engage the UH Manoa Computer Science Department that has developed and performed a program referred to as the Kukui Cup. The Kukui Cup was performed during Fall 2011 at the Hale Aloha dorms at UH Manoa. During Fall 2012, the Kukui Cup will be performed at UH Manoa within the Hale Aloha and East West Center dorms as well as dorms within HPU, Hawaii Pacific University. The Kukui Cup program involves real-time electrical monitoring, educational events, energy related field trips and a smart grid game, all of which provide students the opportunity to perform tasks and participate in educational activities related to energy. The underlying goal of the program is energy awareness and behavior change that results in present year energy savings within dorm facilities.
Program Impacts	Transformational Budget $ 47,120
Collaborative Groups	Hawaii Energy, HPU, UH Manoa – Kukui Cup
Program Goals	Perform the Kukui Cup program at multiple dorm locations in the Fall of 2012. This program teaches energy concepts to participants and monitors and encourages energy usage reduction in dorm facilities toward program goals.

Program Category	**Transformational** Business, Residential **University Targeted Interactive Education, Competition** **Kukui Cup**
Project Milestones	The Hawaii Energy, UH Manoa, Hawaii Pacific University Kukui Cup project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will continue efforts to develop and maintain partnerships that facilitate contribution to the Kukui Cup program including efforts with UH Manoa and HPU as well as possible work with BYUH. ☐ The Kukui Cup program will be performed within at least Three (3) dormitory buildings. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.3.7 Video Programming Net Zero, PSAs, etc. (O'lelo)

Program Category	**Transformational** Business, Residential **Net Zero Home Analysis, Demonstration and Advertising**
Target Project	An emerging focus area, Hawaii Energy will facilitate (with other collaborative organizations) development of a television program, similar in nature to the Blue Planet Foundation "Home Energy Makeover". The program developed will focus on Net Zero homes within the State. Multiple Net Zero homes in various stages of construction will be identified. Energy efficiency features of each home, along with "Net Zero" concepts related to electrical connection and electric utility billing and interactions.
Program Impacts	Transformational Budget $ 47,120
Collaborative Groups	Hawaii Energy, Blue Planet Foundation, Builders Industry Association (BIA), Builder(s) within the State of Hawaii engaged in new construction or construction of Net Zero homes.
Project Goals	Through collaboration with others, Hawaii Energy will seek to increase awareness of issues and opportunities associated with construction of a Net Zero home. Energy efficiency features will be outlined and highlighted. This project will seek to achieve wide media distribution through cable and on-line channels.
Project Milestones	The Hawaii Energy Net Zero Home project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will establish a partnership with One (1) or more organizations involved in design and/or construction of Net Zero homes within the State of Hawaii. ☐ Through this partnership Hawaii Energy will identify Net Zero homes in various stages of construction. ☐ A show, documentary in nature, will be developed for television and on-line viewing. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program.

5.4 Education Programs

The Hawaii Energy Transformational Program will pursue projects that provide opportunities for grades 5-12 students to develop science, technology, engineering and math (STEM) skills. These projects work to prepare tomorrow's workforce through educational development within the STEM arena. They also seek to facilitate development and awareness of Energy Efficiency Service Sector (EESS) career opportunities prior to student entry into University.

At the grades 5-12 level there are two primary goals, first to develop the STEM skills and further the interest necessary to ensure sufficient science and engineering students will be available in the future. The science and engineering field continues to grow as the U.S. Department of Labor predicts jobs requiring science, engineering and technical training will increase 34% between 2008 and 2018. The second goal is to provide an opportunity for the primary school students to develop these STEM skills through application of energy efficiency and energy conservation related projects.

These primary school workforce pipeline development efforts, combined with efforts targeted at Technical Schools, Community Colleges, the University and in Certification Courses work to address issues identified in the EESS Workforce Education and Training Needs report from Lawrence Berkeley Laboratories. This report identified a need to quickly develop and implement new education and training programs to increase the skills of those already active in the field and to help prepare new EESS employees and to also address the point that a *"key challenge for the EESS is that many engineering graduates are unaware of the EESS and the potential career opportunities in this sector."*

Through application of funds both at the K-12 grade level and at the University and beyond, Hawaii Energy will seek to educate those who are capable of performing EESS functions in the very near future as well as those who may fill the pipeline to develop students for careers in the energy efficiency service sector of the future.

5.4.1 Teacher Workforce Development – Energy Education Development

Program Category	**Transformational** **Residential**, *Business* **Teacher - Energy Education Development**
Target Project	A continuing focus area, the NEED project works to promote an energy conscious and educated society by creating an effective network of educators, students, business, government and community leaders to design and deliver objective, multi-sided energy education programs. NEED.org will be engaged for the purpose of bringing NEED developed energy and energy efficiency curriculum to Hawaii schools, teachers and students NEED will also be engaged to manage a teacher/student grant program receiving and reviewing grant proposals, issuing funds and gathering data. http://www.need.org/needpdf/Elementary%20Energy%20Infobook.pdf
Program Impacts	Transformational Budget $ 209,424
Collaborative Groups	Hawaii Energy, National Education Development Project
Project Goals	Grades 5-12 workforce development through partnership with the National Energy Education Development Project will be established and NEED.org will establish contact(s) with schools and teachers throughout the State of Hawaii. NEED.org will present 5 teacher training professional development days during which NEED developed energy efficiency and science of energy curriculum will be presented. NEED curriculum project kits will be distributed to teachers for student and teacher use. Maui, Hawaii Island and Oahu will each have scheduled training sessions. A goal of training an additional 200 teachers will be set, with the expectation that 100% of the trained teachers will make use of the materials within 2 or 3 classes thereby engaging between 12,000 and 18,000 students overall.
Program Category	**Transformational** Residential, *Business* **Teacher – Energy Education Development**

Project Milestones	The Hawaii Energy NEED.org project will be considered a success when the following milestones have been achieved. ☐ Minimum of Four (4) NEED.org teacher development energy education workshops are organized and held within the State of Hawaii. ☐ A minimum of One (1) NEED workshop is be held in each program county, Honolulu, Maui and Hawaii. ☐ Between 120 and 200 eligible and representative individuals will be invited to attend the educator workforce development workshops and receive NEED.org energy efficiency curriculum and material. ☐ Trained educators bring NEED.org materials into the classroom and use curriculum to engage students in energy efficiency studies. Metrics will be captured and analyzed. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.4.2 Educational Energy Audit & Benchmarking Tools and Support

Program Category	**Transformational** Residential, *Business* **Energy Management Tools & Learning Devices**
Program Target	A continuing focus area with additional locations, this project will focus on Hawaii Schools, public, charter and private for grades 5 through 12. The project includes purchase of devices including the Belkin Conserve Insight energy-use monitor and other tools that are to be used in science, math and green club projects to provide exposure to and experience with energy efficiency to these children prior to high school graduation. These tools will become the property of the school to be used year to year for similar projects. We will create energy project guidance with these tools that is simple for the teachers to use and effective at teaching energy efficiency and conservation concepts through math and science. Teachers will be provided with a Hawaii Energy point of contact for follow-up questions. A successful similar project from PY11 was performed at Pahoa High and Intermediate School and will be replicated in at least three other schools. This project included students using a Belkin Conserve Insight to measure energy consumption of items within their homes. The students then perform a math and science project in the classroom to analyze the data collected.
Program Impacts	Transformational Budget $ 20,942
Collaborative Groups	Hawaii Energy, TBD – School Green Clubs
Program Goals	This project, together with other 5-12 grade programs discussed, will create energy based STEM projects in schools that shall be used for years to follow to increase engagement of students to understand energy efficiency concepts and reduce energy consumption.

Program Category	**Transformational** Residential, *Business* **Energy Management Tools & Learning Devices**
Project Milestones	The Hawaii Energy Management Tools & Learning Devices project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will provide materials in support of Three (3) or more schools within the State. ☐ At a minimum Two (2) schools will be located on neighbor islands, One (1) school will be located within each county. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.5 Residential Programs

5.5.1 University of Hawaii Community Colleges – Audit Certifications

Program Category	**Transformational** Business, Residential **University of Hawaii Community Colleges** **Audit Certifications**
Target Project	An emerging focus area, financial support of workforce development courses including Building Operator Certification and other courses resulting in certification of participants will be implemented The courses will be included in a program from Leeward Community College, called the Green Mechanical Council Certification Series, that provides incremental certification(s) with up to 800 contact hours producing the final over arching certification. The series provides curriculum, train-the-trainer training and support. In addition, a "house on wheels" supports training activities. This "house" provides many elements available in a residential home and facilitates hands on training for testing of the various elements of the home.
Program Impacts	Transformational Budget $ 188,482
Collaborative Groups	Hawaii Energy, University of Hawaii, Hawaii Community Colleges
Project Goals	With University of Hawaii Community Colleges, develop and offer work force certification courses and a certification path that leads to a more capable EESS workforce.

Program Category	**Transformational** Business, Residential **University of Hawaii Community Colleges** **Audit Certifications**
Project Milestones	The Hawaii Energy / University of Hawaii Community Colleges Green Mechanical Council Residential Audit Certification program will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will establish One (1) or more collaborative relationship(s) with organizations capable of implementing energy efficiency training. ☐ Hawaii Energy, in partnership with this/these organizations will offer financial support to the implementation of the Certification series. ☐ Hawaii Energy will determine the total population eligible and ensure access is available for eligible participants. Hawaii Energy will assess penetration within first year pilot. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program.

5.5.2 Energy Efficiency through Financial Literacy

Program Category	**Transformational** Residential **Energy Efficiency through Financial Literacy**
Program Target	A continuing and expanding focus area, teaching Residential Hard to Reach individuals and other residential groups such as Condo dwellers Energy Efficiency training combined with Financial Literacy and budgeting concepts. A direct tie is made between financial well being and electrical expenditure. Energy efficiency concepts are taught and energy savings measures explained. Hard to reach individuals are contacted through Public Housing, Hawaiian Homelands Communities and Community Organizers. In the second year of collaboration, the project will refine presentation materials, evaluation and behavioral change implications.
Program Impacts	Transformational Budget $ 209,424
Collaborative Groups	Hawaii Energy, Helen N Wai LLC, Kuha'o Business Center, The Kohala Center, Public Housing, Hawaiian Homeland Communities, Department of Hawaiian Homelands, etc.
Program Goals	Change energy efficiency behavior by providing energy efficiency motivation through financial literacy presentations and training. The program has a goal of establishing contact with additional community leaders and building relationships that provide opportunities to present energy efficiency information and training within low income communities.

Program Category	**Transformational** Residential **Energy Efficiency through Financial Literacy**
Project Milestones	The Energy Efficiency through Financial Literacy project will be considered a success when the following milestones have been achieved. ☐ Hawaii Energy will establish a partnership with One (1) or more organizations involved in performing financial literacy training within the State of Hawaii. ☐ A combined financial literacy, energy efficiency presentation will be refined including behavioral change intentions, for presentation within target communities. ☐ A network of residential communities will be identified. This network shall include an additional minimum of Five (5) distinct communities with a minimum of Ten (10) distinct course locations. ☐ Presentation of prepared materials will be presented at minimum Ten (10) times. This will include at minimum Two (2) times on each island represented by the Hawaii Energy program. ☐ This project will reach more than 1,000 residential individuals. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program. ☐ See Appendix F for further details.

5.5.3 Residential Home Rating System Analysis & Pilot

Program Category	**Transformational** Residential **Residential Home Energy Rating System Analysis & Pilot**
Program Target	Hawaii Energy will explore and seek to deploy a residential home rating system program that provides a mechanism for grading homes relative to their energy efficiency measures. A means for drawing this into use within the community will be explored. One such possibility to be explored might involve training of household inspectors and auditors in the use and application of a home energy grading method then engaging brokers and realtors representing both buyers and sellers and encouraging application of energy grading as a value add for buyers and sellers via an MLS provider, as a required element of inspection or appraisal for buyers.
Program Impacts	Transformational Budget $ 78,534
Collaborative Groups	Hawaii Energy, EEFG, PECI, To Be Determined
Program Goals	Hawaii Energy will research available home rating systems with the goal of developing an understanding of options and identifying a small number for consideration and deployment within Hawaii. Hawaii Energy will seek to understand programs implemented elsewhere and develop an understanding of how to integrate within communities in Hawaii. Hawaii Energy will seek to deploy the program in pilot form.

Program Category	**Transformational** Residential **Residential Home Energy Rating System Analysis & Pilot**
Project Milestones	The Residential Home Rating System Analysis & Pilot program will seek primarily to develop an understanding of alternatives and implementation techniques used in other communities across the country. ☐ Hawaii Energy will establish a partnership with One (1) or more organizations that have developed and implemented a home rating system. ☐ The home rating system concept will be discussed with broker/realtor organizations and appraisal and inspection groups. ☐ Interest and buy-in of energy rating concepts will be evaluated. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program.

5.6 Program Support

Services in this category cross all programs for the purpose of enhancing effectiveness and efficiency of programs, best use of ratepayer dollars, and maximizing participation by eligible groups and individuals.

5.6.1 Workforce Development Course Marketing, Project Outreach and Communications

Program Category	**Transformational** Residential, Business **Workforce Development Course Marketing, Project Outreach and Communication(s)**
Program Target	This marketing effort will work towards marketing, outreach and communications in support of Hawaii Energy Transformational Program Goals. Marketing efforts will focus on raising awareness regarding courses being offered for the purpose of increasing the reach and impact of the transformational program. Transformational outreach and communications will raise awareness for programs to engage people and draw them into potential transformative action. CBSM will be used to analyze potential marketing opportunities and efforts to meet these targets.
Program Impacts	Transformational Budget $ 0 *(to be funded with surplus PY11 incentives, if approved)*
Collaborative Groups	Hawaii Energy, Leader's Wisdom, MVNP
Program Goals	Expand reach and impact of transformational program offerings through marketing and communications. Increase linkage between individual transformational programs and between transformational and incentive based programs within Hawaii Energy.

Program Category	**Transformational** Residential, Business **Workforce Development Course Marketing, Project Outreach and Communication(s)**
Project Milestones	The transformational Workforce Development Course Marketing, Project Outreach and Communication(s) program will establish and continue efforts within organizations that perform outreach and communications. ☐ Hawaii Energy will establish Two (2) or more collaborative vendor relationships with organizations that perform community based social marketing and change management. ☐ Hawaii Energy, in conjunction with these vendors, will develop a transformational marketing strategy that will increase the impact of its programs and awareness of the energy conservation goals. ☐ A minimum of Two (2) PY12 Hawaii Energy programs will be designed and implemented using CBSM and change management approaches. ☐ All current programs from PY11 that are continued will be evaluated and considered for potential improvement using change management and CBSM approaches, in order to maximize ratepayer dollar expenditures. ☐ Project metrics will be established, captured and reviewed in the process of analyzing and improving the PY 2012 Transformational Program.

5.6.2 Project Assessment, Directed Improvement, Analysis

Program Category	**Transformational** Residential, Business **Project Assessment, Directed Improvement, Analysis**
Program Target	All Hawaii Energy Transformational Programs will be monitored and reviewed for the purpose of analyzing program and project targets, project goals, project metrics and for performing surveys and other types of analysis for the purpose of improving program impact. In addition, effort will be put forth for the purpose of identifying second order effects in program and project where individuals trained reach beyond what they are being trained to do and into family, friend or business relationships to share what they have learned. Linkages between transformational programs and Hawaii Energy incentive based activities will be sought. Linkages that can and should be made to other programs within Hawaii Energy to create synergies.
Program Impacts	Transformational Budget $ 94,241
Collaborative Groups	Hawaii Energy, Leader's Wisdom, Community Based Social Marketing Expert(s), Energy Efficiency Agencies Nationwide
Program Goals	Provide thorough analysis of on-going transformational projects; establish new metrics and review status and performance. Work with organizations to ensure data is being captured. Monitor programs and identify areas in which modification will produce improved results.
Project Milestones	The Project Assessment, Directed Improvement and Analysis efforts will be performed throughout the Transformational Program. Analysis of projects, review of status and metrics will provide a basis for improving project effectiveness and impact. Community Based Social Marketing techniques will be used to further identify keys to project success.

5.6.3 Engineering Research, Development, Energy Consumption Analysis

Program Category	**Transformational** Residential, Business **Engineering Research, Development** **Energy Consumption Analysis**
Program Target	The Hawaii Energy Transformational Program will require engineering analysis for development and implementation of many of the transformational efforts. Engineering efforts may be project specific, such as evaluation of tools to provide in lending libraries, analysis of course opportunities or more general, such as the analysis of energy consumption within zip codes throughout the State.
Program Impacts	Transformational Budget $ 0 *(to be funded with surplus PY11 incentives, if approved)*
Collaborative Groups	Hawaii Energy, Association for Energy Engineers, Energy Engineering Consultant(s), TBD
Program Goals	Provide engineering support for the Hawaii Energy Transformational Program.
Project Milestones	Provide services such as the following: • Evaluation to identify which tools to provide in lending libraries • Analysis of potential course opportunities to fund • Analysis of energy consumption within zip codes throughout the State • Other research and development as required to support transformation projects The engineering research and development project works in support of the Hawaii Energy program and in support of goals and milestones of other projects specified within this document.

6.0 PROGRAM BUDGET SUMMARY FOR PY12

Below is a summary of the PY12 Budget.

Hawaii Energy Efficiency Program Annual Plan Budget
July 1, 2012 through June 30, 2013

Activity	Non-Incentive	Incentive	Total
Residential Programs			
REEM	2,684,143	7,718,682	10,402,826
CESH	27,881	10,500	38,381
RESM	103,237	847,500	950,737
RHTR	103,238	1,159,991	1,263,228
Total Residential Programs	**2,918,499**	**9,736,673**	**12,655,172**
Residential Market Evaluation	**127,300**	**0**	**127,300**
Residential Outreach	**659,858**	**0**	**659,858**
Total Residential Services and Initiatives	**3,705,657**	**9,736,673**	**13,442,330**
Business Programs			
BEEM	1,311,945	6,222,730	7,534,675
CBEEM	760,957	974,000	1,734,957
BESM	551,575	3,513,647	4,065,222
BHTR	475,475	1,190,000	1,665,475
Total Business Programs	**3,099,952**	**11,900,377**	**15,000,329**
Business Market Evaluation	**255,550**	**0**	**255,550**
Business Outreach	**1,173,635**	**0**	**1,173,635**
Total Business Services and Initiatives	**4,529,137**	**11,900,377**	**16,429,514**
Total Residential and Business Services and Initiatives	**8,234,794**	**21,637,050**	**29,871,844**
Transformational Programs			
Residential Transformational Programs	0	1,069,797	1,069,797
Business Transformational Programs	0	1,307,529	1,307,529
Total Transformation Services and Initiatives	**0**	**2,377,326**	**2,377,326**
Total Supporting Services	**2,091,908**	**0**	**2,091,908**
Total Tax on Non-Incentive	**486,594**	**0**	**486,594**
Estimated Contractor Costs	**10,813,296**	**24,014,376**	**34,827,672**

Upon request, Hawaii Energy can provide further detail of incentive rebate expenses. Formal changes to the budget (Appendix A and summarized above) will be in accordance with contract Amendment #4, dated 05 April 2011.

7.0 PERFORMANCE INCENTIVE GOALS AND INCENTIVE FRACTIONS PY12

7.1 Performance Incentive Fractions

The following table shows the PY12 Performance Incentive Fractions as contained in the supplemental contract covering the PY11 and PY12 budget and are further applied in Section 7.2 below.

PERFORMANCE INCENTIVE FRACTIONS	
Performance Target Category	**Performance Incentive Fractions**
Energy (kWh)	35%
Peak Demand (kW)	5%
Total Resource Benefits ($)	40%
Transformation Infrastructure Development	10%
Broad Participation (Island Equity)	10%

7.2 Performance Incentive Goals

The following table shows the PY12 Program Performance Goals and Incentives as contained in the supplemental contract covering the PY12 budget. The transition between Minimum, Target and Maximum shall be calculated on a linear basis for both goals and awards where appropriate.

PY12 Performance Goals and Incentives									
Performance Target	*Performance Goals*					*Performance Incentive Awards*			
		Minimum	**Target**	**Maximum**		**% of Target**	**Minimum**	**Target**	**Maximum**
Energy		88,169,207	117,558,943	129,314,837	kWh	35%	$183,750	$245,000	$303,188
Peak Demand		13,328	17,771	19,548	kW	5%	$26,250	$35,000	$43,313
Total Resource Benefit		$100,747,807	$125,934,759	$151,121,711	$	40%	$224,000	$280,000	$346,500
Transformation Infrastructure Development	Substantially accomplish at least two Annual Plan Transformational Tasks in each of the four categories, including: Government, Business & Industry, Education and Residential; 1% of the Target incentive will be awarded for each Task accomplished up to 10%.					10%	N/A	$70,000	N/A
Broad Participation (Island Equity)	Maui	$2,505,053	$3,131,316	$3,757,579	Incentives	10%	N/A	$70,000	N/A
	Hawaii	$2,403,231	$3,004,039	$3,604,846	Incentives				
	Honolulu	$14,311,217	$17,889,021	$21,466,825	Incentives				
Total			$24,014,376 Incentives			100%		$700,000	

8.0 CONCLUSION

The Hawaii Energy Team is projecting strong energy savings results for PY11 (ending June 30, 2012). This is even though tighter TRM energy savings standards, market saturation and a slow economy are making it increasingly difficult to find low cost energy savings opportunities.

The sobering news is that our past accomplishments are no guarantee that we will achieve the more challenging energy savings needed going forward to meet the state's clean energy goals. Our ultimate clean energy success will require continuous innovation and improvement of our efficiency technologies, energy awareness education and program strategies to ensure that we stay ahead of our goals. The Hawaii Energy pledge is to engage these requirements with the best effort possible.

For PY12, the Hawaii Energy Team will continue the transparency, integrity, cost-effectiveness, innovation and singular focus on saving energy for Hawaii that have been the key hallmarks of our tenure as Hawaii's first independent Public Benefit Fee Administrator. Working under the PUC's leadership, together with our allies, government agencies, utilities and utility customers, we look forward to being a major catalyst and contributor to Hawaii's successful climb to a clean energy future.

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The Hawaii Energy Team

9.0 APPENDICES

Appendix A – Program Budget PY12 (Full Version)

Appendix B – Summary Presentation of Programs

Appendix C – TRB Utility Benefit Values

Appendix D – Synopsis of Transformational Programs in PY11

Appendix E – Transformational Project Budget Details

Appendix F – Proposed Transformational Tasks & Milestones in the Context of PY11

Appendix A – Program Budget (Full Version)

Hawaii Energy Efficiency Program Annual Plan Budget - June 28, 2012	PY12 Budget
Residential Programs	
Residential Program Ops and Management	
REEM	2,684,143
CESM	27,881
RESM	103,237
RHTR	103,238
Subotal Residential Programs	2,918,499
Residential Market Evaluation	127,300
Residential Outreach	659,858
Total Residential Non-Incentive	3,705,657
Residential Incentives	
REEM	7,718,682
CESM	10,500
RESM	847,500
RHTR	1,159,991
Subtotal Residential Incentives	9,736,673
Residential Transformational	1,069,797
Total Residential Incentives	*10,806,470*
Total Residential Programs	**14,512,127**
Business (C&I) Programs	
Business Programs Ops and Management	
BEEM	1,311,945
CBEEM	760,957
BESM	551,575
BHTR	475,475
Subtotal Business Programs	3,099,952
Business Evaluation	255,550
Business Outreach	1,173,635
Total Business Non-Incentive	4,529,137
Business Incentives	
BEEM	6,222,730
CBEEM	974,000
BESM	3,513,647
BHTR	1,190,000
Subotal Business Incentive	11,900,377
Business Transformational	1,307,529
Total Business Incentives	13,207,906
Total Business Programs	**17,737,043**
Supporting Services	
Supporting Services	2,091,908
Total Supporting Services	**2,091,908**
Subtotal Non-Incentive (Prior to Tax)	10,326,702
Less Performance Incentives (Prior to Tax)	(700,000)
Subtotal Non-Incentive Less Performance Incentives (PI)	9,626,702
Total Tax on Non-Incentive Without PI	486,594
Performance Incentive Award (Inclusive of Tax)	700,000
Subtotal Non-Incentive Billed	*10,813,296*
Subtotal Residential and Business Customer Incentives	*21,637,050*
Subtotal Transformational Incentives	*2,377,326*
Subtotal Customer and Transformational Incentives	*24,014,376*
Sub-Total Estimated Contractor Costs	***34,827,672***
Performance Awards in Excess of Target Levels	133,000
Total Estimated Contractor Costs, including Performance Awards in Excess of Target Levels	**34,960,672**

Appendix B – Summary Presentation of Programs

Hawaii Energy - PY2012 ANNUAL PLAN - SUMMARY PRESENTATION OF PROGRAMS BY MEASURE

Combined Programs		Budget	Plan					kW	kWh	$/kWh		TRB
Residential	45%	$ 9,736,673	$ 9,736,673	$ (0)	SWH	4,000	59.2%	10,007	71,819,271	$ 0.136		
Business	55%	$ 11,900,377	$ 11,900,377	$ -	SWH*	484	40.8%	6,889	46,163,535	$ 0.258		
Bottom Up Program Impacts		$ 21,637,050	$ 21,637,050	$ (0)	CFL	1,410,900		16,896	117,982,806	$ 0.183	100.4%	$ 135,033,615
Top Down from Budget Table		$ 21,637,050					Target Impact Levels	16,404	117,558,943	$ 0.184		$ 122,689,141

Residential Programs

Residential Target	$ 9,736,673										
Difference											
Residential Plan	$ 9,736,673				10,007		71,819,271	$ 0.136			$ 72,451,707

Program	Category	Measures	Count	Units	Average Incentive per Unit	Estimated Budget	% Total Program	kW/Unit	kWh/Unit	TRM Reference	$/Lifetime kWh	System Loss	Free Rider	Effective kWh	Program Cost per kWh	kW	% Total Program	kWh	% Total Program	Life	TRB kW	TRB kWh	TRB	% Total Program
REEM	***Residential Energy Efficiency Measures***					**$ 7,718,682**	**36%**								**$ 0.12**	**8,854**	**52%**	**65,062,032**	**55%**				**$ 64,015,578**	**47%**
	High Efficiency Water Heating					$ 3,166,500	15%								$ 0.434	1,594	9%	7,304,272	6%				$ 17,153,970	13%
		Solar Water Heater (SWH) Incentive	3,750	systems	$ 750	$ 2,812,500	13%	0.4600	2,066.0	8.1.1	$ 0.018	10.7%	0.73	1,669.56	$ 0.45	1,394	8%	6,260,832	5%	20.0	$ 4,731	$ 1.39	$ 15,328,063	11%
		Solar Water Heater Interest Buydown	250	systems	$ 1,000	$ 250,000	1%	0.4600	2,066.0	8.1.2	$ 0.024	10.7%	0.73	1,669.56	$ 0.60	93	1%	417,389	0%	20.0	$ 4,731	$ 1.39	$ 1,021,871	1%
		Solar Water Heater Energy Hero Gift Packs	400	kits	$ 35	$ 14,000	0%	0.0491	245.9	8.1.3	$ 0.028	10.7%	0.73	198.71	$ 0.18	16	0%	79,486	0%	5.0	$ 1,629	$ 0.48	$ 64,238	0%
		Heat Pumps	450	units	$ 200	$ 90,000	0%	0.2500	1,503.0	8.1.4	$ 0.013	10.7%	0.73	1,214.59	$ 0.16	91	1%	546,565	0%	10.0	$ 2,932	$ 0.87	$ 739,798	1%
	High Efficiency Lighting					$ 2,082,682	10%								$ 0.049	5,862	35%	42,527,335	36%				$ 35,405,286	26%
		CFLs	1,410,900	lamps	$ 0.98	$ 1,382,682	6%	0.0050	36.3	8.2.1	$ 0.004	10.7%	0.73	29.33	$ 0.03	5,701	34%	41,387,900	35%	6.0	$ 1,918	$ 0.57	$ 34,447,944	26%
		LED	100,000	lamps	$ 7	$ 700,000	3%	0.0020	14.1	8.2.2	$ 0.083	10.7%	0.73	11.39	$ 0.61	162	1%	1,139,435	1%	6.0	$ 1,918	$ 0.57	$ 957,343	1%
	High Efficiency Air Conditioning					$ 162,500	1%								$ 0.168	200	1%	964,398	1%				$ 1,705,580	1%
		VRF Split System AC	200	units	$ 200	$ 40,000	0%	0.5000	2,500.0	8.3.2	$ 0.005	10.7%	0.73	2,020.28	$ 0.10	81	0%	404,055	0%	15.0	$ 3,935	$ 1.16	$ 786,797	1%
		Ceiling Fans	2,500	units	$ 40	$ 100,000	0%	0.0190	167.0	8.3.3	$ 0.048	10.7%	0.73	134.95	$ 0.30	38	0%	337,386	0%	5.0	$ 1,629	$ 0.48	$ 225,461	0%
		Solar Attic Fans	150	units	$ 50	$ 7,500	0%	-	502.0	8.3.4	$ 0.005	10.7%	0.73	405.67	$ 0.12	-	0%	60,851	0%	20.0	$ 4,731	$ 1.39	$ 84,877	0%
		Whole House Fans	200	units	$ 75	$ 15,000	0%	0.5000	1,003.0	8.3.5	$ 0.004	10.7%	0.73	810.53	$ 0.09	81	0%	162,107	0%	20.0	$ 4,731	$ 1.39	$ 608,445	0%
	High Efficiency Appliances					$ 1,342,500	6%								$ 0.196	359	2%	6,834,218	6%				$ 8,646,154	6%
		Refrigerator (<$600)	750	units	$ 50	$ 37,500	0%	0.0170	105.0		$ 0.034	10.7%	0.73	84.85	$ 0.59	10	0%	63,639	0%	14.0	$ 3,754	$ 1.11	$ 109,132	0%
		Refrigerator with Recycling	6,000	units	$ 125	$ 750,000	3%	0.0340	822.0	8.4.1	$ 0.011	10.7%	0.73	664.27	$ 0.19	165	1%	3,985,599	3%	14.0	$ 3,754	$ 1.11	$ 5,031,420	4%
		Freezer with Recycling	1,000	units	$ 125	$ 125,000	1%	0.0340	859.0		$ 0.010	10.7%	0.73	694.17	$ 0.18	27	0%	694,166	1%	14.0	$ 3,754	$ 1.11	$ 871,674	1%
		Garage Refrigerator / Freezer Bounty	1,500	units	$ 75	$ 112,500	1%	0.0340	859.0	8.4.1	$ 0.006	10.7%	0.73	694.17	$ 0.11	41	0%	1,041,250	1%	14.0	$ 3,754	$ 1.11	$ 1,307,510	1%
		Clothes Washer (Tier II/III)	5,000	units	$ 50	$ 250,000	1%	0.0280	206.0	8.4.1	$ 0.022	10.7%	0.73	166.47	$ 0.30	113	1%	832,353	1%	11.0	$ 3,155	$ 0.93	$ 1,131,953	1%
		Pool VFD Controller Pumps	450	units	$ 150	$ 67,500	0%	0.0060	597.3	8.4.2	$ 0.025	10.7%	0.73	482.69	$ 0.31	2	0%	217,211	0%	10.0	$ 2,932	$ 0.87	$ 194,465	0%
	Energy Awareness, Measurement and Control Systems					$ 964,500	4%								$ 0.130	838	5%	7,431,808	6%				$ 1,104,588	1%
		Room Occupancy Sensors	300	units	$ 5	$ 1,500	0%	0.0046	20.8	8.5.1	$ 0.030	10.7%	0.73	16.81	$ 0.30	1	0%	5,042.6	0%	8.0	$ 2,453	$ 0.73	$ 6,393	0%
		Peer Group Comparison	75,000	homes	$ 11.84	$ 888,000	4%	0.0137	120.4	8.5.2	$ 0.098	10.7%	0.73	97.28	$ 0.12	833	5%	7,295,852.0	6%	1.0	$ 339	$ 0.10	$ 1,041,122	1%
		Whole House Energy Metering	750	units	$ 100	$ 75,000	0%	0.0070	216.0	8.5.3	$ 0.116	10.7%	0.73	174.55	$ 0.57	4	0%	130,913.8	0%	4.0	$ 1,323	$ 0.39	$ 57,073	0%
CESH	**Custom Energy Solutions for the Home**					**$ 10,500**	**0%**								**$ 0.37**	**28**		**28,284**	**0%**				**$ 59,727**	**0%**
	Target Cost Request for Proposals					$ 10,500	0%								$ 0.371	28	0%	28,284	0%				$ 59,727	0%
		Custom Packaged Proposals (units in kWh)	35,000	kWh	$ 0.30	$ 10,500	0%	0.0010	1.0	9.1.1	$ 0.060	10.7%	0.73	0.81	$ 0.37	28	0%	28,284	0%	5.0	$ 1,629	$ 0.48	$ 59,727	0%
RESM	**Residential Energy Services & Maintenance**					**$ 847,500**	**4%**								**$ 0.55**	**289**	**2%**	**1,553,026**	**1%**				**$ 2,641,235**	**2%**
	Residential Direct Installation					$ 12,500	0%								$ 0.619	20		20,203					$ 57,405	
		TBD	25,000	kWh	$ 0.50	$ 12,500	0%	0.0010	1.0		$ 0.071	10.7%	0.73	0.81	$ 0.62	20	0%	20,203	0%	7.0	$ 2,193	$ 0.65	$ 57,405	0%
	Residential Design and Audits					$ 780,000	4%								$ 0.555	251	1%	1,406,111	1%				$ 2,511,414	2%
		Efficiency Inside Home Design	750	Homes	$ 1,000	$ 750,000	3%	0.4000	2,200.0	10.2.1	$ 0.030	10.7%	0.73	1,777.84	$ 0.56	242	1%	1,333,382	1%	15.0	$ 3,935	$ 1.16	$ 2,501,039	2%
		Hawaii Energy Hero Audits	300	Audits	$ 100	$ 30,000	0%	0.0342	300.0	10.2.3	$ 0.333	10.7%	0.73	242.43	$ 0.41	8	0%	72,730	0%	1.0	$ 339	$ 0.10	$ 10,375	0%
	Residential System Tune-Ups					$ 55,000	0%								$ 0.434	18	0%	126,712	0%				$ 72,416	0%
		Central AC Maintenance	100	Tune Ups	$ 50	$ 5,000	0%	0.0740	323.0	10.3.1	$ 0.155	10.7%	0.73	261.02	$ 0.19	6	0%	26,102	0%	1.0	$ 339	$ 0.10	$ 4,741	0%
		Solar Water Heater Tune Up	500	Tune Ups	$ 100	$ 50,000	0%	0.0290	249.0	10.3.2	$ 0.080	10.7%	0.73	201.22	$ 0.50	12	0%	100,610	0%	5.0	$ 1,629	$ 0.48	$ 67,675	0%
RHTR	***Residential Hard to Reach***					**$ 1,159,991**	**5%**								**$ 0.22**	**836**	**5%**	**5,175,930**	**4%**				**$ 5,735,168**	**4%**
	Energy Efficiency Equipment Grants					$ 508,688	2%								$ 0.117	609		4,363,608					$ 3,533,116	
		Solar Inspections (WAP)	450	Inspections	$ 95	$ 42,750	0%	0.0460	206.6	11.1.1	$ 0.092	10.7%	0.73	166.96	$ 0.57	17	0%	75,130	0%	5.0	$ 1,629	$ 0.48	$ 63,530	0%
		Energy Hero Gift Packs	2,000	Packs	$ 40	$ 80,000	0%	0.0491	245.9	11.1.2	$ 0.033	10.7%	0.73	198.71	$ 0.20	79	0%	397,428	0%	5.0	$ 1,629	$ 0.48	$ 321,191	0%
		CFL Exchange	125,000	Lamps	$ 2.49	$ 310,938	1%	0.0050	37.8	11.1.3	$ 0.011	10.7%	0.73	30.55	$ 0.08	505	3%	3,818,320	3%	6.0	$ 1,918	$ 0.57	$ 3,138,021	2%
		Hawaii Energy Hero Audits	300	Audits	$ 250	$ 75,000	0%	0.0342	300.0	11.1.4	$ 0.833	10.7%	0.73	242.43	$ 1.03	8	0%	72,730	0%	1.0	$ 339	$ 0.10	$ 10,375	0%
	Landlord, Tenant, AOAO Measures					$ 651,303	3%								$ 0.802	227		812,322					$ 2,202,051	2%
		Hawaii Energy Hero Landlord Program	5,212	kWh	$ 0.25	$ 1,303	0%	0.0010	1.0	11.2.1	$ 0.017	10.7%	0.73	0.81	$ 0.31	4	0%	4,212	0%	15.0	$ 3,935	$ 1.16	$ 21,459	0%
		Custom SWH Proposals (units in kWh)	1,000,000	kWh	$ 0.65	$ 650,000	3%	0.0003	1.0		$ 0.033	10.7%	0.73	0.81	$ 0.80	223	1%	808,110	1%	20.0	$ 4,731	$ 1.39	$ 2,180,592	2%

Business Programs

Business Target $ 11,900,377

Difference $ -

Program	Category	New/ Exist	Measures	Count	Units	Average Incentive per Unit	Estimated Budget	% Total Program	kW/Unit	kWh/Unit		$/Lifetime kWh	System Loss	Free Rider	Effective kWh	Program Cost per kWh	kW	% Total Program	kWh	% Total Program	Life	TRB kW	TRB kWh	TRB	% Total Program
			Business Plan				**$ 11,900,377**										6,889		46,163,535	$ 0.258				$ 62,581,908	
BEEM	**Business Energy Efficiency Measures**						**$ 6,222,730**	**29%**								**$ 0.17**	**5,916**	**34%**	**36,399,205**	**31%**				**$ 51,226,632**	**37%**
	High Efficiency Lighting						**$ 3,371,900**	**16%**								**$ 0.13**	**4,009**	**23%**	**26,571,559**	**23%**				**$ 34,271,070**	**25%**
x		*E*	CFL	16,100	lamps	$ 2.00	$ 32,200	0%	0.0290	246.5	12.1.1	$ 0.003	10.7%	0.73	199.20	$ 0.01	377	2%	3,207,106	3%	3.0	$ 1,002	$ 0.30	$ 1,336,043	1%
		E	CFL - Military Homes	32,900	lamps	$ 1.00	$ 32,900	0%	0.0050	45.3	12.1.1	$ 0.007	10.7%	0.73	36.61	$ 0.03	133	1%	1,204,383	1%	3.0	$ 1,002	$ 0.30	$ 492,959	0%
x		*E*	T12 to T8 Standard (2 / 3 / Straight 8 foot lamps)	5,000	lamps	$ 6.00	$ 30,000	0%	0.0070	56.4	12.1.2	$ 0.008	10.7%	0.73	45.58	$ 0.13	28	0%	227,887	0%	14.0	$ 3,754	$ 1.11	$ 358,470	0%
x		*E*	T12 to T8 Low Wattage	30,000	lamps	$ 15.00	$ 450,000	2%	0.0090	78.1		$ 0.014	10.7%	0.73	63.11	$ 0.24	218	1%	1,893,402	2%	14.0	$ 3,754	$ 1.11	$ 2,915,268	2%
x		*E/N*	T8 to T8 Low Wattage	115,200	lamps	$ 7.50	$ 864,000	4%	0.0060	51.0	12.1.3	$ 0.011	10.7%	0.73	41.21	$ 0.18	559	3%	4,747,808	4%	14.0	$ 3,754	$ 1.11	$ 7,353,146	5%
x		*E*	Delamp	5,000	lamps removed	$ 7.50	$ 37,500	0%	0.0170	149.2	12.1.4	$ 0.004	10.7%	0.73	120.57	$ 0.06	69	0%	602,850	1%	14.0	$ 3,754	$ 1.11	$ 925,275	1%
x		*E*	Delamp/Reflector	2,500	lamps removed	$ 15.00	$ 37,500	0%	0.0170	149.2	12.1.5	$ 0.007	10.7%	0.73	120.57	$ 0.12	34	0%	301,425	0%	14.0	$ 3,754	$ 1.11	$ 462,637	0%
x		*E*	LED Refrigerated Case Lighting	2,000	lamps	$ 75.00	$ 150,000	1%	0.0230	223.6	12.1.6	$ 0.034	10.7%	0.73	180.69	$ 0.42	37	0%	361,387	0%	10.0	$ 2,851	$ 0.85	$ 414,078	0%
x		*E*	ENERGY STAR LED Non-Dimmable - Existing	40,000	lamps	$ 15.00	$ 600,000	3%	0.0179	154.7	12.1.7	$ 0.010	10.7%	0.73	125.01	$ 0.12	579	3%	5,000,585	4%	10.0	$ 2,932	$ 0.87	$ 6,026,191	4%
x		*E*	ENERGY STAR LED Dimmable w/Controls - Existing	26,090	lamps	$ 20.00	$ 521,800	2%	0.0239	203.3	12.1.7	$ 0.010	10.7%	0.73	164.29	$ 0.12	504	3%	4,286,294	4%	10.0	$ 2,932	$ 0.87	$ 5,188,682	4%
x		*New*	ENERGY STAR LED Non-Dimmable - New	12,000	lamps	$ 10.00	$ 120,000	1%	0.1100	95.0	12.1.7	$ 0.011	10.7%	0.73	76.77	$ 0.13	1,067	6%	921,245	1%	10.0	$ 2,932	$ 0.87	$ 3,925,375	3%
x		*New*	ENERGY STAR LED Dimmable w/Controls - New	10,000	lamps	$ 15.00	$ 150,000	1%	0.0239	203.3	12.1.7	$ 0.007	10.7%	0.73	164.29	$ 0.09	193	1%	1,642,888	1%	10.0	$ 2,932	$ 0.87	$ 1,988,763	1%
x		*E*	ENERGY STAR LED Non-Dimmable A19 Only - Existing	5,000	lamps	$ 10.00	$ 50,000	0%	0.0061	52.5	12.1.7	$ 0.019	10.7%	0.73	42.43	$ 0.24	25	0%	212,129	0%	10.0	$ 2,932	$ 0.87	$ 255,936	0%
x		*N*	ENERGY STAR LED Dimmable A19 Only - New	3,000	lamps	$ 10.00	$ 30,000	0%	0.0061	52.5	12.1.7	$ 0.019	10.7%	0.73	42.43	$ 0.24	15	0%	127,277	0%	10.0	$ 2,932	$ 0.87	$ 153,562	0%
x		*E*	LED Exit Signs	1,000	signs	$ 25.00	$ 25,000	0%	0.0350	307.0	12.1.8	$ 0.005	10.7%	0.73	248.09	$ 0.10	28	0%	248,090	0%	16.0	$ 4,108	$ 1.21	$ 416,705	0%
x		*E*	HID Pulse Start	600	lamps	$ 60.00	$ 36,000	0%	0.0350	196.0	12.1.10	$ 0.022	10.7%	0.73	158.39	$ 0.38	17	0%	95,034	0%	14.0	$ 3,754	$ 1.11	$ 168,916	0%
x		*E/N*	Sensors	4,000	sensors	$ 20.00	$ 80,000	0%	0.0250	200.0	12.1.13	$ 0.013	10.7%	0.73	161.62	$ 0.12	81	0%	646,488	1%	8.0	$ 2,453	$ 0.73	$ 667,105	0%
x		*E/N*	Stairwell Bi-Level Dimming Fluorescent	1,000	Fixture	$ 50.00	$ 50,000	0%	0.0560	546.0		$ 0.007	10.7%	0.73	441.23	$ 0.11	45	0%	441,228	0%	14.0	$ 3,754	$ 1.11	$ 658,369	0%
x		*E/N*	Daylighting	500,000	kWh	$ 0.150	$ 75,000	0%	-	1.0	12.1.14	$ 0.008	10.7%	0.73	0.81	$ 0.19	-	0%	404,055	0%	20.0	$ 4,731	$ 1.39	$ 563,589	0%
	High Efficiency HVAC						**$ 1,731,000**	**8%**								**$ 0.28**	**1,197**	**7%**	**6,272,307**	**5%**				**$ 10,803,708**	**8%**
x		*E/N*	Chillers - kW/Ton meter & Chiller Curve Optimization	1,500,000	kWh	$ 0.25	$ 375,000	2%	0.0002	1.0	12.2.1	$ 0.013	10.7%	0.73	0.81	$ 0.31	242	1%	1,212,165	1%	20.0	$ 4,731	$ 1.39	$ 2,837,767	2%
x		*E*	VFD - Chilled Water / Condenser Water	500	hp	$ 80	$ 40,000	0%	0.2450	902.7	12.2.2	$ 0.006	10.7%	0.73	729.48	$ 0.11	99	1%	364,740	0%	15.0	$ 3,935	$ 1.16	$ 812,721	1%
x		*E*	VFD - AHU	1,200	hp	$ 50	$ 60,000	0%	0.2000	471.6	12.2.4	$ 0.007	10.7%	0.73	381.10	$ 0.13	194	1%	457,326	0%	15.0	$ 3,935	$ 1.16	$ 1,293,758	1%
x		*E/N*	Garage Active Ventilation Control	3,400,000	kWh	$ 0.14	$ 476,000	2%	0.0001	1.0	12.2.5	$ 0.018	10.7%	0.73	0.81	$ 0.17	314	2%	2,747,574	2%	8.0	$ 2,453	$ 0.73	$ 2,762,122	2%
x		*E*	Package Units - 25% Better Than Code	900	tons	$ 200	$ 180,000	1%	0.0930	552.2	12.2.6	$ 0.024	10.7%	0.73	446.24	$ 0.45	68	0%	401,615	0%	15.0	$ 3,935	$ 1.16	$ 732,137	1%
x		*E*	VFR Split Systems - Existing	1,500	tons	$ 300	$ 450,000	2%	0.1930	676.7	12.2.7	$ 0.030	10.7%	0.73	546.85	$ 0.55	234	1%	820,272	1%	15.0	$ 3,935	$ 1.16	$ 1,872,284	1%
x		*N*	VFR Split Systems - New Construction	600	tons	$ 250	$ 150,000	1%	0.0950	554.0	12.2.7	$ 0.030	10.7%	0.73	447.69	$ 0.56	46	0%	268,616	0%	15.0	$ 3,935	$ 1.16	$ 492,919	0%
	High Efficiency Water Heating						**$ 113,500**	**1%**								**$ 0.30**	**235**	**1%**	**377,913**	**0%**				**$ 1,300,437**	**1%**
x		*E*	Commercial Solar Water Heating - Electric Resistance	250	tons	$ 250	$ 62,500	0%	1.0000	927.0	12.3.1	$ 0.018	10.7%	0.73	749.12	$ 0.33	202	1%	187,279	0%	15.0	$ 3,935	$ 1.16	$ 1,012,216	1%
x		*E/N*	Commercial Solar Water Heating - Heat Pump	75	tons	$ 100	$ 7,500	0%	0.3800	164.0		$ 0.041	10.7%	0.73	132.53	$ 0.75	23	0%	9,940	0%	15.0	$ 3,935	$ 1.16	$ 102,153	0%
x		*E*	Heat Pump - Conversion - Electric Resistance	200	tons	$ 120	$ 24,000	0%	0.0400	668.0	12.3.2	$ 0.018	10.7%	0.73	539.82	$ 0.22	6	0%	107,963	0%	10.0	$ 2,932	$ 0.87	$ 112,433	0%
x		*E*	Heat Pump Upgrade	300	tons	$ 65	$ 19,500	0%	0.0150	300.0		$ 0.022	10.7%	0.73	242.43	$ 0.27	4	0%	72,730	0%	10.0	$ 2,932	$ 0.87	$ 73,634	0%
	High Efficiency Water Pumping						**$ 213,200**	**1%**								**$ 0.22**	**91**	**1%**	**985,215**	**1%**				**$ 1,502,462**	**1%**
x		*E*	VFD Dom. Water Booster Packages - VFD	100	hp	$ 700	$ 70,000	0%	0.5240	5,100.0	12.4.1	$ 0.009	10.7%	0.73	4,121.36	$ 0.17	42	0%	412,136	0%	15.0	$ 3,935	$ 1.16	$ 644,822	0%
x		*E*	VFD Dom. Water Booster Packages - added HP Reduction	40	hp reduced	$ 80	$ 3,200	0%	0.1150	989.0	12.4.1	$ 0.005	10.7%	0.73	799.22	$ 0.10	4	0%	31,969	0%	15.0	$ 3,935	$ 1.16	$ 51,720	0%
x		*E/N*	VFD Pool Pump Packages	400	hp	$ 350	$ 140,000	1%	0.1400	1,674.0	12.4.2	$ 0.014	10.7%	0.73	1,352.78	$ 0.26	45	0%	541,110	0%	15.0	$ 3,935	$ 1.16	$ 805,920	1%
	High Efficiency Motors						**$ 33,300**	**0%**								**$ 0.09**	**78**	**0%**	**391,141**	**0%**				**$ 758,903**	**1%**
x		*E/N*	CEE Tier 1+ Premium Efficiency Motors	1,800	HP	$ 6	$ 10,800	0%	0.0283	46.4	12.5.1	$ 0.009	10.7%	0.73	37.50	$ 0.16	41	0%	67,493	0%	15.0	$ 3,935	$ 1.16	$ 240,285	0%
		E/N	ECM w/Controller- Evaporator Fan Motors	200	motor	$ 85	$ 17,000	0%	0.1500	1,335.0	12.5.1	$ 0.004	10.7%	0.73	1,078.83	$ 0.08	24	0%	215,765	0%	15.0	$ 3,935	$ 1.16	$ 345,746	0%
		E/N	ECM - Fan Coil Fans	100	motor	$ 55	$ 5,500	0%	0.1500	1,335.0	12.5.1	$ 0.003	10.7%	0.73	1,078.83	$ 0.05	12	0%	107,883	0%	15.0	$ 3,935	$ 1.16	$ 172,873	0%
	Commercial Industrial Processes						**$ 450,000**	**2%**								**$ 0.57**	**154**	**1%**	**789,342**	**1%**				**$ 1,180,009**	**1%**
x		*E*	Waste Water Processes	100,000	kWh	$ 0.50	$ 50,000	0%	0.0002	1.0	12.6.1	$ 0.033	10.7%	0.73	0.81	$ 0.62	16	0%	80,811	0%	15.0	$ 3,935	$ 1.16	$ 157,359	0%
x		*E*	Compressed Air	100,000	kWh	$ 0.25	$ 25,000	0%	0.0002	1.0	12.6.2	$ 0.025	10.7%	0.73	0.81	$ 0.31	16	0%	80,811	0%	10.0	$ 2,932	$ 0.87	$ 117,358	0%
x		*E/N*	Kitchen Exhaust Hood Demand Ventilation	500	hp	$ 300	$ 150,000	1%	-	53.6	12.6.3	$ 0.373	10.7%	0.73	43.27	$ 6.93	-	0%	21,637	0%	15.0	$ 3,935	$ 1.16	$ 25,106	0%
x		*E/N*	ENERGY STAR Commercial Kitchen Equipment	750,000	kWh	$ 0.30	$ 225,000	1%	0.0002	1.0		$ 0.030	10.7%	0.73	0.81	$ 0.37	121	1%	606,083	1%	10.0	$ 2,932	$ 0.87	$ 880,186	1%
	Building Envelope Improvements						**$ 84,830**	**0%**								**$ 0.28**	**86**	**0%**	**308,429**	**0%**				**$ 520,058**	**0%**
x		*E*	Window Tinting	74,830	square feet	1.00	$ 74,830	0%	0.0013	4.9	12.7.1	$ 0.020	10.7%	0.73	3.96	$ 0.25	79	0%	296,307	0%	10.0	$ 2,932	$ 0.87	$ 487,053	0%
x		*E*	Cool Roof Technologies	50,000	square feet	0.20	$ 10,000	0%	0.00019	0.30	12.7.2	$ 0.067	10.7%	0.73	0.24	$ 0.82	8	0%	12,122	0%	10.0	$ 2,932	$ 0.87	$ 33,005	0%
	Energy Star Business Equipment						**$ 93,750**	**0%**								**$ 0.19**	**21**	**0%**	**496,382**	**0%**				**$ 626,914**	**0%**
x		*E*	Refrigerators w/Recycling	750	units	$ 125	$ 93,750	0%	0.0340	819.0	12.8.1	$ 0.011	10.7%	0.73	661.84	$ 0.19	21	0%	496,382	0%	14.0	$ 3,754	$ 1.11	$ 626,914	0%
	Energy Awareness, Measurement and Control Systems						**$ 131,250**	**1%**								**$ 0.63**	**46**	**0%**	**206,917**	**0%**				**$ 263,069**	**0%**
x		*E/N*	Condominum Submetering Pilot	750	units metered	$ 150	$ 112,500	1%	0.0570	273.0	12.9.1	$ 0.069	10.7%	0.73	220.61	$ 0.68	35	0%	165,461	0%	8.0	$ 2,453	$ 0.73	$ 204,752	0%
x		*E/N*	Small Business Submetering Pilot	125	units metered	$ 150	$ 18,750	0%	0.1140	410.4	12.9.2	$ 0.046	10.7%	0.73	331.65	$ 0.45	12	0%	41,456	0%	8.0	$ 2,453	$ 0.73	$ 58,317	0%

Business Programs Cont.

Program	Category	Measures	Count	Units	Average Incentive per Unit	Estimated Budget	% Total Program	kW/Unit	kWh/Unit			System Loss	Free Rider	Effective kWh	Program Cost per kWh	kW	% Total Program	kWh	% Total Program	Life	TRB kW	TRB kWh	TRB	% Total Program
CBEEN	**Custom Business Energy Efficiency Measures**					**$ 974,000**	**5%**								**$ 0.18**	**529**	**3%**	**5,293,121**	**4%**				**$ 5,974,917**	**4%**
	Customized Project Measures					$ 974,000									$ 0.18	529		5,293,121					$ 5,974,917	
x	E/N	Customized Project Measures - Under 5 year Life	1,500,000	kWh	$ 0.10	$ 150,000	1%	0.0001	1.0	13.1.1	$ 0.0200	10.7%	0.73	0.81	$ 0.12	121	1%	1,212,165	1%	5.0	$ 1,629	$ 0.48	$ 782,850	1%
x	E/N	Customized Project Measures - Over 5 year Life	4,250,000	kWh	$ 0.16	$ 680,000	3%	0.0001	1.0	13.1.1	$ 0.0133	10.7%	0.73	0.81	$ 0.20	343	2%	3,434,468	3%	12.0	$ 3,364	$ 0.99	$ 4,564,616	3%
	E/N	Cofunding Leveraged Project Assistance	800,000	kWh	$ 0.18	$ 144,000	1%	0.0001	1.0	13.1.1	$ 0.0225	10.7%	0.73	0.81	$ 0.22	65	0%	646,488	1%	8.0	$ 2,453	$ 0.73	$ 627,451	0%
BESM	**Business Service and Maintenance**					**$ 3,513,647**	**16%**								**$ 0.97**	**359**	**2%**	**3,611,875**	**3%**				**$ 4,134,711**	**3%**
	Business Direct Installation					$ 2,000,000	9%								$ 0.93	215	1%	2,154,960	2%				$ 3,194,738	2%
x	E	SBDI - Lighting Retrofits	2,666,667	kWh	$ 0.75	$ 2,000,000	9%	0.0001	1.0	14.1.1	$ 0.054	10.7%	0.73	0.81	$ 0.93	215	1%	2,154,960	2%	14.0	$ 3,754	$ 1.11	$ 3,194,738	2%
	Business Design, Audits and Commissioning					$ 1,513,647	7%								$ 1.04	144	1%	1,456,915	1%				$ 939,972	1%
x	E	Central Plant Performance Competition	900,000	kWh	$ 0.80	$ 720,000	3%	0.0001	1.0	14.2.1	$ 0.160	10.7%	0.73	0.81	$ 0.99	73	0%	727,299	1%	5.0	$ 1,629	$ 0.48	$ 469,710	0%
x	E	Cooling Tower Optimization	250,000	kWh	$ 0.25	$ 62,500	0%	0.0001	1.0	14.2.3	$ 0.250	10.7%	0.73	0.81	$ 0.31	20	0%	202,028	0%	1.0	$ 339	$ 0.10	$ 27,861	0%
x	E	Decision Maker - Real-Time Submeters	5	Groups	$ 12,000	$ 60,000	0%	-	5,000.0	14.2.4	$ 2.400	10.7%	0.73	4,040.55	$ 2.97	-	0%	20,203	0%	1.0	$ 306	$ 0.10	$ 2,029	0%
x	E	Energy Study Project Implementation - 100%	6	studies	$ 30,000	$ 180,000	1%			14.2.6		10.7%	0.73	-		-	0%	-	0%					0%
x	E	Energy Study Assistance - 50%	10	studies	$ 15,000	$ 150,000	1%			14.2.6		10.7%	0.73	-		-	0%	-	0%					0%
x	E/N	Design Assistance - 50%	6	studies	$ 15,000	$ 90,000	0%			14.2.7		10.7%	0.73	-		-	0%	-	0%					0%
x	E/N	Energy Project Catalyst	627,868	kWh	$ 0.40	$ 251,147	1%	0.0001	1.0	14.2.8	$ 0.057	10.7%	0.73	0.81	$ 0.49	51	0%	507,386	0%	7.0	$ 2,193	$ 0.65	$ 440,373	0%
BHTR	**Business Hard to Reach**					**$ 1,190,000**	**5%**								**$ 1.38**	**85**		**859,334**					**$ 1,245,649**	
	Energy Efficiency Equipment Grants					$ 1,175,000									$ 1.43	81		818,929					$ 1,210,580	
x	E	SBDI - Kitchen Exhaust Hood Demand Ventilation	250	hp	$ 1,700	$ 425,000	2%	-	53.6		2.116	10.7%	0.73	43.27	$ 39.28	-	0%	10,819	0%	15.0	$ 3,935	$ 1.16	$ 12,553	0%
x	E	SBDI - Restaurant Lighting	1,000,000	kWh	$ 0.75	$ 750,000	3%	0.0001	1.0		$ 0.054	10.7%	0.73	0.81	$ 0.93	81	0%	808,110	1%	14.0	$ 3,754	$ 1.11	$ 1,198,027	1%
	Landlord, Tenant, AOAO Measures					$ 15,000	0%								$ 0.37	4		40,406					$ 35,069	0%
		Energy Hero Landlord	50,000	kWh	$ 0.30	$ 15,000	0%	0.0001	1.0	15.2.1	$ 0.043	10.7%	0.73	0.81	$ 0.37	4	0%	40,406	0%	7.0	$ 2,193	$ 0.65	$ 35,069	0%

Potential Business Project Pending Developer Progress on Planned Schedule (figures provided for demonstration of impact and not summarized in Business Program Totals above.

Program	Category	Measures	Count	Units	Average Incentive per Unit	Estimated Budget	% Total Program	kW/Unit	kWh/Unit			System Loss	Free Rider	Effective kWh	Program Cost per kWh	kW	% Total Program	kWh	% Total Program	Life	TRB kW	TRB kWh	TRB	% Total Program
SWAC	**Sea Water Air Conditioning**					$ 7,500,000	35%									11,576	66%	62,224,470	53%				$ 141,561,971	103%
	Sea Water Air Conditioning					$ 7,500,000	35%								$ 0.12	11,576	66%	62,224,470	53%				$ 141,561,971	103%
		SWAC Infrastructure Support Incentive	25,000	tons	$ 300	$ 7,500,000	35%	0.5730	3,080.0		$ 0.005	10.7%	0.73	2,488.98	$ 0.12	11,576	66%	62,224,470	53%	20.0	$ 4,731	$ 1.39	$ 141,561,971	103%

Appendix C

TRB Utility Benefit Values

Hawaii Energy - PY2012 ANNUAL PLAN
TRB Calculations

		Discount Rate	HECO IRP4 Avoided Cost		NPV for each Year		NPV Cumulative from Final Year	
		6%						
Year	Period	NPV Multiplier	$/kW/yr.	$/kWh/yr.	$/kW/yr.	$/kWh/yr.	$/kW/yr.	$/kWh/yr.
2012	1	1.00	$ 338.6	$ 0.104	$ 339	$ 0.1040	$ 339	$ 0.1040
2013	2	0.94	$ 353.2	$ 0.104	$ 333	$ 0.0978	$ 672	$ 0.2019
2014	3	0.89	$ 370.6	$ 0.109	$ 330	$ 0.0969	$ 1,002	$ 0.2987
2015	4	0.84	$ 382.5	$ 0.112	$ 321	$ 0.0943	$ 1,323	$ 0.3931
2016	5	0.79	$ 386.2	$ 0.113	$ 306	$ 0.0899	$ 1,629	$ 0.4830
2017	6	0.75	$ 387.7	$ 0.114	$ 290	$ 0.0851	$ 1,918	$ 0.5681
2018	7	0.70	$ 389.1	$ 0.114	$ 274	$ 0.0806	$ 2,193	$ 0.6486
2019	8	0.67	$ 391.9	$ 0.115	$ 261	$ 0.0766	$ 2,453	$ 0.7252
2020	9	0.63	$ 390.7	$ 0.115	$ 245	$ 0.0720	$ 2,699	$ 0.7972
2021	10	0.59	$ 394.6	$ 0.116	$ 234	$ 0.0686	$ 2,932	$ 0.8658
2022	11	0.56	$ 398.3	$ 0.117	$ 222	$ 0.0653	$ 3,155	$ 0.9312
2023	12	0.53	$ 397.4	$ 0.117	$ 209	$ 0.0615	$ 3,364	$ 0.9927
2024	13	0.50	$ 401.4	$ 0.118	$ 199	$ 0.0586	$ 3,563	$ 1.0513
2025	14	0.47	$ 405.7	$ 0.119	$ 190	$ 0.0559	$ 3,754	$ 1.1071
2026	15	0.44	$ 409.3	$ 0.120	$ 181	$ 0.0532	$ 3,935	$ 1.1603
2027	16	0.42	$ 415.9	$ 0.122	$ 174	$ 0.0510	$ 4,108	$ 1.2113
2028	17	0.39	$ 423.3	$ 0.124	$ 167	$ 0.0490	$ 4,275	$ 1.2602
2029	18	0.37	$ 428.9	$ 0.126	$ 159	$ 0.0468	$ 4,434	$ 1.3070
2030	19	0.35	$ 433.9	$ 0.128	$ 152	$ 0.0448	$ 4,586	$ 1.3519
2031	20	0.33	$ 438.9	$ 0.130	$ 145	$ 0.0430	$ 4,731	$ 1.3948

Appendix D

Synopsis of Transformational Programs in PY11

Introduction

Transformational offerings are those which involve education, outreach and other government support activities that may not result in direct quantifiable energy savings in the immediate timeframe of the activity yet are likely to contribute to program savings goals within a five year period. These efforts contribute to development of an infrastructure and mindset that will result in societal changes and increased energy savings in the future. A comprehensive, current definition of Transformation efforts and their linkage to long-term kWh reduction is found in the recent report entitled "Who Should Deliver Ratepayer-Funded Energy Efficiency?" a 2011 Update based on work for the Colorado Public Utilities Commission. In this report, Market Transformation is defined in the following way:

> *Market Transformation …is based upon the understanding that a great deal of cost-effective efficiency does not occur because of certain well known barriers in the markets for efficiency goods and services. These barriers, which have been well described, include (1) high customer discount rates, in which the customer demands a very short payback for what is essentially a capital resource; (2) split incentives such as that between landlord and tenant in which a tenant who pays the energy bills might see savings from an efficiency program but the landlord who would need to make the capital improvement would not realize any savings; (3) lack of awareness and information, including among engineers, architects, customers, the buyers of equipment and services, and equipment distributors; and (4) high upfront costs that prevent customers from making efficient purchases; such customers may understand there are savings to be had over time, but nevertheless don't have the cash to retrofit a household with expensive LED lights or to purchase a $1,000 front-loading efficient washing machine.*

Market Transformation programs seek to understand barriers to adoption for a specific device, appliance, process, or measure and to use funds to permanently alter or remove the barrier so that a particular market will function on its own in the future with no further investment of ratepayer funds.

Although Transformation initiatives have not been a required part of the Program prior to PY11, all across the country, Market Transformation has grown in importance and is considered to be essential to the long term reduction in energy use necessary to achieve state energy goals. As an example, the ACEEE recently supported the linkage between building efficiency through appliances and the education of building occupants in commercial buildings to conservation of energy use.

Energy research community, energy efficiency professionals, and policy decision makers should work together to develop an improved evaluation framework to better document, study, and evaluate energy behavior programs. Program administrators should consider the integration of energy behavior (transformation) programs into their building efficiency initiatives, which would help promote the development and deployment of advanced technologies in a more conservation-conscious environment. Moreover, government and utilities at every level should consider leading by example by implementing their own energy behavior programs, as such efforts would promote a culture of energy conservation in their workplaces and beyond.

PY11 Successes

During PY11, Transformation initiatives were developed in the following categories, which are considered foundational and important, and will be continued or expanded:

- **Government** – Education of policy makers and public servants at the state and county level, as well as energy audits and activities such as education of government employees about energy and energy efficient behaviors – to reduce kWh usage and increase energy efficient behaviors in government or public buildings. For example, University of Hawaii Manoa Dormitories where hundreds of students participated in the Kukui Cup; a program offering field trips, lectures, online activities to reduce energy consumption within their dormitory facilities aided by electrical monitoring.

- **Business & Industry** – Education of decision makers in private businesses, professionals who interface with business and consumers regarding energy efficiency, and education of employees about energy efficient behaviors. For example, in PY11, Hawaii Energy supported training by EEFG – Business education for professionals in energy professions to encourage consumers to purchase energy efficient appliances and lighting, as well as CEM certification for professionals. In addition the Program collaborated with Leeward Community College in a Career Fair with a Green Jobs component.

- **Education** – Education in schools, K through University level, which can include learning about energy as well as energy audits, and teaching energy efficient behaviors. For example, in PY11, Hawaii Energy supported KUPU (RISE), an internship program for college level or recent college graduates to learn and perform energy audits in school and other commercial buildings, as well as NEED, a nationally recognized science curriculum for the Science of Energy, targeted to Middle and High School Students.

- **Residential** – Education and energy audit tools for homeowners and renters, both hard-to-reach communities as well as other demographic groups, to understand energy and how to reduce energy costs in the home. In PY11, Hawaii Energy supported a course called Energy Efficiency and Financial Literacy for hard-to-reach populations.

The approach taken in PY11 was to mirror the population of Hawaii in types of offerings created, and to work collaboratively with existing organizations that have performed or can perform transformational projects. We have termed this approach Vendor/Ally and it has worked well, exceeding targets for the activities mentioned above. The multiple pilot offerings initiated in PY11 mirrored well to the realities in the state of Hawaii. For example, Education offerings reflected the fact that 24% of the state population, which would be 329,081 people as of the 2010 Census, are enrolled in schools, and in addition, the education was of teachers and others non-students as well. Because of efforts to link the learning with immediate energy reductions, several of these efforts could potentially report estimated kWh reductions once our data gathering is complete for PY11. These projects include: Kukui Cup, Pahoa High School's use of Belkin Conserve Insight Monitors, Financial Literacy and Energy Efficiency training, and NEED.

Appendix E

Transformational Project Budget Details

The Business and Residential % Allocation indicates the rate payer funding source from which the Transformational Program, whether business or residential or both, are contributing to each transformational program. In many instances educational experiences provide benefit to both residential individuals and business institutions therefore funding is allocated proportionately to each segment.

These programs may be expanded should surplus PY11 funds be rolled over, notably the few that remain unfunded.

HAWAII ENERGY - PY12 TRANSFORMATIONAL ANNUAL PLAN

Comprensive Transformational Offerings	Market Sector	Budget (Post-Tax)	Budget (Pre-Tax)	Residential % Allocation	Residential Funds	Business % Allocation	Business Funds
Energy Ambassador Development							
State, Federal, Civil Defense, National Guard	Government	**$261,780**	$250,000	30%	$75,000	70%	$175,000
Small Business Workforce Development	Government	**$52,356**	$50,000	30%	$15,000	70%	$35,000
Hawaii State Department of Education	Business & Industry	**$261,780**	$250,000	30%	$75,000	70%	$175,000
Energy Audit & Benchmarking, Tools & Support							
State, Federal, Civil Defense, National Guard	Business & Industry	**$83,770**	$80,000	30%	$24,000	70%	$56,000
Commercial Facilities	Business & Industry	**$83,770**	$80,000	0%	$0	100%	$80,000
Educational	Education	**$20,942**	$20,000	75%	$15,000	25%	$5,000
Workforce Development Training							
Academic Level							
University Targeted Interactive Education, Competition - Kukui Cup	Business & Industry	**$47,120**	$45,000	30%	$13,500	70%	$31,500
Video Programming Net Zero, PSAs, etc. (O'lelo)	Business & Industry	**$47,120**	$45,000	45%	$20,250	55%	$24,750
Vocational / Entry Level							
University of Hawaii Community Colleges - Residential Audit Certifications	Residential	**$188,482**	$180,000	50%	$90,000	50%	$90,000
Professional Development							
Workforce Development - Courses, Certification, Application	Business & Industry	**$418,848**	$400,000	30%	$120,000	70%	$280,000
Teacher Workforce Development - Energy Education Development	Education	**$209,424**	$200,000	75%	$150,000	25%	$50,000
Residential Home Rating System Analysis and Pilot	Residential	**$78,534**	$75,000	75%	$56,250	25%	$18,750
Workforce Development - Internships	Business & Industry	**$104,712**	$100,000	30%	$30,000	70%	$70,000
Outreach & Education							
Sustainable Energy Career Fair(s), Energy Expo, Rebuild Hawaii	Business & Industry	**$78,534**	$75,000	88%	$65,625	13%	$9,375
Energy Efficiency through Financial Literacy	Residential	**$209,424**	$200,000	96%	$192,618	4%	$7,382
Supporting Serivces and Resources							
Energy Resource Centers		**$136,489**	$130,347	30%	$38,913	70%	$91,434
Workforce Development Course Marketing, Project Outreach and Communication(s)		**$0**	$0	45%	$0	55%	$0
Project Assessment, Directed Improvement, Analysis		**$94,241**	$90,000	45%	$40,500	55%	$49,500
Engineering Research, Development, Energy Consumption Analysis		**$0**	$0	45%	$0	55%	$0
Transformational Program Budget		**$2,377,326**	**$2,270,347**	**45.0%**	**$1,021,656**	**55.0%**	**$1,248,691**
Hawaii Energy PY 2012 Appropriated Transformational Budget		**$2,377,326**	**$2,270,347**	**45.0%**	**$1,021,656**	**55.0%**	**$1,248,691**

Appendix F

Proposed Transformational Tasks & Milestones in the Context of PY11

Within this section, numerous offerings are defined with a review of Hawaii Energy PY11 Transformational Program Goals and projected PY11 Status, or accomplishments. These projections are in some cases estimates based on current status within PY11. PY12 Transformational Program goals for each offering are stated with a Minimum, Target and Maximum goal specified.

In PY12, Hawaii Energy will work to accomplish or exceed stated Target goals within offerings that continue execution from PY11. All additional, or NEW goals outlined within Section 8.0 are offerings under consideration, or areas in which offerings are being considered. These offerings will be set out for Request for Information (RFI) or Request for Proposal (RFP) with implementation as a pilot project where appropriate. Goals will be established as pilot execution allows for establishment and analysis of metrics.

Transformation Task Options and Projected Milestones for PY12

Transformational Offering	PY11 Goal	Projected PY11 Status	PY12 Proposed Goal
Government			
Continue EEPS (Energy Efficiency Performance Standards) Support	Provide on-going support through participation in EEPS and HEPF (Hawaii Energy Portfolio Standards) organizations.	EEPS and HEPF participation	Continue EEPS and HEPF participation through PY12.
Continue Energy Efficiency subject matter expert support for Government entities	Respond to requests for data and advice on energy use, while providing feedback on effectiveness on current laws or issues.	Support and expertise provided through response to inquiries.	Continue to provide support as well as expand participation. Provide energy efficiency training opportunities to members of the legislature and other government entities. Provide support for establishing and performing neighborhood energy education programs in partnership with legislators and other government entities.
Continue Energy Efficiency language inclusion in County and State Master Plans	Respond to requests for assistance as appropriate.	Work performed to establish relationships with County and State representatives.	Efforts continue to develop relationships for the purpose of performing projects and assisting with inclusion of energy efficiency standards in County and State master plans.
Expand HCEI (Hawaii Clean Energy Initiative) Collaboration and Support	Support for internships if funds are available.	Internships within and in partnership with DBEDT provided via Kupu – RISE.	Continue to collaborate with DBEDT and other organizations in support for HCEI.
Rebuild Hawaii	Support meetings and overall process funding. Facilitate expanded reach through on-line webinar presentation.	New for PY12	Support meetings and overall process funding. Provide for webinar capabilities. Accept overall organizational management of Rebuild Hawaii and its mailing lists.

Transformational Offering	PY11 Goal	Projected PY11 Status	PY12 Proposed Goal
Government (continued)			
NEW – Education for State and county employees	New for PY12	New for PY12	Identify and hire vendor/ally to teach energy efficiency in the workplace. **PY12 Goal – TBD**
NEW – Energy Audit and efficiency support for State Government Buildings	New for PY12	New for PY12	Hire vendor/ally or collaborate with organizations to teach and implement energy audits and perform energy benchmarking. **PY12 Goal – TBD**

Transformational Offering	PY11 Goal	Projected PY11 Status	PY12 Proposed Goal
Business & Industry			
CEM – Certified Energy Management Courses	Workforce Development Pilot #1 of 2 - Establish 2 collaborative relationships with organizations for energy efficiency training.	5-day CEM course, 70 participants Islands – Oahu, Hawaii Island	**EXPAND** in PY12 **PY12** **Target 5-day Courses / Total Students** Minimum - 2 / 20 Target – 3 / 70 Maximum – 5 / 140 Islands – Oahu, Maui, Hawaii Island
EEFG – Energizing Efficiency™ Courses	Workforce Development Pilot #2 of 2 - Establish 2 or more collaborative relationships with organizations for energy efficiency training.	6 1-day courses, 250 participants 3 classes • Learning to SEE • Role of Energy in Sustainability • Benchmarking Commercial Building, Islands – Oahu, Maui, Hawaii Island	**CONTINUE** in PY12. **PY12** **Target 1-day Courses / Total Students** Minimum - 12 / 300 Target – 18 / 450 Maximum – 24 / 800 Islands – Oahu, Maui, Hawaii Island, (via travel /remote, poss. Molokai, Lanai)

Transformational Offering	PY11 Goal	Projected PY11 Status	PY12 Proposed Goal
Business & Industry (continued)			
KUPU – RISE – Rewarding Internships for Sustainable Employment	Partner with 2 or more green clubs and schools. Workforce development students, interns and professional energy auditors will perform facility wide energy audits.	2 interns – 1 each Pahoa High & Intermediate School Kea'au School Green Clubs email blast to 90 contacts to create network. Islands – Hawaii Island	**EXPAND** - new internships for facility complexes. **PY12 Target Institution and/or Facility Complexes** Minimum – 3 Target – 5 Maximum – 8 Islands – Oahu, Maui, Hawaii Island
NEW – UHCC (University of Hawaii Community Colleges) Green Mechanical Council	New for PY12	New for PY12	Intended to build certification in the energy efficiency building trades. Will begin as pilot at one location, as it shows itself successful, will be expanded to others. **PY12 Goal – TBD**
NEW – Energy Audits and Education in Food Service and Accommodations Industry (Restaurants)	New for PY12	New for PY12	Support energy cost reduction efforts within this industry, which is second largest private industry in state. **PY12 Goal – TBD**
NEW – Energy Efficiency Education for Private Business Employees	New for PY12	New for PY12	Contract with vendor/ally to establish workplace conservation training programs. Possibly collaborate with Chamber of Commerce or other trade organization with significant reach, using curriculum on energy efficiency in the workplace and train-the-trainer model. **PY12 Goal – TBD**

Transformational Offering	PY11 Goal	Projected PY11 Status	PY12 Proposed Goal
Business & Industry (continued)			
Energy Resource Center	Establish 2 energy resource (tool lending) centers. Establish 2 partnerships with organizations acting as energy resource centers.	Performed due diligence – Performed survey based on Pacific Resource Center content. High interest for energy resource centers exist. 98% respondents would find this helpful, 76% stated tools would help grow their business. Target Island - Maui	**PILOT** – Locate at community college(s). Potentially purchase identified tools in PY11, if possible. **PY12 Target Number of Resource Centers** Minimum – 1 Target – 3 Maximum – 5 Islands – Oahu, Maui, Hawaii Island, Molokai
Energy Efficiency Service Sector Career Fair	Partner with 2 or more organizations to host the fair. Connect training programs with interested individuals. 2000 attendees targeted.	Event included 3 partner organizations and 50 participating organizations. Estimate 2000 career fair attendees. 199 responded to evaluation. 60% attended at least one energy efficiency workshop, 82% found fair helpful.	**REPEAT** with different Community College campus' in FY12. **PY12 Target Number** Minimum – 1 Target – 2 Maximum – 3 Islands – Oahu, Maui, Hawaii Island

Transformational Offering	PY11 Goal	Projected PY11 Status	PY12 Proposed Goal
Education			
Teacher Development (NEED)	120 - 200 teachers trained With each teacher teaching 2-3 classes. Reach of 12 – 18K students	Hilo (1: Dec) Oahu (4: Dec, Feb, Mar, April) Maui (2: March, April) Kona (1: 3/29) 289 trained teachers 5 Islands – Oahu, Maui, Hawaii Island (via travel Lanai, Molokai)	**CONTINUE** **PY12 Target # Trained Teachers** Minimum - 150 Target - 250 Maximum - 300 5 Islands – Oahu, Maui, Hawaii Island (via travel Lanai, Molokai)
EAD - Energy Ambassador Development **Train Energy Auditor & Ambassadors**	Pilot Initiated April 2012, not on initial plan	**Target for PY11** 13 facility complexes 100 energy Ambassadors 4 islands, Oahu, Molokai, Lanai, Hawaii Island	**EXPAND** in PY12. **PY12 Target Facility Complexes / Ambassadors** Minimum - 35 / 175 Target - 50 / 250 Maximum – 100 / 500 5 Islands – Oahu, Maui, Hawaii Island, Lanai, Molokai
UH Manoa, Hawaii Pacific University – Kukui Cup	Support pilot with limited equipment - <50 Belkin Conserve Insights, 500 Smart Strips	3 weeks/rounds, 4 residence halls, 1036 eligible students. 418 (40%) actively engaged, in the educational program. Efficiency ranged, best was 16% reduction over 3 weeks. Statistically significant Improvement in knowledge pre-post for participants, not for non-participants. Note: 850 hours of time on game site, with 4000+ unique visitors and 1700 page hits.	**EXPAND** - Plan to expand support for 2nd round at UHM in 2012 and also support HPU project. Plan for intern support for both. **PY12** **Target Institution / Facility Complexes** Minimum – 1 / 2 Target – 2 / 3 Maximum – 3 / 4

Transformational Offering	PY11 Goal	Projected PY11 Status	PY12 Proposed Goal
Education (continued)			
School Belkin Energy Meter Kits	Pilot – identify schools.	Funded 75 Belkin Energy Meter Kits and 300 smart strips at Pahoa. 189 participants in labs, 107 smart strips with 50 distributed. Next lab kit was distributed mid-April, 2011. Added Keeau High School on Hawaii Island. Funded one intern for each school. Islands – Hawaii Island	**CONTINUE –** Expand energy based STEM projects in schools that engage students. With a goal of introducing energy efficiency as science and developing interest in science and energy (EESS) related study and careers. **PY12 Target Schools** Minimum – 4 Target – 6 Maximum – 10 Islands – Oahu, Maui, Hawaii Island, Lanai, Molokai

Transformational Offering	PY11 Goal	Projected PY11 Status	PY12 Proposed Goal
Residential			
Energy Efficiency through Financial Literacy Target Residential Low Income Communities	10 presentations across 5 distinct communities. Number of individuals reached 500 minimum.	45 presentations, 1727 participants, 1549 APS 5 Islands – Oahu, Maui, Hawaii Island, Lanai, Molokai	**EXPAND** - Continue to serve hard-to-reach and Native Hawaiian communities and expand to other demographic groups such as condo owners and apartment dwellers. **PY12 Target** Minimum - 1000 Target - 1500 Maximum - 2500 5 Islands – Oahu, Maui, Hawaii Island, Lanai, Molokai
NEW Landlord/Tenant Incentives and Solutions	New for PY12	New for PY12	Intended to provide methods for landlords and tenants (>40% of Hawaii residents) with feasible methods to reduce energy consumption in units. **PY12 Goal - TBD**
NEW **Energy Efficiency Local Resident Experts**	New for PY12	New for PY12	Create pilot effort to find ways to help residents influence each other within neighborhood community centers to learn about energy efficiency. **PY12 Goal - TBD**
NEW **Documentary about Energy Efficient Homes Video(s)**	New for PY12	New for PY12	Pilot with O'lelo Community Television and/or other group(s) to demonstrate net zero or energy efficient homes. **PY12 Goal - TBD**

*   *   *

Attachment F

Technical Reference Manual

Hawaii Energy Efficiency Program

Program Year 4
July 2012 through June 2013

Technical Reference Manual (TRM)

No. 2012

Measure Savings Calculations

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1 Introduction

METHODS AND ASSUMPTIONS
This reference manual provides methods, formulas and default assumptions for estimating energy and peak impacts from measures and projects that receive cash incentives from the Hawaii Energy Efficiency Program.

The reference manual is organized by program, end use and measure. Each section provides mathematical equations for determining savings (algorithms), as well as default assumptions for all equation parameters that are not based on site-specific information. In addition, any descriptions of calculation methods or baselines are provided, as appropriate.

The parameters for calculating savings are listed in the same order for each measure. Algorithms are provided for estimating annual energy and demand impacts.

Data assumptions are based on Hawaii specific data, where available. Where Hawaii data was not available, data from neighboring regions is used where available and in some cases, engineering judgment is used.

Data sources used, in the general order of preference, included, but were not necessarily limited to the following:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Management Programs – KEMA
- HECO IRP-4: Energy Efficiency Potential Study (HECO DSM Docket)
- 2004-2005 Database for Energy Efficiency Resources (CA DEER database)
- 2007-2008 Database for Energy Efficiency Resources (CA DEER database) Update
- Other EE Program Design Information (e.g. Efficiency Maine, Focus on Energy, etc.)
- SAIC Staff expertise and engineering judgment
- Evergreen TRM Review – 2/23/12

2 Gross Customer-to-Net Program Savings Calculation

The algorithms shown with each measure calculate gross customer electric savings without counting the effects of line losses from the generator to the customer or free ridership.

The formulae for converting gross customer-level savings to net generation-level savings are as follows:

Net Program kWh = Gross Customer Level ΔkWh $\times$ (1 + SLF) x RR

Net Program kW = Gross Customer Level ΔkW $\times$ (1 + SLF) x RR

Where:

Net kWh = kWh energy savings at generation-level, net of free riders and system losses
Net kW = kWh energy savings at generation-level, net of free riders and system losses

Gross Cust. ΔkWh = Gross customer level annual kWh savings for the measure
Gross Cust. ΔkW = Gross customer level connected load kW savings for the measure

SLF = System Loss Factor
RR = Realization Rate that includes Free Riders and Engineering Verification

Hawaii Energy PY2009 Portfolio Energy (kWh) Reduction Impacts by Level					
	Gross Customer Level Savings	System Loss Factor (SLF)	Gross System Level Savings	Realization Rate (RR)	Net Program Level Savings (Net kWh)
Oahu	110,545,694	11.17%	122,893,648	73%	89,712,363
Hawaii	12,590,195	9.00%	13,723,313	73%	10,018,018
Maui	9,182,496	9.96%	10,097,072	73%	7,370,863
Lanai	61,712	9.96%	67,858	73%	49,537
Molokai	85,269	9.96%	93,762	73%	68,447
Total	132,465,366		146,875,654		107,219,227
% of Customer Level Savings			111%		81%

SLF – System Loss Factor
The system loss factors were provided by HECO, MECO and HELCO. The do not vary by measure, but by island, and are in the following Table 1.1:

Table 2.1

County Customer to System Loss Factor		
Oahu	Maui	Hawaii
11.17%	9.96%	9.00%

RR - Realization Rate
The Realization Rate used was estimated using the following information from the HECO 2008 A&S report:

Table 2.2

Program	Realization Rate			
	Energy	Demand	Net System Level Energy Savings 2008	Gross System Level Energy Savings 2008
1. CIEE	0.6530	0.6640	45,798,527	70,135,569
2. CINC	0.5960	0.6100	17,469,147	29,310,648
3. CICR	0.7590	0.7550	28,749,233	37,877,777
4. ESH	0.8500	0.8500	32,203,749	37,886,763
5. REWH	0.7290	0.7310	8,237,872	11,300,236
6. RNC	0.8410	0.8850	8,267,217	9,830,222
7. RLI	1.0000	1.0000	7,899,869	7,899,869
TOTAL			148,625,614	204,241,087

The total Net Energy Savings divided by the total Gross Energy Savings for 2008 is 73%.

Therefore, the overall realization rate for HECO was 0.73 and Table 1.3 reflects the use of this for the other islands.

Table 2.3

County Customer Realization Rate		
Oahu	Maui	Hawaii
73%	73%	73%

3 Interactive Effects

The TRM provides specific savings algorithms for many prescriptive measures. When a customer installs a prescriptive measure, the savings are determined according to these algorithms. In some cases these algorithms include the effects of interactions with other measures or end.

For "custom" measures, Hawaii Energy performs site-specific customized calculations. In this case, Hawaii Energy takes into account interactions between measures (e.g., individual savings from installation of window film and replacement of a chiller are not additive because the first measure reduces the cooling load met by the second measure).

Hawaii Energy will calculate total savings for the package of custom measures being installed, considering interactive effects, either as a single package or in rank order of measures as described below.

If a project includes both prescriptive and custom measures, the prescriptive measures will be calculated in the normal manner. However, the prescriptive measures will be assumed to be installed prior to determining the impacts for the custom measures.

For commercial lighting measures, the following factors are applied for facilities with air conditioning.

Table 3

Building Type	Expected Level of Similarity	Energy Factor	Demand Factor
All Commercial	Low	1.056	1.075
Misc Commercial	Low	1.056	1.075
Cold Storage	Very High	1.423	1.22
Education	Low	1.061	1.039
Grocery	Low	1.043	1.114
Health	High	1.122	1.233
Hotel/Motel	High	1.115	1.236
Industrial	Low	1.043	1.074
Office	Low	1.068	1.102
Restaurant	Low	1.051	1.073
Retail	Low	1.054	1.085
Warehouse	Low	1.019	1.053

4 Persistence

Persistence factors may be used to reduce lifetime measure savings in recognition that initial engineering estimates of annual savings may not persist long term.

This might be because a measure is removed or stops functioning prior to the end of its normal engineering lifetime, because it is not properly maintained, it is overridden, it goes out of calibration (controls only), or for some other reason.

Some of the measure algorithm may contain an entry for persistence factor. The default value if none is indicated is 1.00 (100%). A value lower than 1.00 will result in a downward adjustment of lifetime savings and total resource benefits.

For any measure with a persistence value less than 1.00, the normal measure life (“Engineering Measure Life”) will be reduced to arrive at an “Effective Useful Life” for the purposes of estimating the TRB of a measure or program.

5 Glossary

The following glossary provides definitions for necessary assumptions needed to calculate measure savings.

Attribution Factor (AF): The Attribution Factor is the amount of savings attributable to the program impact. It is calculated by subtracting from one the % free ridership.

Baseline Efficiency (η_{base}): The assumed standard efficiency of equipment, absent an Hawaii Energy program.

Coincidence Factor (CF): Coincidence factors represent the fraction of connected load expected to be "on" and using electricity coincident with the system peak period.

Connected Load: The maximum wattage of the equipment, under normal operating conditions, when the equipment is "on".

Freeridership (FR): A program's ***free ridership rate*** is the percentage of program participants deemed to be free riders. A ***free rider*** refers to a customer who received an incentive through an energy efficiency program who would have installed the same or a smaller quantity of the same high efficiency measure on their own within one year if the program had not been offered.

Full Load Hours (FLH): The equivalent hours that equipment would need to operate at its peak capacity in order to consume its estimated annual kWh consumption (annual kWh/connected kW).

High Efficiency (η_{effic}): The efficiency of the energy-saving equipment installed as a result of an efficiency program.

Incremental Cost: The cost difference between the installed cost of the high efficiency measure and the standard efficiency measure.

Lifetimes: The number of years (or hours) that the new high efficiency equipment is expected to function. These are generally based on engineering lives, but sometimes adjusted based on expectations about frequency of remodeling or demolition.

System Loss Factor (SLF): The marginal electricity losses from the generator to the customer meter – expressed as a percent of meter-level savings. The Energy Line Loss Factors vary by period. The Peak Line Loss Factors reflect losses at the time of system peak, and are shown for two seasons of the year (winter and summer). Line loss factors are the same for all measures.

Load Factor (LF): The fraction of full load (wattage) for which the equipment is typically run.

Operating Hours (HOURS): The annual hours that equipment is expected to operate.

Persistence (PF): The fraction of gross measure savings obtained over the measure life.

Realization Rate (RR): The fraction of gross measure savings realized by the program impact. It includes the gross verification adjustment and free ridership or attribution adjustment.

Spillover (SPL): Spillover refers to energy-efficient equipment installed in any facility in the program service area due to program influences, but without any financial or technical assistance from the Program. It is expressed as a percent or fraction of the gross savings attributable to program participation.

Total Resource Benefits (TRB): The present value of benefits from the program savings resulting from avoided energy and capacity costs for the utility and their ratepayers.

6 Load shapes and Demand Coincidence Factors

Load shapes for different types of equipment or systems were not needed because the savings values estimated in the KEMA 2008 impact evaluation already accounted for these load shapes. The coincidence factors were developed based on the calculated full load demand reduction and the KEMA values for each building type. The resulting coincidence factors were evaluated for reasonableness depending on the system type and the building type.

7 Total Resource Benefits – Avoided Costs and Measure Life

HECO provided avoided energy and capacity costs for future years shown in the table below:

Table 7.1

Year	$/MWh	$/kW
2006	$109.62	$180.20
2007	$107.16	$181.14
2008	$102.19	$181.14
2009	$106.89	$181.14
2010	$98.90	$0.00
2011	$100.41	$0.00
2012	$104.04	$0.00
2013	$103.69	$0.00
2014	$108.86	$0.00
2015	($139.65)	$1,530.33
2016	($132.67)	$1,704.00
2017	($118.95)	$1,537.80
2018	($115.35)	$1,412.69
2019	($109.01)	$1,304.38
2020	($104.57)	$1,207.27
2021	($100.02)	$1,149.38
2022	($109.30)	$1,112.04
2023	($111.41)	$1,076.56
2024	$137.80	($411.76)
2025	$144.46	($744.16)

The avoided cost values for energy and capacity that was originally provided by HECO was deemed inappropriate to use for reasons that included a negative avoided cost value for energy in the year 2015 to 2023 and no capacity costs for years 2010 to 2014. Therefore, the avoided cost used for the program was estimated using an extrapolation of the HECO provided avoided energy in the first few years of data for energy and the capacity costs leveled over 20 years. The following table was developed from this extrapolation.

Table 7.2

Year	$/MWh	$/kW
2006	109.62	180.20
2007	107.16	181.14
2008	102.19	181.14
2009	106.89	181.14
2010	98.90	279.79
2011	100.41	305.64
2012	104.04	338.65
2013	103.69	353.19
2014	108.86	370.59
2015	112.36	382.51
2016	113.45	386.22
2017	113.90	387.74
2018	114.30	389.12
2019	115.13	391.92
2020	114.76	390.68
2021	115.92	394.63
2022	117.01	398.34
2023	116.75	397.44
2024	117.91	401.41
2025	119.18	405.71

This table was deemed a good estimate of actual avoided energy and capacity costs as it was more in line with the avoided costs used in many other programs. Therefore, these avoided costs were used to calculate the Total Resource Benefits.

Effective Useful Life (EUL): Table 7.3

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2010
End date: TBD

Referenced Documents: Econorthwest TRM Review – 6/23/10
DEER The Database for Energy Efficient Resources

TRM Review Actions:

- 6/23/10 Rec. – Adopt DEER values in those cases where there is a greater than 20 percent difference between DEER and current TRM. – Adopted

Major Changes:

- Hawaii Energy will adopt DEER EUI values across the board and will follow DEER changes as they are updated unless obvious differences for Hawaii applications are identified.

The measure Effective Useful Life estimated for each measure is shown in the following table:

Table 7.3

PY12			
Residential (R) Business (B)	Measure Type	Description	DEER Effectve Useful Life (EUL)
R	Water Heating	Solar Water Heating	20
R		Heat Pumps	10
R	Lighting	CFL	6
R		LED	15
R	Air Conditioning	VRF Split	15
R		Ceiling Fans	5
R		Solar Attic Fans	20
R		Whole House Fans	20
R	Appliances	Refrigerator (<$600)	14
R		Refrigerator w/Recycling	14
R		Garage Refrigerator/Freezer Bounty	14
R		Clothes Washer (Tier II/III)	11
R		Pool VFD Controller Pumps	10
R	Control Systems	Room Occupancy Sensors & Timers	8
R		Peer Group Comparison	1
R		Whole House Energy Metering	4
R	Custom	Custom Packaged Proposals	5
R	Direct Install	TBD	7
R	Design and Audits	Efficiency Inside	15
		Hawaii Energy Hero Audits	1
R	Tune Ups	Central AC Tune Up	1
		Solar Water Heater Tune Up	5
R	Hard to Reach Grants	Solar Inspections	5
R		Solar Water Heater	20
R		Hawaii Energy Hero Gift Packs	5
R		CFL Exchange	6
R	Landlord Tennant	Hawaii Energy Hero Landlord Program	15
		Custom SWH Proposals	20
B	Lighting	CFL	3
		CFL - Military Homes	3
B		T12 to T8 Standard (2/3/8)	14
B		T12 to T8 Low Wattage	14
B		T8 to T8 Low Wattage	14
B		Delamp	14
B		Delamp w/Reflector	14
B		LED Refrigerator Case Lighting	15
B		ENERGY STAR LED Non-Dimmable	15
B		ENERGY STAR LED Dimmable w/Controls	15
B		ENERGY STAR LED Non-Dimmable A19	15
B		ENERGY STAR LED Dimmable A19	15
B		LED Exit Signs	16
B		HID Pulse Start	14
B		Sensors	8
B		Stairwell Bi-Level Dimming Fluorescent	14
B		Daylighting	20

Residential (R) Business (B)	Measure Type	Description	DEER Effectve Useful Life (EUL)
B	HVAC	Chillers	20
B		VFD - Chilled Water/Condenser Water	15
B		VFD - AHU	15
B		Garage Active Ventilation Control	8
B		Package Units	15
B		VFR Split System - Existing	15
B		VFR Split System - New Construction	15
B	Water Heating	Solar Water Heating - Electric Resistance	15
B		Solar Water Heating - Heat Pump	15
B		Heat Pump - conversion - Electric Resistance	10
B		Heat Pump Upgrade	10
B	Water Pumping	VFD Dom Water Booster Packages	15
B		VFD Pool Pump	15
B	Motors	CEE Tier 1 + Premium Efficiency Motors	15
B		ECM w/Controller - evap fan motors	15
B		ECM - Fan Coil Fans	15
B	Industrial Process	Waste Water Processes	15
		Compressed Air	10
		Kitchen Exhaust Hood Demand Ventilation	15
B		ENERGY STAR Commercial Kitchen Equipment	10
B	Building Envelope	Window Tinting	10
B		Cool Roof	10
B	Business Equipment	ENERGY STAR Refrigerator w/Recycling	14
B	Control Systems	Condominium submetering	8
B		Small Business submetering	8
B	Customized	Custom <= 5 years	5
B		Custom > 5 years	12
B		Custom Carryover	12
B	Direct Install	SBDIL - Lighting	14
B	Design and Audits	Central Plant Performance Competition	5
B		Cooling Tower Optimization	1
B		Decision Maker - Real time submeters	1
B		Energy Study Implementation - 100%	N/A
B		Energy Study Assistance - 50%	N/A
B		Design Assistance - 50%	N/A
B		Energy Project Catalyst	7
B	Grants	Water cooler timer	5
B	Restaurant	SBDI - Kitchen Exhaust Hood Demand Ventilation	15
B		SBDI - Restaruant Lighting	14
B	Landlord Tennant	Energy Hero Landlord	7

8 (REEM) Residential Energy Efficiency Measures

8.1 High Efficiency Water Heating

8.1.1 Solar Water Heater

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Management Programs – (KEMA 2005-07)
- Econorthwest TRM Review – 6/23/10
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. # 6 – For PY 2010, adjust claimed demand savings based on participant data from all service territories covered. Adjust Demand Savings based on participant data weighted average of KEMA results across all counties. Change from 0.50 to 0.46 kW. non-military – Adopted and incorporated into PY2010-1 TRM.
- 6/23/10 Rec. # 7 - For PY 2010, include a discussion of shell losses in the savings analysis and supporting documentation. Discussion included in PY2010-1 TRM.
- 10/5/11 – Currently Under Review.

Major Changes:

- Eliminated Military figure as no foreseeable military retrofit applications will be received.
- Demand change to weighted average from KEMA 2008. 0.46 kW
- Changed individual water usage from 13.3035 to 13.3

Measure Description:
Replacement of Electric Resistance Water Heater with a Solar Water Heater designed for a 90% Solar Fraction. The new Solar Water Heating systems most often include an upgrade of the hot water storage tank sized at 80 or 120 gallons.

Systems must comply with Hawaii Energy Solar Standards and Specifications which call out:

- Panel Ratings
- System Sizing
- Installation orientation de-rating factors
- Hardware and mounting systems

Shell Losses:
The increase in size from a 40 or 60 gallon to an 80 or 120 gallon standard electric resistance water heater would in and of itself increase the “shell” losses of the system. These shell losses are the result of a larger surface area exposing the warm water to the cooler environment and thus more heat lost to the environment through conduction through the tank. Engineering calculations by Econorthwest puts this at a 1% increase in losses. This is further reduced by 90% as the solar water system provides that fraction of the annual water heating requirements.

Baseline Efficiencies:
Baseline usage is a 0.9 COP Electric Resistance Water Heater. The baseline water heater energy consumption is by a single 4.0kW electric resistance element that is controlled thermostatically on/off controller based of tank finish temperature set point. The tank standby loss differences between baseline and high efficiency case are assumed to be negligible.

Demand Baseline has been determined by field measurements by KEMA 2005-07 report. The energy baseline also comes from the KEMA 2005-07 report and is supported by engineering calculations shown in this TRM.

Building Types	Demand Baseline(kW)	Energy Baseline (kWh)
Residential	0.57	2,733

High Efficiency:
Solar Water Heater designed for a 90% Solar Fraction. The Solar Systems use solar thermal energy to heat the water 90% of the time and continue to utilize electricity to operate the circulation pump and provide heating through a 4.0 kW electric resistance element when needed.

Solar Contractors do not favor Photo-Voltaic powered DC circulation pumps as they have proven less reliable in the field than an AC powered circulation pump.

The electric resistance elements in the high efficiency case do not have load control timers on them.

The energy is the design energy of a 90% solar fraction system with circulation pump usage as metered by KEMA 2008.

The on peak demand is the metered demand found by KEMA 2008.

Building Types	Demand High Efficiency (kW)	Energy High Efficiency (kWh)	Circ. Pump %
Residential	0.07	379	28%

Energy Savings:

Solar Water Heater Gross Savings before operational adjustments:

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Residential	0.46	2,354

Operational Factor	Adjustment Factor
Solar Fraction Performance (sfp)	0.94
Persistence Factor (pf)	0.93
Demand Coincidence Factor (cf)	1.0

Solar Water Heater Net Savings after operational adjustments:

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Residential	0.46	2,065

Savings Algorithms

Solar Water Heater - Non-Military Single Family Home

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.141	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		23,000	BTU/Day	
Energy per Day (BTU) Needed in Tank		23,000	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	kWh / BTU	
Energy per Day (kWh)		6.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		205	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		2,459	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		2,732	kWh / Year	KEMA 2008 - HECO
Design Annual Solar Fraction		90%	Water Heated by Solar System	Program Design
		10%	Water Heated by Remaining Backup Element	
Energy Usage per Year at the Meter		2,732	kWh / Year	
	x	10%	Water Heated by Remaining Backup Element	
Back Up Element Energy Used at Meter		273	kWh / Year	
Circulation Pump Energy		0.082	kW	KEMA 2008
Pump Hours of Operation	x	1,292	Hours per Year	KEMA 2008
Pump Energy used per Year		106	kWh / Year	
Back Up Element Energy Used at Meter		273	kWh / Year	72%
Pump Energy used per Year	+	106	kWh / Year	28%
Design Solar System Energy Usage		379	kWh / Year	
Base SERWH Energy Usage per Year at the Meter		2,732	kWh / Year	
Design Solar System Energy Usage	-	379	kWh / Year	
Design Solar System Energy Savings		2,353	kWh / Year	
Design Solar System Energy Savings		2,353	kWh / Year	
Performance Factor		0.94	pf	HE
Persistance Factor	x	0.93	pf	KEMA 2008
		2,065	kWh / Year	KEMA 2008
Residential Solar Water Heater Energy Savings		**2,065**	**kWh / Year Savings**	
Base SERWH Element Power Consumption		4.0	kW	
Coincidence Factor	x	0.143	cf	8.6 Minutes per hour
Base SERWH On Peak Demand		0.57	kW On Peak	KEMA 2008
Base SERWH On Peak Demand	-	0.57	kW On Peak	
Solar System Metered on Peak Demand	-	0.11	kW On Peak	KEMA 2008
		0.46	kW On Peak	
Residential Solar Water Heater Demand Savings		**0.46**	**kW Savings**	

Operating Hours
See Table above.

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Persistence
The persistence factor has been found to be 0.93 based in the KEMA 2005-07 report that found 7% of the systems not operational.

Lifetime
20 years (Table 7.3)

Measure Costs and Incentive Levels

Table 1 – SWH Measure Costs and Incentive Levels

Description	Unit Incentive	Incremental Cost
Non-Military	$ 750	$6,600

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Reference Tables
None

8.1.2 Solar Water Heating Loan Interest Buydown (Hot Water Cool Rates)

Version Date & Revision History
Draft date: May 22, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Management Programs – (KEMA 2005-07)
- Econorthwest TRM Review – 6/23/10
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. # 6 – For PY 2010, adjust claimed demand savings based on participant data from all service territories covered. Adjust Demand Savings based on participant data weighted average of KEMA results across all counties. Change from 0.50 to 0.46 kW. non-military – Adopted and incorporated into PY2010-1 TRM.
- 6/23/10 Rec. # 7 - For PY 2010, include a discussion of shell losses in the savings analysis and supporting documentation. Discussion included in PY2010-1 TRM.
- 10/5/11 – Currently Under Review.

Major Changes:

- Eliminated Military figure as no foreseeable military retrofit applications will be received.
- Demand change to weighted average from KEMA 2008. 0.46 kW
- Changed individual water usage from 13.3035 to 13.3

Measure Description:
The Solar Water Heating Loan Interest Buydown Program offers eligible borrowers an interest buy down of $1,000 (with a minimum loan of $5,000) toward the financing of a solar water heating system from a participating lender – see www.hawaiienergy.com for a list of participating lenders.

Replacement of Electric Resistance Water Heater with a Solar Water Heater designed for a 90% Solar Fraction. The new Solar Water Heating systems most often include an upgrade of the hot water storage tank sized at 80 or 120 gallons.

Systems must comply with Hawaii Energy Solar Standards and Specifications which call out:

- Panel Ratings
- System Sizing
- Installation orientation de-rating factors
- Hardware and mounting systems

Shell Losses:
The increase in size from a 40 or 60 gallon to an 80 or 120 gallon standard electric resistance water heater would in and of itself increase the “shell” losses of the system. These shell losses are the result of a larger surface area exposing the warm water to the cooler environment and thus more heat lost to the environment through conduction through the tank. Engineering calculations by Econorthwest puts this at a 1% increase in losses. This is further reduced by 90% as the solar water system provides that fraction of the annual water heating requirements.

Baseline Efficiencies:
Baseline usage is a 0.9 COP Electric Resistance Water Heater. The baseline water heater energy consumption is by a single 4.0 kW electric resistance element that is controlled thermostatically on/off

controller based of tank finish temperature set point. The tank standby loss differences between baseline and high efficiency case are assumed to be negligible.

Demand Baseline has been determined by field measurements by KEMA 2005-07 report. The energy baseline also comes from the KEMA 2005-07 report and is supported by engineering calculations shown in this TRM.

Building Types	Demand Baseline(kW)	Energy Baseline (kWh)
Residential	0.57	2,733

High Efficiency:
Solar Water Heater designed for a 90% Solar Fraction. The Solar Systems use solar thermal energy to heat the water 90% of the time and continue to utilize electricity to operate the circulation pump and provide heating through a 4.0 kW electric resistance element when needed.

Solar Contractors do not favor Photo-Voltaic powered DC circulation pumps as they have proven less reliable in the field than an AC powered circulation pump.

The electric resistance elements in the high efficiency case do not have load control timers on them.

The energy is the design energy of a 90% solar fraction system with circulation pump usage as metered by KEMA 2008.

The on peak demand is the metered demand found by KEMA 2008.

Building Types	Demand High Efficiency (kW)	Energy High Efficiency (kWh)	Circ. Pump %
Residential	0.07	379	28%

Energy Savings:

Solar Water Heater Gross Savings before operational adjustments:

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Residential	0.46	2,354

Operational Factor	Adjustment Factor
Solar Fraction Performance (sfp)	0.94
Persistence Factor (pf)	0.93
Demand Coincidence Factor (cf)	1.0

Solar Water Heater Net Savings after operational adjustments:

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Residential	0.46	2,065

Savings Algorithms

Solar Water Heater - Non-Military Single Family Home

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.141	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		23,000	BTU/Day	
Energy per Day (BTU) Needed in Tank		23,000	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	kWh / BTU	
Energy per Day (kWh)		6.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		205	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		2,459	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		2,732	kWh / Year	KEMA 2008 - HECO
Design Annual Solar Fraction		90%	Water Heated by Solar System	Program Design
		10%	Water Heated by Remaining Backup Element	
Energy Usage per Year at the Meter		2,732	kWh / Year	
	x	10%	Water Heated by Remaining Backup Element	
Back Up Element Energy Used at Meter		273	kWh / Year	
Circulation Pump Energy		0.082	kW	KEMA 2008
Pump Hours of Operation	x	1,292	Hours per Year	KEMA 2008
Pump Energy used per Year		106	kWh / Year	
Back Up Element Energy Used at Meter		273	kWh / Year	72%
Pump Energy used per Year	+	106	kWh / Year	28%
Design Solar System Energy Usage		379	kWh / Year	
Base SERWH Energy Usage per Year at the Meter		2,732	kWh / Year	
Design Solar System Energy Usage	-	379	kWh / Year	
Design Solar System Energy Savings		2,353	kWh / Year	
Design Solar System Energy Savings		2,353	kWh / Year	
Performance Factor		0.94	pf	HE
Persistance Factor	x	0.93	pf	KEMA 2008
		2,065	kWh / Year	KEMA 2008
Residential Solar Water Heater Energy Savings		**2,065**	**kWh / Year Savings**	

Operating Hours
See Table above.

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Persistence
The persistence factor has been found to be 0.93 based in the KEMA 2005-07 report that found 7% of the systems not operational.

Lifetime
20 years (Table 7.3)

Measure Costs and Incentive Levels
Incentive = $1000 to lender to buydown interest on SWH loan.

8.1.3 Solar Water Heater Energy Hero Gift Packs

Version Date & Revision History
Draft date: October 4, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07)
- Econorthwest TRM Review – 6/23/10
- Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Management Programs – (KEMA 2005-07)
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- 11/22/11 – LED algorithm updated. See section 8.2.2 for changes.
- 11/22/11 – Akamai Power Strip kWh savings updated based on NYSERDA Measure Characterization for Advanced Power Strips.
- 11/22/11 – Updated content in headings *Description*, *Base Case*, *High Efficiency Case*, and *Energy Savings* in regard to LED lamps to match section 8.2.2.
- 11/29/11 – Low Flow Shower Head algorithm updated – previously claiming only 50% of total energy savings due to inaccurately calculating hot and cold water mix. Also updated *Energy Savings* table as necessary.
- 4/17/12 – Updated CFL and LED algorithms to refer to CFL and LED sections in TRM to ensure accuracy. Updated energy savings numbers to be consistent with EMV revisions.

Description:
Potential gift pack components:
- Compact Fluorescent Lamp
- Akamai Power Strip
- LED Lamp
- Low Flow Shower Head

Base Case

- 60 W incandescent lamps
- Standard power strip or no power strip
- 25% 60W incandescent, 25% 40W incandescent, 25% 23W CFLs and 25% 13W CFLs (See LED TRM)
- Low Flow Shower Head rated at 2.5 gpm

High Efficiency Case

- 15W CFLs
- Akamai Power Strip
- 50% 7W LED Lamp and 50% 12.5W LED Lamp
- Low Flow Shower Head rated at 1.5 gpm

Energy Savings

Measure	Energy Savings (kWh/year)	Demand Savings (kW)
3 CFL	108.8	0.0156
Power Strip	78.0	0.0089
LED	16.6	0.0026
Low Flow Shower Head - Solar	42.5	0.0220
TOTAL	**246**	**0.049**

Measure life

Measure	Measure Life *(Years)*
Compact Fluorescent Lamp	5
Akamai Power Strip	5
LED	5
Low Flow Shower Head	10

Savings Algorithms

CFL - Single and Multi Family Residential Home

Refer to TRM Compact Fluorescent Lamp (CFL) Section

Akamai Power Strips				
Savings per Unit	56.5 kWh		102.8 kWh	*NYSERDA Measure Characterization for*
Plugs per Unit	5 plugs		7 plugs	Advanced Power Strips
Savings per Plug	11.3 kWh/plug		14.68571 kWh/plug	
Average Savings per Plug			13.0 kWh	
		x	6 plugs/unit	
Akamai Power Strip Energy Savings			**78 kWh per Unit first year**	
Hours of Operation			8760 hours/year	
Demand Savings			**0.0089 kW**	

First Year Savings		78	kWh first year
Measure Life	x	5	year measure life
Lifetime Savings		389.78571	kWh lifetime
Total Resource Cost		$ 30.96	
Total Resource Benefit	÷	$ 46.15	
Total Resource Cost Ratio		1.5	TRB Ratio
Potential Akamai Power Strip Incentive		$ 7.00	
First Year Savings	÷	66	kWh first year
		$ 0.11	per kWh first year
Standard Power Strip Cost		$ 14.49	
Akamai Power Strip Cost	-	$ 30.96	
Incremental Akamai Power Strip Cost		$ 16.47	
Incremental Akamai Power Strip Cost		$ 16.47	
Potential Akamai Power Strip Incentive	÷	$ 7.00	
Percentage of Incremental Cost		43%	
Akamai Power Strip Cost		$ 30.96	
Potential Akamai Power Strip Incentive	÷	$ 7.00	
Percentage of Customer Measure Cost		23%	

LED - Single and Multi Family Residential Home

Refer to TRM Light Emitting Diode (LED) Section

Low Flow Showerhead w/Solar Water Heating

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.2	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	BTU/kWh	
Energy per Day (kWh)		6.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		205	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		2,460	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		2,733	kWh / Year	KEMA 2008 - HECO
Design Annual Solar Fraction		90%	Water Heated by Solar Syste	Program Design
		10%	Water Heated by Remaining Backup Element	
Energy Usage per Year at the Meter		2,733	kWh / Year	
	x	10%	Water Heated by Remaining Backup Element	
Back Up Element Energy Used at Meter		273	kWh / Year	
Circulation Pump Energy		0.082	kW	KEMA 2008
Pump Hours of Operation	x	1,292	Hours per Year	KEMA 2008
Pump Energy used per Year		106	kWh / Year	
Back Up Element Energy Used at Meter		273	kWh / Year	72%
Pump Energy used per Year	+	106	kWh / Year	28%
Design Solar System Energy Usage		379	kWh / Year	
Utilization Factor		28%		Hot water used for showers (AMMA)
Hot Water Usage from Showers		106		
Base Case Showerhead		2.5	GPM	
High Efficiency Case Showerhead		1.5	GPM	
Savings = (1 - High Efficiency/Base)		40%		
Energy Savings		**42**	**kWh / Year**	
Solar System Metered on Peak Demand		0.11	kW On Peak	KEMA 2008
Demand Savings		40%		
Residential Low Flow Shower Head Demand Savings		**0.044**	**kW Savings**	

8.1.4 Heat Pump Water Heaters

Measure ID: See Table 7.3

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- From SalesForce Measures (Impact)
- October 2004 (KEMA Report)
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- Recognizing the growing product availability and sales efforts regarding residential heat pumps, increase educational efforts.
- Changed base SERWH element power consumption from 4.5 kW to 4.0 kW

Measure Description:
Residential heat pump rebates are available at $200. Rebate applications for water heaters are provided by the retailers at the time of purchase or a customer can visit our website and download the form. Rebate applications must include an original purchase receipt showing brand and model number.

Baseline Efficiencies:

The base case is a standard electric resistance water heater (SERWH).

Measure	Demand Baseline (kW)	Energy Baseline (kWh/year)
SERWH	0.57	2,732

High Efficiency:

Measure	Demand Efficient Case (kW)	Efficient Case (kWh/year)
Heat Pump Water Heating	0.36	1,230

Energy Savings:

	Demand Savings (kW)	Energy Savings (kWh/year)
Savings	0.25	1,503

Savings Algorithms

Heat Pump Water Heater

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.1	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		23,000	BTU/Day	
Energy per Day (BTU) Needed in Tank		23,000	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	kWh / BTU	
Energy per Day (kWh)		6.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		205	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		2,459	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		2,732	kWh / Year	KEMA 2008 - HECO
Energy (kWh) Needed to Heat Water per Year		2,459	kWh / Year	
Heat Pump Water Heating Efficiency	÷	2.00	COP	
Heat Pump Water Heating Energy Usage		1,230	kWh / Year	
Base SERWH Energy Usage per Year at the Meter		2,732	kWh / Year	
Heat Pump Water Heating Energy Usage	-	1,230	kWh / Year	
Residential Heat Pump Water Heating Savings		1,503	kWh / Year	
Heat Pump Power Consumption		4.5	kW	
Coincedence Factor	x	0.08	cf	4.80 Minutes per hour
		0.36	kW On Peak	
Base SERWH Element Power Consumption		4.0	kW	
Coincidence Factor	x	0.143	cf	8.6 Minutes per hour
Base SERWH On Peak Demand		0.57	kW On Peak	KEMA 2008
Base SERWH On Peak Demand	-	0.57	kW On Peak	
Heat Pump Water Heater Demand	-	0.36	kW On Peak	KEMA 2008
		0.21	kW On Peak	
Residential Heat Pump Demand Savings		**0.21**	**kW Savings**	

Operating Hours
See Table above.

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Persistence

Lifetime
10 years (DEER)

Measure Costs and Incentive Levels

Incentive = $200

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Reference Tables

8.2 High Efficiency Lighting

8.2.1 Compact Fluorescent Lamp (CFL)

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07)
- Econorthwest TRM Review – 6/23/10
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 6/23/10 Rec. # 8 – Starting with PY2010, adjust the hours used per day for CFLs from 4.98 to 2.3 in order to be consistent with other literature. Conduct additional research to verify the most appropriate hours of operation for the Hawaii customer base, which can be incorporated into future years. – Adopted.
- 6/23/10 Rec. # 9 - Starting with PY 2010, adjust the peak coincidence factor from 0.334 to 0.12 to be consistent with the literature. Conduct additional research to verify the most appropriate coincidence factor for the Hawaii customer base, which can be incorporated into future years.- Adopted.
- 10/5/11 – Currently Under Review.
- 4/17/12 – Updated persistence factor to 0.96 and removed adjustment for mix of CFL sizes found in CA study as per EMV report February 23, 2012. Updated energy and demand savings accordingly.

Major Changes:
- Hours used per day for CFLs from 4.98 to 2.3 hrs.
- Peak coincidence factor from 0.334 to 0.12
- Persistence factor changed from 0.80 to 0.96 as per EMV
- Adjustment for mix of CFL sized found in CA study removed as per EMV

Measure Description:
The replacement of incandescent screw-in lamps to standard spiral compact fluorescent lamps in Residential Single Family and Multi-family homes.

Lamps must comply with:
- Energy Star
- UL

Baseline Efficiencies:
Baseline usage is a 60W A-Shaped incandescent lamp with the energy consumption as follows:

Building Types	Demand Baseline(kW)	Energy Baseline (kWh)
Single Family	0.060	50.4
Multi Family	0.060	50.4

High Efficiency:
The high efficiency case is a 15W Spiral CFL with the energy consumption as follows:

Building Types	Demand High Efficiency (kW)	Energy High Efficiency (kWh)
Single Family	0.015	12.6
Multi Family	0.015	12.6

Energy Savings:
CFL Gross Savings before operational adjustments:

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Single Family	0.005	36.3
Multi Family	0.005	36.3

CFL Net Savings after operational adjustments:

Operational Factor	Adjustment Factor
Persistence Factor (pf)	0.960
Demand Coincidence Factor (cf)	0.12

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Single Family	0.005	36.3
Multi Family	0.005	36.3

Savings Algorithms

CFL - Single and Multi Family Residential Home

60W Incandescent Lamp Demand		0.060	kW		
		2.30	Hours per Day		
	x	365	Days	839.5	Hours per Year
60W Incandescent Lamp Energy Usage		50.4	kWh per Year		
15W Compact Fluorescent Lamp Demand		0.015	kW		
		2.30	Hours per Day		
	x	365	Days	839.5	Hours per Year
15W Compact Fluorescent Lamp Energy Usage		12.6	kWh per Year		
60W Incandescent Lamp Energy Usage		50.4	kWh per Year		
15W Compact Fluorescent Lamp Energy Usage	-	12.6	kWh per Year		
CFL Savings Before Adjustments		37.8	kWh per Year		
		37.8	kWh per Year		
Persistance Factor	x	0.960	pf	4.0%	Lamps not installed or replaced back
CFL Energy Savings		36.3	kWh per Year		

CFL Energy Savings	**36.3**	**kWh / Year Savings**

60W Incandescent Lamp Demand		0.060	kW		
15W Compact Fluorescent Lamp Demand	-	0.015	kW		
CFL Demand Reduction Before Adjustments		0.045	kW		
CFL Demand Reduction Before Adjustments		0.045	kW		
Coincidence Factor		0.120	cf	12.0%	Lamps on between 5 and 9 p.m.
Persistance Factor	x	0.960	pf	4.0%	Lamps not installed or replaced back
CFL Demand Savings		0.005	kW		

CFL Demand Savings	**0.005**	**kW Savings**

Operating Hours
2.3 hours per day, 839.5 hours per year

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Demand Coincidence Factor
Estimated coincidence factor of 0.12 cf assumes that 12% of the lamps purchased would be operating during the winter 5 p.m. to 9 p.m. weekday peak period.

Persistence
Estimated persistence factor of 0.96 pf which assumes 4% of the lamps purchased not installed or returned back to incandescent.

Lifetime
6 years

Measure Costs and Incentive Levels

Table 1 – Residential CFL Measure Costs and Incentive Levels

Description	Unit Incentive	Incremental Cost
Standard CFL - Res	$ 1.00	$ 2.50

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Reference Tables
None

8.2.2 Light Emitting Diode (LED)

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- 11/21/11 – Updated tables and text in the following headings:
  - Measure description
  - Baseline efficiencies
  - High efficiency
  - Energy savings
  - Savings algorithm

  Updates made to capture a broader range of lamp types (two wattages per lamp type) and obtain more accurate savings calculations.
- 11/21/11 – Changed the following text under *Energy Savings* heading: 1) "LED Gross Savings before operational adjustments" was changed to "LED Savings before…" and 2) "CFL Net Savings after operational adjustments" was changed to "LED Savings after…"
- 11/21/11 – Under *Energy Savings* heading changed table to only one building type because savings are calculated the same between single and multi-family housing.
- Removed the 1.08 size adjustment factor.

Measure Description:
The replacement of a standard incandescent lamp (40W or 60W) or spiral compact fluorescent lamp (13W or 23W) with a light emitting diode (7W or 12.5 W) in both Residential Single Family and Multi-family homes.

Lamps must comply with:
- Energy Star
- UL

Baseline Efficiencies:
Baseline usage is a combination of standard incandescent lamp (40W or 60W) or spiral compact fluorescent lamp (15W or 23W) A-Shaped incandescent lamp with the energy consumption as follows:

Baseline Efficiency					
Lamp Types	Demand Baseline (kW)	Hours per Day	Energy Baseline (kWh/year)	%	Totals
Incandescent	0.060	2.3	50.4	25%	12.59
CFL	0.015	2.3	12.6	25%	3.15
Incandescent	0.040	2.3	33.6	25%	8.40
CFL	0.023	2.3	19.3	25%	4.83
Demand Ave	**0.035**			**Total Baseline Energy (kWh)**	**28.96**

High Efficiency:
The high efficiency case is a 7W or 12.5W LED with the energy consumption as follows:

High Efficiency					
Lamp Types	**Demand Baseline (kW)**	**Hours per Day**	**Energy Baseline (kWh/year)**	**%**	**Totals**
LED	0.007	2.3	5.9	50%	2.94
LED	0.0125	2.3	10.5	50%	5.25
Demand Ave	**0.010**	**Total High Efficiency Energy (kWh)**			**8.19**

Energy Savings:
LED Savings before operational adjustments:

Total Baseline Energy (kWh)	29.0
Total High Efficiency Energy (kWh)	8.2
Annual Energy Savings (kWh)	**20.8**

LED Savings after operational adjustments:

Persistence Factor (pf) 0.80
Demand Coincidence Factor (cf) 0.12

Demand Savings (kW)	Energy Savings (kWh)
0.003	16.6

Savings Algorithms

LED - Single and Multi Family Residential Home

Lamp Average Demand		0.035	kW		
		2.30	Hours per Day		
	x	365	Days	839.50	Hours per Year
Baseline Energy Usage		28.96	kWh per Year		
Enhanced LED Lamp Average Demand		0.010	kW		
		2.30	Hours per Day		
	x	365	Days	839.50	Hours per Year
Enhanced LED Lamp Energy Usage		8.19	kWh per Year		
Baseline Energy Usage		29.0	kWh per Year		
Enhanced LED Lamp Energy Usage	-	8.2	kWh per Year		
LED Savings Before Adjustments		20.78	kWh per Year		
		20.8	kWh per Year		
Persistance Factor	x	0.800	pf	20.0%	Lamps not installed or replaced back
		16.6	kWh per Year		
LED Energy Savings		**16.6**	**kWh / Year Savings**		
Baseline Lamp Demand		0.035	kW		
Enhanced LED Lamp Demand	-	0.007	kW		
LED Demand Reduction Before Adjustments		0.028	kW		
LED Demand Reduction Before Adjustments		0.028	kW		
Coincidence Factor		0.120	cf	12.0%	Lamps on between 5 and 9 p.m.
Persistance Factor	x	0.800	pf	20.0%	Lamps not installed or replaced back
		0.003	kW		
LED Demand Savings		**0.003**	**kW Savings**		

Operating Hours
2.3 hours per day, 839.5 hours per year

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Demand Coincidence Factor
Estimated coincidence factor of 0.12 cf assumes that 12% of the lamps purchased would be operating during the winter 5 p.m. to 9 p.m. weekday peak period.

Persistence
Estimated persistence factor of 0.80 pf which assumes 20% of the lamps purchased not installed or returned back to incandescent.

Lifetime
15 years

Measure Costs and Incentive Levels

Table 1 – Residential LED Measure Costs and Incentive Levels

Description	Unit Incentive	Incremental Cost
LED - Res	$ 7.00	$ 35.00

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Reference Tables
None

8.3 High Efficiency Air Conditioning

8.3.1 VRF Split System AC

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description: Inverter driven variable refrigerant flow (VRF) air conditioning systems are direct expansion AC systems that utilize variable speed evaporator/condenser fans, and a combination of fixed and variable speed compressors along with most often multiple individual zone evaporators to provide the ability to more closely match the AC system's output with the building's cooling requirements.
Savings comes from:
- *Part Load Efficiencies*: Increased part-load efficiency operation
- *High Efficiency Motors*: Many systems use ECM motors
- *Higher Room Temperatures*: The capacity matching allows for better humidity control through longer cooling operation.
- *Reduction of Distribution Losses*: Duct losses are reduced with DX systems. This may be offset by dedicated outside air distribution systems when needed.

Payback Qualifications: VRF products need a payback requirement of 1 year or greater. The TRB/TRC must be greater than 1.

Energy and Demand Savings: VRF systems have demonstrated a 20-30% reduction in energy consumption as compared to standard DX equipment. The energy savings and demand tables that follow provide the savings by building type and system size for VRF systems.

The VRF applications have been new construction projects with no ability to perform pre and post measurements. Hawaii Energy will perform field pre and post field measurements to determine the measure effectiveness in the local environment

Savings Algorithms

VRF Split System AC - Single and Multi Family Residential Home				
Base Case				
Conventional Room AC Built After 1994				
Average Unit Cooling Capacity		12,000	BTU / Hr	(Equals 1 Ton Cooling Capacity)
Energy Efficiency Ratio	÷	9.8	EER	DOE Federal Test Procedure 10CFR 430, Appendix F
Full Load Demand		1,224.5	Watts	
Conversion	÷	1,000.0	Watts / kW	
Full Load Demand		1.2	kW	
Conventional Room AC Full Load Demand		1.2	kW	
Honolulu Full Load Equivalent Cooling Hours	x	5,016.0	Hours per Year	EPA 2002
Conventional Room AC Annual Energy Consumption		6,142.0	kWh per Year	
VRF Split System AC				
Average Unit Cooling Capacity		12,000	BTU / Hr	(Equals 1 Ton Cooling Capacity)
Energy Efficiency Ratio	÷	13.0	EER	Minimum Requirement (AHRI 1230)
Full Load Demand		923.1	Watts	(Energy Star Criteria = 10.8 EER)
Conversion	÷	1,000.0	Watts / kW	
Full Load Demand		0.9	kW	
VRFSplit AC Full Load Demand		0.923	kW	
Honolulu Full Load Equivalent Cooling Hours	x	5,016.0	Hours per Year	EPA 2002
VRF Split Annual Energy Consumption		4,630.2	kWh per Year	
Conventional Room AC Annual Energy Consumption		6,142.0	kWh per Year	
VRF Split Annual Energy Consumption	-	4,630.2	kWh per Year	
VRF Split Annual Energy Savings		1,511.9	kWh per Year	
VRF Split Annual Energy Savings		1,512	kWh per Year	
Single Family Use Factor	x	0.46		2,307 Single Family Full Load Operating Hours (inferred)
Single Family VRF Split AC Annual Energy Savings		695	kWh per Year	
VRF Split Annual Energy Savings		1,512	kWh per Year	
Multi Family Use Factor	x	0.25		1,135 Multi Family Full Load Operating Hours (inferred)
Multi FamilyVRF Split AC Annual Energy Savings		371	kWh per Year	
Single Family Use Weighting		40%		HECO DSM Docket 2006 - Global Energy Partners
Multi Family Use Weighting		60%		HECO DSM Docket 2006 - Global Energy Partners
Single Family VRF Split AC Annual Energy Savings		695	kWh per Year	
Single Family Use Weighting	x	40%		
Single Family Savings Contribution to Measure		278	kWh per Year	
Multi FamilyVRF Split AC Annual Energy Savings		370.5734266	kWh per Year	
Multi Family Use Weighting	x	60%		
Multi Family Savings Contribution to Measure		222	kWh per Year	
Single Family Savings Contribution to Measure	-	278	kWh per Year	
Multi Family Savings Contribution to Measure	+	222	kWh per Year	
		501	kWh per Year	
		501		
Persistance Factor	x	1	pf	100.0%
		501	kWh per Year	
VRF Split AC Energy Savings		**501**	**kWh / Year Savings**	
Conventional Room AC Full Load Demand		1.224	kW	0.225
VRF Split AC Full Load Demand	-	0.923	kW	0.167
VRF AC Demand Reduction Before Adjustments		0.301	kW	
Single Family				
VRF Split AC Demand Reduction Before Adjustments		0.301	kW	
On Peak Demand Coincidence Factor	x	1.00	cf	100.0% Single Family ACs on between 5 and 9 p.m.
Single Family Demand Savings		0.301	kW	
Single Family Use Weighting	x	40%		
Single Family Savings Contribution to Measure		0.121	kW	
Multi Family				
VRF Split AC Demand Reduction Before Adjustments		0.301	kW	
On Peak Demand Coincidence Factor	x	0.74	cf	74.4% Multi Family ACs on between 5 and 9 p.m.
Multi Family Demand Savings		0.224	kW	
Multi Family Use Weighting	+	60%		
Multi Family Savings Contribution to Measure		0.135	kW	
Single Family Savings Contribution to Measure		0.12	kW	
Multi Family Savings Contribution to Measure	x	0.13	kW	
VRF Split AC Measure Demand Savings		0.26	kW	
VRF Split AC Measure Demand Savings	-	0.255	kW	
Persistance Factor	x	1.0	pf	100.0% ACs installed and operational at EER Efficiency
		0.26	kW	
Single & Multi Family VRF Split AC Demand Savings		**0.26**	**kW Savings**	

Measure Incentive/Incremental Cost

Incentive = $200/unit

8.3.2 Ceiling Fans

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- ENERGY STAR Ceiling Fan Savings Calculator

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:
This measure describes the instillation of an ENERGY STAR ceiling fan that uses a high efficiency motor and contains compact fluorescent bulbs in place of a standard fan with integral incandescent bulbs.

Baseline Efficiencies:
The baseline equipment is assumed to be a standard fan with integral incandescent bulbs.

High Efficiency:
The efficient equipment must be an ENERGY STAR certified ceiling fan with integral CFL bulbs.

Energy Savings:

	Average Annual kWh savings per unit	Average Coincident Peak kW savings per unit
2010 - 2013	167	0.019
2014 on	97	0.012

$\Delta kWh = ((\%_{low} * (LowKW_{base} - LowKW_{ee}) + \%_{med} * (MedKW_{base} - MedKW_{ee}) + \%_{high} * (HighKW_{base} - HighKW_{ee})) * HOURS_{fan}) + ((IncKW – CFLKW) * HOURS_{light} * WHFe)$

Where:

$\%_{low}$ = Percent of time on Low Speed = 40%
$\%_{med}$ = Percent of time on Medium Speed = 40%
$\%_{high}$ = Percent of time on High Speed = 20%
$LowWatt_{base}$ = Low speed baseline ceiling fan wattage = 0.0152 kW
$LowWatt_{ee}$ = Low speed ENERGY STAR ceiling fan wattage = 0.0117 kW
$MedWatt_{base}$ = Medium speed baseline ceiling fan wattage = 0.0348 kW
$MedWatt_{ee}$ = Medium speed ENERGY STAR ceiling fan wattage = 0.0314 kW
$HighWatt_{base}$ = High speed baseline ceiling fan wattage = 0.0725 kW
$HighWatt_{ee}$ = High speed ENERGY STAR ceiling fan wattage = 0.0715 kW
$HOURS_{fan}$ = Typical fan operating hours (2.8/day, 365 days per year) = 1022 hours
IncWatt = Incandescent bulb kW (assumes 3 * 60W bulb) = 0.180kW
CFLWatt = CFL bulb kW (assumes 3 * 20W bulb) = 0.060kW
$HOURS_{light}$ = Typical lighting operating hours (3.5/day, 365 days per year) = 1277.5 hours
WHFe = Waste Heat Factor for Energy to account for cooling savings from Efficient lighting. = 1.07

ΔkWh = ((0.4 * (0.0152 – 0.0117) + 0.4 * (0.0348 – 0.0314) + 0.2 * (0.0725 – 0.0715)) * 1022) + ((0.18 – 0.06) * 1277.5 * 1.07)

= **167 kWh**

Baseline Adjustment

Federal legislation stemming from the Energy Independence and Security Act of 2007 will require all general-purpose light bulbs between 40 and 100W to be approximately 30% more energy efficient than current incandescent bulbs, in essence beginning the phase out of standard incandescent bulbs. In 2012 100W incandescents will no longer be manufactured, followed by restrictions on 75W in 2013 and 60W in 2014. The baseline for this measure will therefore become bulbs (improved incandescent or halogen) that meet the new standard. To account for these new standards, first year annual savings for this measure must be reduced beginning in 2014. This measure assumes 60W baseline bulbs, which in 2014 will become 43W and so the annual savings beginning in 2014 should therefore be:

ΔkWh = ((0.4 * (0.0152 – 0.0117) + 0.4 * (0.0348 – 0.0314) + 0.2 * (0.0725 – 0.0715)) * 1022) + ((0.129 – 0.06) * 1277.5 * 1.07)

= **97 kWh**

In addition, since during the lifetime of a CFL, the baseline incandescent bulb will be replaced multiple times, the annual savings claim must be reduced within the life of the measure. Therefore, for bulbs installed in 2010, the full savings (167kWh) should be claimed for the first four years, but the reduced annual savings (97kWh) claimed for the remainder of the measure life. The savings adjustment is therefore equal to 97/167 = 58%.

Coincident Peak Demand Savings

ΔkW = (%low * (LowKWbase - LowKWee) + %med * (MedKWbase - MedKWee) + %high * (HighKWbase - HighKWee)) + ((IncKW – CFLKW) * WHFd) * CF

Where:

WHFd = Waste Heat Factor for Demand to account for cooling savings from efficient lighting = 1.21

CF = Peak Coincidence Factor for measure = 0.11

ΔkW = ((0.4 * (0.0152 – 0.0117) + 0.4 * (0.0348 – 0.0314) + 0.2 * (0.0725 – 0.0715)) + ((0.18 – 0.06) * 1.21) * 0.11

ΔkW = **0.019kW**

After 2014, this will be reduced to:

ΔkW = ((0.4 * (0.0152 – 0.0117) + 0.4 * (0.0348 – 0.0314) + 0.2 * (0.0725 – 0.0715)) + ((0.129 – 0.06) * 1.21) * 0.11

ΔkW = **0.012kW**

Operating Hours

See Table above.

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Lifetime
5 years (DEER)

Measure Costs and Incentive Levels

Description	Unit Incentive	Incremental Cost
Ceiling Fan	$ 40.00	$ 86.00

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

8.3.3 Solar Attic Fans

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description: Solar attic fan is assumed to reduce 10% of existing air conditioning load energy usage and no demand reduction from 5PM – 9PM.

Baseline Efficiencies:

The baseline case is no solar attic fan.

Base Case	Demand Baseline (kW)	Energy Baseline (kWh/year)
No Solar Attic Fan	1.00	5,016

High Efficiency:

High Efficiency Case	Efficient Case (kW)	Efficient Case (kWh/year)
Solar Attic Fan	1.00	4,514

Energy Savings:

Savings Type	Gross Customer Savings (kW)	Gross Customer Savings (kWh/year)
Gross Savings	0.00	502

Operational Factor	Adjustment Factor
Persistence Factor (pf)	0.00
Demand Coincidence Factor (cf)	0.00

Savings Type	Net Customer Savings (kW)	Net Customer Savings (kWh/year)
Net Savings	0.000	502

Savings Algorithms

Solar Attic Fan - Single Family Residential Home			
Energy Star Room AC Full Load Demand		1.0	kW
Honolulu Full Load Equivalent Cooling Hours	x	5,016	Hours per Year
Energy Star Room AC Annual Energy Consumption		5,016	kWh per Year
Energy Reduction Percentage with Solar Attic Fan		10.0%	
Energy Usage with Solar Attic Fan		4,514	kWh / Year Savings
Energy Star Room AC Annual Energy Consumption		5,016	kWh / Year Savings
Energy Usage with Solar Attic Fan	-	4,514	kWh / Year Savings
Solar Attic Fan Annual Energy Savings		502	kWh / Year Savings
Solar Attic Fan Annual Energy Savings		502	kWh / Year Savings
Persistance Factor	x	1.0	
Net Customer Level Savings		502	kWh / Year Savings
Solar Attic Fan Energy Savings		502	kWh / Year Savings
Energy Star Room AC Full Load Demand		1.00	kW
Peak Demand Reduction		0%	
AC Demand with Solar Attic Fan		1.00	kW
Energy Star Room AC Full Load Demand		1.00	kW
AC Demand with Solar Attic Fan	-	1.00	kW
Gross Customer Demand Savings		-	kW
Solar Attic Fan Demand Savings		0.000	kW Savings

Operating Hours
See Table above.

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Persistence
1.0

Lifetime
5 years

Measure Costs and Incentive Levels

Incentive = $50/unit

8.3.4 Whole House Fans

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- KEMA for the Sate of California Low-Income Energy Efficiency Program; calmac.org/publications/2001_LIEE_Impact_Evaluation.pdf
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 4/9/12 – Energy reduction percentage changed from .25 to .2 as per the EM&V report dated 23 Feb 2012. Added reference document from EM&V report.
- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:

Baseline Efficiencies:

Base Case	Demand Baseline (kW)	Energy Baseline (kWh/year)
No Whole House Fan	1.00	5,016

High Efficiency:

High Efficiency Case	Efficient Case (kW)	Efficient Case (kWh/year)
Whole House Fan	0.15	3,762

Energy Savings:

Savings Type	Gross Customer Savings (kW)	Gross Customer Savings (kWh/year)
Gross Savings	0.85	1,254

Operational Factor	Adjustment Factor
Persistence Factor (pf)	1.00
Demand Coincidence Factor (cf)	0.59

Savings Type	Net Customer Savings (kW)	Net Customer Savings (kWh/year)
Net Savings	0.50	1,254

Savings Algorithms

Whole House Fan - Single Family Residential Home			
Energy Star Room AC Full Load Demand		1.0	kW
Honolulu Full Load Equivalent Cooling Hours	x	5,016	Hours per Year
Energy Star Room AC Annual Energy Consumption		5,016	kWh per Year
Energy Reduction Percentage with Whole House Fan		20.0%	
Energy Usage with Whole House Fan		4,013	kWh / Year Savings
Energy Star Room AC Annual Energy Consumption		5,016	kWh / Year Savings
Energy Usage with Whole House Fan	-	4,013	kWh / Year Savings
Solar Attic Fan Annual Energy Savings		1,003	kWh / Year Savings
Solar Attic Fan Annual Energy Savings		1,003	kWh / Year Savings
Persistance Factor	x	1.0	
Net Customer Level Savings		1,003	kWh / Year Savings
Whole House Fan Energy Savings		1,003	kWh / Year Savings
Energy Star Room AC Full Load Demand		1.00	kW
Whole House Fan Demand	-	0.15	kW
Gross Customer Demand Reduction		0.85	kW
Gross Customer Demand Reduction		0.850	kW
Gross Customer Demand Reduction		0.850	kW
Persistence Factor		1.000	
Coincedence Factor	x	0.590	
Net Whole House Fan Demand Savings		0.50	kW Savings

Operating Hours
See Table above.

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Persistence/Coincidence Factor

Operational Factor	Adjustment Factor
Persistence Factor (pf)	1.00
Demand Coincidence Factor (cf)	0.59

Lifetime
5 years

Measure Costs and Incentive Levels

Description	Incentive	Incremental Cost
Whole House Fans	$ 75.00	$ 1,000.00

8.4 High Efficiency Appliances

8.4.1 Energy Star Clothes Washer & Refrigerator

Measure ID: See Table 7.3

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- HECO DSM Docket – Backup Worksheets - Global Energy (07-14-06)
- Econorthwest TRM Review – 6/23/10
- Department of Energy Refrigerator Profile – Updated December 2009

TRM Review Actions:

- 6/23/10 Rec. # 11 – Revise savings to be consistent with ENERGY STAR estimates. – Adopted with modifications on refrigerator figures based on DOE Refrigerator profile and the addition of bounty, recycle with new figures.
- 6/23/10 Rec. # 12 – Split the claimed savings by appliance. – Adopted.
- 6/23/10 Rec. # 13 – Incorporate solar hot water heating into appliance savings values – Adopted.
- 6/23/10 Rec. # 14 – Revise demand savings values for ENERGY STAR appliances – Adopted.
- 10/4/11 – Removed dishwashers from appliance list.
- 4/9/12 – Baseline efficiency for non-ES Refrigerator changed from 537 to 540. Number changed to match ES data.
- 10/5/11 – Currently Under Review.

Major Changes:

- Split between ESH appliances
- Incorporation of three refrigerator categories (new, new with turn in, and bounty (turn in only))
- All ESH 313 kWh and 0.12 kW changed to:
  - New ES Refrigerator Only – 105 kWh, .017 kW
  - New ES Refrigerator with Turn-In – 822 kWh, .034 kW
  - Bounty (Turn in only) – 859 kWh, .034 kW
  - Washing Machine – 206 kWh, .028 kW

Measure Description:
The replacement of standard Clothes Washers and Refrigerators in Residential Single Family and Multi-family homes.

Appliances must comply with:

- Energy Star

Refrigerators – ENERGY STAR refrigerators utilize improvements in insulation and compressors.

Clothes Washers – Clothes washers that meet ENERGY STAR criteria use next generation technology to cut energy and water consumption by over 40% compared to conventional washers. Clothes washers come in either front-load or redesigned top-load designs. Both configurations include technical innovations that help save substantial amounts of energy and water.

- **No Central Agitator** Front-loaders tumble clothes through a small amount of water instead of rubbing clothes against an agitator in a full tub. Advanced top loaders use sophisticated wash systems to flip or spin clothes through a reduced stream of water. Both designs dramatically reduce the amount of hot water used in the wash cycle, and the energy used to heat it.

- **High Spin Speeds** Efficient motors spin clothes two to three times faster during the spin cycle to extract more water. Less moisture in the clothes means less time and energy in the dryer.

Baseline Efficiencies:
Baseline energy usage based on 2009 Energy Star Information for the appliances are as follows:

	Demand Baseline (kW)	Energy Baseline (kWh)	Notes
Non ES Qualifying Refrigerator		540	19.0-21.4 Top Freezer
Non ES Qualifying Clothes Washer		787	392 Loads per Year

High Efficiency:
The high efficiency case Energy Star energy usage based on 2009 Energy Star Calculator Information and DOE Refrigerator Market Profile for the appliances is as follows:

	Demand High Efficiency (kW)	Energy High Efficiency (kWh)	Notes
ES Qualifying Refrigerator		435	19.0-21.4 Top Freezer
ES Qualifying Clothes Washer		563	392 Loads per Year

Energy Savings:

Energy Star Appliance Gross Savings before operational adjustments:

	Demand Savings (kW)	Energy Savings (kWh)
ES Refrigerator	0.017	105
ES Refrigerator with Turn-In	0.034	822
Bounty (Turn in only)	0.034	859
ES Washing Machine	0.028	206

Energy Star Appliance Net Savings operational adjustments:

Operational Factor	Adjustment Factor
Persistence Factor (pf)	1.0
Demand Coincidence Factor (cf)	1.0

Savings Algorithms

Energy Star Dishwasher & Clothes Washers - Single and Multi Family Residential Home

Based on DOE/EPA Energy Star Calculator and Econorthwest adjustment factor

	Standard Efficiency (kWh)	Energy Star Qualified (kWh)	Energy Savings (kWh)	Solar Water Heater Penetration Adjustment Factor	Claimed Energy Savings	Notes
ES Qualifying Clothes Washer	787	563	224	92%	206	392 Loads per Year

Energy Star Refrigerator and Turn In Refrigerator - Single and Multi Family Residential Home

Opportunity		Energy Usage		
New Non-ENERGY STAR		540		Table 2
New ENERGY STAR Refrigerator	-	435		Table 2
		105	kWh/Year	Table 1
#1 - Purchase of ENERGY STAR Refrigerator		105		Table 1
#2 - Removal of Old Unit from Service (off the grid)	+	717		Table 1
#1 + #2 = Purchase ES and Recycle old unit		822	kWh/Year	

	Energy Usage	Ratio	Contribution		
Post-1993 Refrigerator	640	55%	354.54		Table 3
Pre-1993 Refrigerator	1,131	45%	504.46		Table 3
			859	kWh/Year	

Table 1

Energy Savings Opportunities for Program Sponsors

Opportunity	Annual Savings			
	Per Unit		Aggregate U.S. Potential	
	kWh	$	MWh	$ million
1. Increase the number of buyers that purchase ENERGY STAR qualified refrigerators. • 9.3 million units were sold in 2008. • 70 percent were not ENERGY STAR. • 6.5 million potential units per year could be upgraded.	105	11.64	675,928	75
2. Decrease the number of units kept on the grid when new units are purchased. • 8.7 million primary units were replaced in 2008. • 44 percent remained in use, whether they were converted to second units, sold, or given away. • 3.8 million units are candidates for retirement every year.	717	79.53	2,746,062	305
3. Decrease the number of second units. • 26 percent of households had a second refrigerator in 2008. • 29.6 million units are candidates for retirement.	859	95.28	25,442,156	2,822
4. Replace pre-1993 units with new ENERGY STAR qualified models. • 19 percent of all units in use in 2008 were manufactured before 1993. • 27.3 million total potential units are candidates for targeted replacement.	730	81	19,946,440	2,212

Sources: See endnote 10.

Table 2

Energy and Cost Comparison for Upgrading to ENERGY STAR

Purchase Decision	New Non-ENERGY STAR Qualified Refrigerator	New ENERGY STAR Qualified Refrigerator
Annual Consumption	540 kWh	435 kWh
	$60	$48
Annual Savings	–	105 kWh
	–	$12
Average Lifetime	12 years	12 years
Lifetime Savings	–	1,260 kWh
	–	$140
Price Premium	–	$30 - $100
Simple Payback Period	–	3-9 years

Note: Calculations based on shipment-weighted average annual energy consumption of 2008 models. An ENERGY STAR qualified model uses 20 percent less energy than a new non-qualified refrigerator of the same size and configuration.

Source: See endnote 10.

Table 3

Energy and Cost Comparison for Removing a Second Refrigerator from the Grid

Fate of Unit	Post-1993 Unit		Pre-1993 Unit	
	Remains on the Grid	Removed from the Grid	Remains on the Grid	Removed from the Grid
Annual Consumption	640 kWh	–	1,131 kWh	–
	$71	–	$125	–
Annual Savings	–	640 kWh	–	1,131 kWh
	–	$71	–	$125
Average Lifetime*	6	–	6	–
Lifetime Savings*	–	3,840 kWh	–	6,788 kWh
	–	$426	–	$753
Removal Cost	–	$50 - $100	–	$50 - $100
Simple Payback Period	–	1-2 years	–	<1 year

*Assumes unit has six years of functionality remaining.

Sources: See endnote 10.

Operating Hours
Refrigerators = 8,760 hours per year
Clothes Washers = 392 Loads per Year

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Demand Coincidence Factor
NA

Persistence
NA

Lifetime
(DEER) 11 years for clothes washer
(DEER) 14 years for refrigerator

Measure Costs and Incentive Levels

Residential Measure Costs and Incentive Levels

Description	Unit Incentive	Incremental Cost HECO DSM Docket 2006	Incremental Cost Energy Star 2009
ES Refrigerator	$50	$ 60.36	$ 65
ES Clothes Washer	$50	$ 398.36	$ 258

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Water Descriptions

	Base Water Usage (Gallons)	High Efficiency Water Usage (Gallons)	Water Savings (Gallons)	Notes
Refrigerator	n/a	n/a		19.0-21.4 Top Freezer
Clothes Washer	12,179	5,637	6,542	392 Loads per Year

Reference Tables
None

8.4.2 Pool VFD Controller Pumps

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Davis Energy Group (2008). Proposal Information Template for Residential Pool Pump Measure Revisions. Prepared for Pacific Gas and Electric Company; Page 2.
- Residential Retrofit High Impact Measure Evaluation Report. The Cadmus Group. February 8, 2010.

TRM Review Actions:
- 4/9/12 – Measure updated per EMV report February 23, 2012. Coincidence Factor of .0862 added. Added algorithm for Evergreen with 4.25 hours in place of 6 hours per day. Added Cadmus Group reference.
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description
A variable speed residential pool pump motor in place of a standard single speed motor of equivalent horsepower.

Definition of Efficient Equipment
The high efficiency equipment is a variable speed residential pool pump.

Definition of Baseline Equipment
The baseline efficiency equipment is assumed to be a single speed residential pool pump.

$$\Delta kWh = (kWBASE \times Hours) \times 55\%\ BASE$$

Where:

Unit = variable speed pool pump
ΔkWh = Average annual kWh reduction
Hours = Average annual operating hours of pump
kWBASE = connected kW of baseline pump
55% = average percent energy reduction *(Davis Energy Group, 2008)*

Baseline Efficiency
The baseline efficiency case is a single speed pump.

Based Demand	0.70 kW
Base Energy Usage per day	2.97 kWh/day
Base Energy Usage per year	1085 kWh/year

High Efficiency

The high efficiency case is variable speed pump.

Demand Reduction	10%	
High Efficiency Demand	0.63	kW
Energy Savings	55%	
High Efficiency Energy Usage	488	kWh/year

Energy and Demand Savings

Demand Savings	1.278	kW
Coincidence Factor	0.0862	kW

Energy Savings per year	597	kWh/year
Peak Demand Reduction	0.006	kW

Savings Algorithm

Average Pool Pump Horesepower	0.75	HP
Efficiency	0.8	
Hours of operation per day	4.25	hours
Number of days pool in use	365	days per year
1 HP Equals	0.746	kW

Based Demand	0.70	kW
Base Energy Usage per day	2.97	kWh/day
Base Energy Usage per year	1085	kWh/year

Demand Reduction	10%	
High Efficiency Demand	0.63	kW
Energy Savings	55%	
High Efficiency Energy Usage	488	kWh/year

Demand Savings	1.278	kW
Coincidence Factor	0.0862	kW

Energy Savings per year	597	kWh/year
Peak Demand Reduction	0.006	kW

Lifetime of Efficient Equipment

The estimated useful life for a variable speed pool pump is 10 years.

Measure Cost

The incremental cost is estimated to be $750 for a variable speed motor

Incentives

$150/unit

8.5 Energy Awareness, Measurement and Control Systems

8.5.1 Room Occupancy Sensors

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
Flex your Power – "Occupancy sensors can reduce lighting costs by up to 50% in rooms where lights are frequently left on when on one is around."

According to the Federal Energy Management Program (FEMP) of the US Department of Energy, in a small, private office, an occupancy sensor can reduce energy use by almost 30% shaving 100kWh off the annual energy use. In a large open office area, energy use can be reduced by approximately 10%.

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:
This measure is for wall switch sensors that controls the use of lighting in areas around the home with variable use such as laundry, storage, garage, bedrooms or spare areas.

Occupancy sensors must comply with:
- Energy Star
- UL Listing

Baseline Efficiencies:
The base case is an even split between two (2) 60W A-Shaped incandescent lamp and 15W Compact Fluorescent Lamp with the energy consumption as follows:

Lamp Types	Demand Baseline (kW)	Hours per Day	Energy Baseline (kWh/year)	%	Totals
Incandescent	0.060	2.30	50.4	50%	25.2 kWh
CFL	0.015	2.30	12.6	50%	6.3 kWh
				Watts per Lamp	31.5 W
				Lamps	2
				Total Baseline Energy (kWh)	63.0 kWh

High Efficiency:
The high efficiency case is 33% run time reduced.

Lamp Types	Demand Baseline (kW)	Hours per Day	Energy Baseline (kWh/year)	%	Totals
Incandescent	0.060	1.54	33.7	50%	16.9 kWh
CFL	0.015	1.54	8.4	50%	4.2 kWh
				Watts per Lamp	21.1 W
				Lamps	2
				Total High Efficiency Energy (kWh)	42.2 kWh

Energy Savings:

Total Baseline Energy (kWh)	63.0 kWh
Total High Efficiency Energy (kWh)	42.2 kWh
	20.8 kWh

Savings Algorithms

Room Occupancy Sensors - Single and Multi Family Residential Home				
Two (2) - Lamp Demand		0.075	kW	Even split between 60W Incand. and 15W CFL
		2.30	Hours per Day	
	x	365	Days	839.5 Hours per Year
Baseline Energy Usage		63.0	kWh per Year	
Run Time Reduced (RTR)		0.76	Hours per Day	33%
		63.0	kWh per Year	
	x	0.330		33% Run Time Reduced
		20.8	kWh per Year	
Energy Savings		**20.8**	**kWh / Year Savings**	
Two Lamp Demand Reduction Before Adjustments		0.075	kW	
Demand Reduction Before Adjustments		0.038	kW	
Coincidence Factor		0.120	cf	12.0% Lamps on between 5 and 9 p.m.
Persistance Factor	x	1.000	pf	100.0%
		0.0046	kW	
Demand Savings		**0.0046**	**kW Savings**	

Operating Hours
2.3 hours per day

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Coincidence
CF = 0.12 (12% lamps on between 5PM – 9PM)

Persistence
PF =1.0

Lifetime
8 years (DEER)

Measure Costs and Incentive Levels

Incentive = $5

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Reference Tables
None

8.5.2 Peer Group Comparison

Version Date & Revision History
Draft date: September 18, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- *Study 1* - Environmental Defense Fund: Behavior and Energy Savings (Matt Davis) 2011 - Reports sent to a random subset of customers are shown to reduce energy demand by **1.8%** on average, with the effectiveness of individual programs ranging from 0.9% to 2.9%.

- *Study 2* - Navigant Consulting Evaluation Report: OPOWER SMUD Pilot Year2 (February 20, 2011) - OPOWER is pleased to share the latest analysis of the nation's longest running behavioral energy program, our 35,000 household Home Energy Report deployment with Sacramento Municipal Utility District (SMUD). The analysis was led by Bill Provencher, Associate Director of the Navigant Consulting Energy Practice, and reviews data from April 2008 to October 2010. Navigant confirms the persistence, and even increase, of savings over the program's lifetime. The key findings of the updated report are:
    - Year 1 savings = **2.25%**
    - Year 2 savings = 2.89%, a 22% increase over Year 1
    - Highest savings occur during the peak season: 3.56% savings in July and August of 2009
    - No sign of impact deterioration over 30 months

- *Study 3* - DBEDT / ARRA Hawaii Energy Residential Peer Group Pilot Program – This program was implemented in 2011 for 15,000 participants with 10,000 control group. The energy savings results for the program to date are as follows:
    - April 2011: 0.60%
    - May 2011: 1.10%
    - June 2011: 1.37%
    - August 2011: 1.50%
    - Average YTD: **1.14%**

TRM Review Actions:

- Continue to monitor participant vs control group energy usage comparison.
- 10/5/11 – Currently Under Review.

Major Changes:

- New PBFA 100% funded program.
- 11/22/11 – Removed detailed table from *Energy Savings* heading – not pertinent information.

Measure Description:
The Behavior/Feedback programs send monthly energy use reports to participating electric customers in order to change customers' energy-use behavior. These reports rank the customers within a group of 100 similar sized homes in their neighborhood. Customers are also directed to a website with energy efficient tips and recommendations on energy conservation.

Energy Savings
The unit energy savings of 1.73% is deemed based on study results, forecasting and prior OPOWER program performances.

Peer Group Program - First Year Performance Average	
Study 1	1.80%
Study 2	2.25%
Study 3	1.14%
Average	1.73%

Example Algorithm Calculating Customer Level Impact

ΔkWh = (Total Monthly Base Energy Usage)(# of Participating Months)(%Savings)
ΔkW = Annual ΔkWh per Unit/ 3000 hours

Where:
Unit = One participant household
%Savings = Energy savings percent per program participant

Baseline Efficiency
The baseline efficiency case is the control group that does not receive behavior and feedback program reports.

High Efficiency
The high efficiency case is 60,000 active participants for the period from December 1, 2011 until June 30, 2012 who receives a behavior and feedback program report.

- 30,000 designated customers on Maui, Lanai and Molokai, with an effort to maximize the number of customers on Lanai and Molokai.
- 30,000 designated customers on the island of Hawaii.

Persistence
1 year

Measure Life
1 year

8.5.3 Whole House Energy Metering

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Hawaii Energy Historic Utility Billing Research – Residential Review 2010
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- Changed energy savings from 2% to 3.8% based on EM&V Review.

Measure Description:
Whole house metering systems allow the occupant to see in real time the energy usage in their home. This "dashboard" allows them to see what actions and equipment drive their energy usage and the associated costs of running them. These devices collect energy data for the whole house at the panel and transmit the information to a display unit "dashboard" which can be located anywhere in the house.

Baseline Efficiencies:

Building Types	Demand Baseline (kW)	Energy Baseline (kWh/year)
No Metering	1.50	12,000

High Efficiency:

Building Types	Efficient Case (kW)	Efficient Case (kWh/year)
Whole House Meter	1.47	11,544

Energy Savings:

Building Types	Gross Customer Savings (kW)	Gross Customer Savings (kWh/year)
Gross Customer Savings	0.03	456

Operational Factor	Adjustment Factor
Persistence Factor (pf)	0.90
Demand Coincidence Factor (cf)	0.30

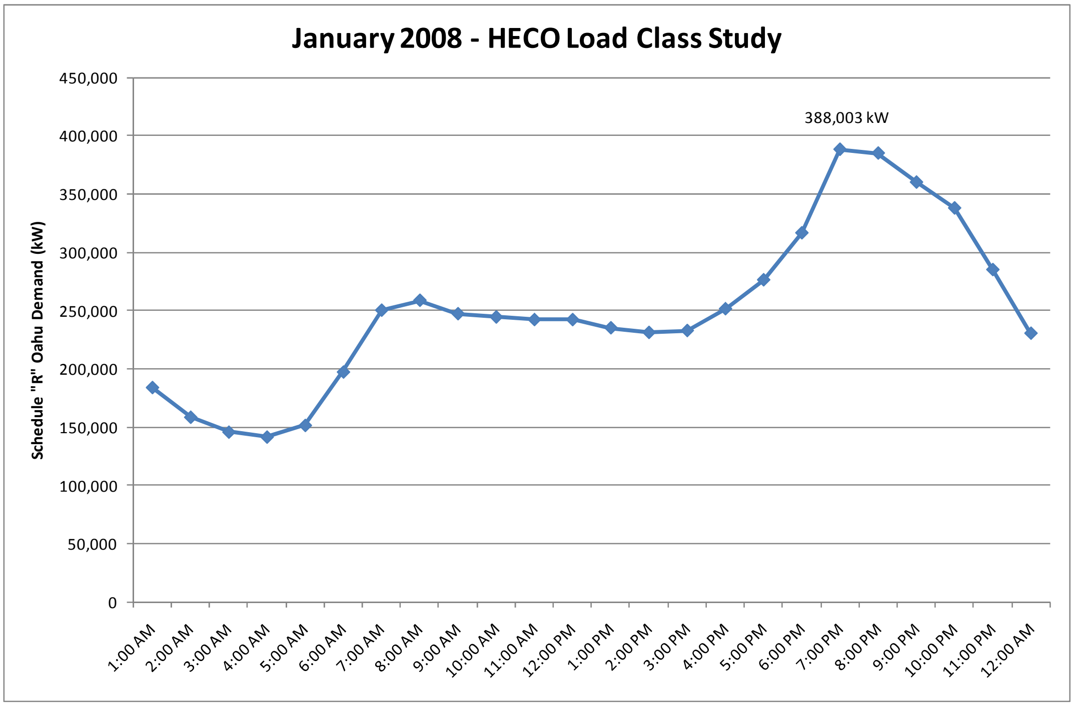
Building Types	Net Customer Savings (kW)	Net Customer Savings (kWh/year)
Net Customer Savings	0.01	410

Savings Algorithms

Whole House Metering - Single Multi Family Residential Home				
High Energy Usage Home (85th percentile)		1,000	kWh per home per month	Hawaii Energy review - HECO 2010 Data
	x	12		
Baseline Household Energy Usage		12,000	kWh per Year	
Energy Reduction		3.8%		
Actively Informed Household Energy Usage		11,544	kWh per Year	
Baseline Household Energy Usage		12,000	kWh per Year	
Actively Informed Household Energy Usage	-	11,544	kWh per Year	
Gross Customer Level Energy Savings		456	kwh per Year	
	x	1,000	Watts per kW	
	÷	8,760	Hours per Year	
Average 24/7 Demand Reduction		52	Watts	
Gross Customer Level Energy Savings		456	kwh per Year	
Persistance Factor	x	0.9		
Net Customer Level Savings		410	kwh per Year	
Whole House Metering Energy Savings		410	kWh / Year Savings	
Baseline Household Demand		1.50	kW	HECO 2008 Load Study
Peak Demand Reduction		1.75%		
Actively Informed Household Demand		1.47	kW	
Baseline Household Demand		1.50	kW	
Actively Informed Household Demand	-	1.47	kW	
Gross Customer Demand Savings		0.026	kW	
Gross Customer Demand Savings		0.026	kW	
Persistance Factor	x	0.90		
Coincidence Factor	x	0.30		
		0.007	kW	
Whole House Metering Demand Savings		0.007	kW Savings	

Operating Hours
8,760 hours per year

Loadshape
TBD



Freeridership/Spillover Factors
0.73

Persistence Factor
PF = 0.9

Coincedence Factor
CF= 0.3

Lifetime
4 years

Measure Costs and Incentive Levels

		Low	High
Measure Cost		$100	$450
Incremental Cost		$100	$450

Incentive Level 50% up to $100

9 (CESH) Custom Energy Solutions for the Home

9.1 Target Cost Request for Proposals

9.1.1 Custom Packaged Proposals

Version Date & Revision History
Draft date: October 4, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
This program will target the contractor/home auditors/energy vendors and encourage them to develop cost-effective projects that focus on high energy consumption homes. The program will be a call for projects that meet a total dollar per kWh savings target and allow the market to be creative in the actions and measures that achieve the targeted cost per kWh energy savings.

The projects will use utility metered data and submetered if required to insure savings performance.

Incentive = $0.30/kWh
Target Goal = 35,000 kWh

10 (RESM) Residential Direct Installation

10.1 Residential Direct Installation

10.1.1 Real Time Metering

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
This program will be implemented to target residential properties that can influence the energy usage. A whole house meter will be installed by either a grassroots organization or a participating electrical contractor. After meter installation,

Energy Savings:
Meter data will not be shared with customers for the first month of operation to obtain baseline energy usage. After one month of operation, will be encouraged to take actions to reduce energy consumption and will have access to meter data.

Savings Algorithms

10.2 Residential Design and Audits

10.2.1 Efficiency Inside (New Home Construction Incentive)

Measure Code: Efficiency Inside

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description: This measure provides developers with financial, technical and other assistance to promote the
construction of homes that require the least amount of air conditioning to meet customer demands.
It is assumed that all new homes will have Solar Water Heating, Energy Star Appliances, and CFLs.
The components are:

- *Energy Model Review* – Used to compare the projected home performance as compared to an IECC
2006 built home. At least 6 scenarios must be modeled (IECC 2006, Proposed Home, Proposed with
Cool Roof, Proposed with 4.0 ACH @ 50Pa, Proposed other energy feature, Proposed home with all
modeled features).
- *Construction Quality Control (CQC)* – Mandatory inspections of a sampling of units during construction
to insure best construction practices are used to maximize design and to encourage field improvements. (Sampled)
- *Performance Testing (PT)* – A sampling of units tested to document the final result of the design and
building practices.
- *Whole House Metering System* – Permanent devices to support home owner energy awareness and
persistence of savings.

Savings comes from:

- *Lower Cooling Loads*: Through design and construction techniques.
- *Right Sizing of AC Systems*: Selection of smaller ACs match energy models load determination.
- *Energy Use Awareness*: Home equipped with metering will have greater user awareness that will drive energy use behavior.

Energy and Demand Savings: It is expected that the best built homes systems will provide a 20-30% reduction in energy consumption as compared to IECC 2006 code built homes. Net zero homes will provide 100% reductions.

- *Energy Modeling*: Energy savings will be determined through the cooling reductions modeled. This will be a combination of the construction and AC equipment selection.
- *Net Zero*: Net zero homes with PV are allowed and the predicted PV system output will be included in energy savings.

Sample New Home Construction Worksheet

Efficiency Inside - Hawaii Energy New Residential Home Construction Incentive Program

Contractor	Project	Type	Units	Start	End	Modeled Scenarios	Scenario Energy Usage (kWh/year)	Over Baseline Savings (kWh/year)	Quality Inspections	Performance Tested	Adopted Recommendations	Solar Thermal	Energy Star Appl.	CFLs	Low Wattage T8	Per Unit Incentive	Total Incentive	Project Status	
GC Pacific	60 Parkside	Multi	60	Oct-2011	Jun-2011	1. Baseline - IECC 2006			20%	20%						$450	$27,000	Approved	x
						2. Energy Star Roof												Modeled	
						3. Insulation / HP Window options												Inspected	
						4. Air tightness (4.0 @ 50 pa)												Tested	
						5. AC Equipment Sizing & Technology												M&V	
						6. As Constructed		2,400										Paid	
Gentry Pacific		Single	120	Oct-2011	Jun-2011	1. Baseline - IECC 2006			20%	20%						$600	$72,000	Approved	
						2. Energy Star Roof												Modeled	
						3. Insulation / HP Window options												Inspected	
						4. Air tightness (4.0 @ 50 pa)												Tested	
						5. AC Equipment Sizing & Technology												M&V	
						6. As Constructed		3,200										Paid	
Haseko		Single	120	Oct-2011	Jun-2011	1. Baseline - IECC 2006			20%	20%						$600	$72,000	Approved	
						2. Energy Star Roof												Modeled	
						3. Insulation / HP Window options												Inspected	
						4. Air tightness (4.0 @ 50 pa)												Tested	
						5. AC Equipment Sizing & Technology												M&V	
						6. As Constructed		2,200										Paid	
DHHL		Single	19	Oct-2011	Jun-2011	1. Baseline - IECC 2006			20%	20%						$600	$11,400	Approved	
						2. Energy Star Roof												Modeled	
						3. Insulation / HP Window options												Inspected	
						4. Air tightness (4.0 @ 50 pa)												Tested	
						5. AC Equipment Sizing & Technology												M&V	
						6. As Constructed		15,000										Paid	
Totals			**319**	**units**				**5,700**	**kWh/yr. per home reduction**								**$182,400**		

10.2.2 Hawaii Energy Hero Audits

Measure Code: Efficiency Inside

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- 11/22/11 – Akamai Power Strip kWh savings updated based on NYSERDA Measure Characterization for Advanced Power Strips. – NO LONGER RELEVANT.
- 4/17/12 – Removed gift pack information/data. Updated measure to match energy audit measure under "Residential Hard to Reach" in order to make savings consistent with an energy audit. This change was a complete revamp of the entire measure and did changed expected savings.

Measure Description:
- Work with grass roots organization(s) to develop a residential educational presentation and a high level household energy audit based on use of a Belkin Conserve Insight or Kill-A-Watt style single outlet energy monitor.
- Identify individuals/homes who accept participation in the program with an energy challenge commitment to reduce energy consumed within their household.
- Participants will receive the energy monitor and possibly other energy savings devices for the purpose of performing the energy audit, applying energy savings devices and achieving energy savings.
- Provide the energy monitors and possibly other energy savings devices along with funds to the grass roots organizations. The organizations will distribute energy monitors and devices, provide training to recipient households and perform a high level audit with selected individuals.

Energy Savings:

Monthly Usage	625
Percent Savings	4%
Hours per Year	8760

Savings	Energy Savings (kWh)	Demand Savings (kW)
Monthly Savings	25	0.0029
Yearly Savings	300	0.0342

Measure Costs and Incentive Levels

Incentive = $100

Savings Algorithm

Refer to TRM Compact Fluorescent Lighting (CFL) Section

Akamai Power Strips				
Savings per Unit	56.5 kWh		102.8 kWh	*NYSERDA Measure Characterization for*
Plugs per Unit	5 plugs		7 plugs	Advanced Power Strips
Savings per Plug	11.3 kWh/plug		14.68571 kWh/plug	
Average Savings per Plug			13.0 kWh	
		x	6 plugs/unit	
Akamai Power Strip Energy Savings			**78 kWh per Unit first year**	
Hours of Operation			8760 hours/year	
Demand Savings			**0.0089 kW**	

First Year Savings		78	kWh first year
Measure Life	x	5	year measure life
Lifetime Savings		389.78571	kWh lifetime
Total Resource Cost		$ 30.96	
Total Resource Benefit	÷	$ 46.15	
Total Resource Cost Ratio		1.5	TRB Ratio
Potential Akamai Power Strip Incentive		$ 7.00	
First Year Savings	÷	66	kWh first year
		$ 0.11	per kWh first year
Standard Power Strip Cost		$ 14.49	
Akamai Power Strip Cost	-	$ 30.96	
Incremental Akamai Power Strip Cost		$ 16.47	
Incremental Akamai Power Strip Cost		$ 16.47	
Potential Akamai Power Strip Incentive	÷	$ 7.00	
Percentage of Incremental Cost		43%	
Akamai Power Strip Cost		$ 30.96	
Potential Akamai Power Strip Incentive	÷	$ 7.00	
Percentage of Customer Measure Cost		23%	

10.3 Residential System Tune-Ups

10.3.1 Central AC Tune Up

Measure ID: See Table 7.3

Version Date & Revision History
Draft date: February 21, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- Split Systems addition to central systems for AC tune-up
- Reduced savings percentage from 20% to 8% based on EM&V review.

Measure Description:
- Demonstrate the benefits of tune-ups
- Educate customer of potential savings and system longevity
- Utilize the participating contractors to contact the customers and have them arrange for the service work
- Participating contractors will use the Hawaii Energy Checklist to inspect and record the pre and post conditions
- Participating contractor's invoice must show that checklist requirements have been met and signed by the servicing technician
- Customers can have two incentives per location annually

Baseline Efficiencies:

Building Types	Demand Baseline (kW)	Energy Baseline (kWh/year)
Residential Household	2.77	4,852

High Efficiency:

With AC Annual Tune Up

Building Types	Efficient Case (kW)	Efficient Case (kWh/year)
Residential Household	2.70	4,043

Energy Savings:

Building Types	Gross Customer Savings (kW)	Gross Customer Savings (kWh/year)
Residential Household	0.07	323

Operational Factor	Adjustment Factor
Persistence Factor (pf)	1.00
Demand Coincidence Factor (cf)	0.20

Building Types	Net Customer Savings (kW)	Net Customer Savings (kWh/year)
Residential Household	0.000	323
On Peak Run Time Reduction Peak Demand Savings	0.07	

Savings Algorithms

Home AC Tune Up - Single Multi Family Residential Home				
Average AC unit Size		3	ton unit	
Average AC Unit EER		13.0	EER	
EER to kW Conversion		12		
	÷	13.0	EER	
Average AC Unit kW/Ton		0.92	kW/Ton	
Equivelant Full Load Run Hours (EFLRH)		1460	hrs./Year	4.0 hrs. per Day
Average AC unit Size		3	ton unit	
Average AC Unit kW/Ton		0.92	kW/Ton	
Equivelant Full Load Run Hours (EFLRH)	x	1,460	hrs./Year	
Post Tune Up - Average AC Unit Energy Consumption		4,043	kWh/Year	
Incorrect Refrigerant Charge				
Clogged AHU Filter				
Dirty Condenser Coil				
Pre Tune Up AC Operational Problems EFLRH Adjustment Factor		8%		Updated number based on EMV 23 Feb 12. 20% changed to 8%.
Post Tune Up - Average AC Unit Energy Consumption		4,043	kWh/Year	
Pre Tune Up AC Operational Problems EFLRH Adjustment Factor	÷	108%		
Pre Tune Up - Average AC Unit Energy Consumption		4,367	kWh/Year	1,577 hrs. per year
				4.3 hrs. per Day
Pre Tune Up - Average AC Unit Energy Consumption		4,367		
Post Tune Up - Average AC Unit Energy Consumption		4,043		
Post Tune Up - Average AC Unit Energy Savings		323	kWh/Year	
Post Tune Up - Average AC Unit Energy Savings		323	kWh/Year	
Persistance Factor	x	1.0		
Net Customer Level Savings		323	kWh/Year	
AC Tune Up Energy Savings		323	kWh / Year Savings	
Average AC unit Size		3	ton unit	
Average AC Unit kW/Ton		0.92	kW/Ton	
Average AC Unit Demand		2.77	kW	
Average AC Unit Demand		2.77	kW	
Persistance Factor	x	1.00		
Pre Tune Up Coincidence Factor	x	0.33		Updated number based on EMV 23 Feb 12. 0.25 changed to 0.33.
Pre Tune Up On Peak Demand		0.925	kW	

AC Unit Demand will not change. A reduction in operational hours will occur once tune up is completed. This lowers Coincidence Factor

Pre Tune Up Coincidence Factor		0.33	
Post Tune Up Run Time Reduction Adjustment Factor	x	92%	
Post Tune Up Coincidence Factor		0.31	
Average AC Unit Demand		2.77	
Persistance Factor	x	1.00	
Post Tune Up Coincidence Factor	x	0.31	
Post Tune Up On Peak Demand		0.851	kW
Pre Tune Up On Peak Demand		0.92	
Post Tune Up On Peak Demand	-	0.85	
AC Tune Up Demand Savings		0.074	kW
AC Tune Up Demand Savings		0.074	kW Savings

Operating Hours

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Coincidence Factor
CF = 0.30

Persistence
PF = 0.90

Lifetime:
1 Year

Measure Costs and Incentive Levels

Description	Unit Incentive	Incremental Cost
Home AC Tune Up	$ 50.00	$ 300.00

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Reference Tables
None

10.3.2 Solar Water Heating Tune-up

Version Date & Revision History
Draft date: February 21, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- KEMA "Impact Evaluation Report of the 2001-2003 Demand Side Management Programs" October 2004. Page 2-36 "Inoperable systems are those that use more than an average of 5 kWh per day, and problem systems use between 2-5 kWh per day.

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- New

Measure Description:

- Demonstrate the benefits of tune-ups
- Educate customer of potential savings and system longevity
- Utilize the participating contractors to contact the customers and have them arrange for the service work
- Participating contractors will use the Hawaii Energy Checklist to inspect and record the pre and post conditions
- Participating contractor's invoice must show that checklist requirements have been met and signed by the servicing technician
- Customers can have two incentives per location annually

Baseline Efficiencies:

	Energy (kWh)	Demand (kW)
Baseline	577	0.079

High Efficiency:

	Energy (kWh)	Demand (kW)
High Efficiency	328	0.05

Energy/Demand Savings:

	Energy (kWh)	Demand (kW)
Energy Savings	249	0.029

KEMA 2005-2007 Energy and Peak Demand Impact Evaluation Report

Samples	Group	kWh per Unit	On Peak Demand	Total kWh	On Peak Demand
260	All	577	0.079	150,020	20.5
18	Failed	3,925	0.469	70,644	8.4
242	Operating	328	0.050	79,376	12.1

Operating Hours
10 hours

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Demand Coincidence Factor

Persistence

Lifetime
5 years

Measure Costs and Incentive Levels

Incentive = $100/unit

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Reference Tables
None

11 (RHTR) Residential Hard to Reach

11.1 Energy Efficiency Equipment Grants

11.1.1 Solar Inspections (Weatherization Assistance Program)

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Description:

Energy and Demand Savings:

Based on the percentage (%) the Solar Inspection cost compared to incentives. For example, Solar Inspection Cost = $95 and the Solar Water Heater Incentive = $750. The energy savings = 10%

Energy Savings = 10% x 2066 kWh/year
= 206.6 kWh/year

Demand Savings = 10% x 0.46 kW
= 0.046 kW

Example

Solar Inspection (WAP) Cost	$ 75.00	
Solar Water Heating Incentive	$ 750.00	
Percentage Savings = Cost/Incentive	10%	Savings
Solar Inspection Energy Savings	**206.6**	**kWh / Year Savings**
Solar Inspection Demand Savings	**0.046**	**kW Savings**

Savings Algorithm

Solar Water Heater - Single Family Home

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.2	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	kWh / BTU	
Energy per Day (kWh)		6.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		205	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		2,460	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		2,733	kWh / Year	KEMA 2008 - HECO
Design Annual Solar Fraction		90%	Water Heated by Solar System	Program Design
		10%	Water Heated by Remaining Backup Element	
Energy Usage per Year at the Meter		2,733	kWh / Year	
	x	10%	Water Heated by Remaining Backup Element	
Back Up Element Energy Used at Meter		273	kWh / Year	
Circulation Pump Energy		0.082	kW	KEMA 2008
Pump Hours of Operation	x	1,292	Hours per Year	KEMA 2008
Pump Energy used per Year		106	kWh / Year	
Back Up Element Energy Used at Meter		273	kWh / Year	72%
Pump Energy used per Year	+	106	kWh / Year	28%
Design Solar System Energy Usage		379	kWh / Year	
Base SERWH Energy Usage per Year at the Meter		2,733	kWh / Year	
Design Solar System Energy Usage	-	379	kWh / Year	
Design Solar System Energy Savings		2,354	kWh / Year	
Design Solar System Energy Savings		2,354	kWh / Year	
Performance Factor		0.94	pf	HE
Persistance Factor	x	0.93	pf	KEMA 2008
		2,066	kWh / Year	KEMA 2008
Residential Solar Water Heater Energy Savings		**2,066**	**kWh / Year Savings**	
Base SERWH Element Power Consumption		4.0	kW	
Coincidence Factor	x	0.143	cf	8.6 Minutes per hour
Base SERWH On Peak Demand		0.57	kW On Peak	KEMA 2008
Base SERWH On Peak Demand	-	0.57	kW On Peak	
Solar System Metered on Peak Demand	-	0.11	kW On Peak	KEMA 2008
		0.46	kW On Peak	
Residential Solar Water Heater Demand Savings		**0.46**	**kW Savings**	
Solar Inspection (WAP) Cost		$ 75.00		
Solar Water Heating Incentive		$ 750.00		
Percentage Savings = Cost/Incentive		10%	Savings	
Solar Inspection Energy Savings		**206.6**	**kWh / Year Savings**	
Solar Inspection Demand Savings		**0.046**	**kW Savings**	

11.1.2 Energy Hero Gift Packs

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07)
- Econorthwest TRM Review – 6/23/10
- Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Management Programs – (KEMA 2005-07)
- US DOE: Federal Energy Management Program (2010). Cost Calculator for Faucets & Shower Heads. http://www1.eere.energy.gov/femp/technologies/eep_faucets_showerheads_calc.html#output

TRM Review Actions:

- 10/06/11 – Added additional items to possible gift pack components list and corresponding data. Items included: LED lamp, low flow shower head for standard electric water heating systems, low flow shower head for solar heating systems, and faucet aerators.
- 10/06/11 – Currently Under Review.

Major Changes:

- 10/06/11 – Added additional items to possible gift pack components list (including data)
- 11/22/11 – LED algorithm updated. See section 8.2.2 for changes.
- 11/22/11 – Akamai Power Strip kWh savings updated based on NYSERDA Measure Characterization for Advanced Power Strips.
- 11/22/11 – Updated content in headings *Base Case*, *High Efficiency Case*, and *Energy Savings* in regard to LED lamps to match section 8.2.2.
- 11/29/11 – Low Flow Shower Head algorithms updated – previously claiming only 50% of total energy savings due to inaccurately calculating hot and cold water mix. Also updated *Energy Savings* table as necessary.
- 11/29/11 – Faucet Aerator algorithm updated – recalculated to follow low flow shower head algorithm, and include solar and non-solar calculations. Also updated *Energy Savings* table as necessary.

Description:
Potential gift pack components:
- Compact Fluorescent Lamp (15W)
- Akamai Power Strip
- LED Lamp (7W)
- Low Flow Shower Head – Solar Water Heater (1.5 gpm)
- Low Flow Shower Head – Standard Electric Water Heater (1.5 gpm)
- Faucet Aerator (2.2 gpm)

Base Case
- 60 W incandescent lamps
- Standard power strip or no power strip
- 25% 60W incandescent, 25% 40W incandescent, 25% 23W CFLs and 25% 13W CFLs (See LED TRM)
- Low Flow Shower Head – Solar Water Heater (1.5 gpm)
- Low Flow Shower Head – Standard Electric Water Heater (1.5 gpm)
- Faucet Aerator (1.5 gpm)

High Efficiency Case
- Replace 60 W incandescent lamps with CFLs rated at 15W
- Replace existing standard power strip or no power strip with Akamai Power Strip
- Replace existing non-LED lamp with LED lamp (50% 7W and 50% 12.5W)
- Replace 2.5 gpm Low Flow Shower Head with Low Flow Shower (Solar) Head rated at 1.5 gpm
- Replace 2.5 gpm Low Flow Shower Head with Low Flow Shower (Electric) Head rated at 1.5 gpm
- Replace 2.2 gpm Faucet Aerator with Low Flow Faucet Aerator rated at 1.5 gpm

Energy Savings

Measure	Energy Savings (kWh / year)	Demand Savings (kW)
Compact Fluorescent Lamp	119.7	0.0170
Akamai Power Strip	78.0	0.0089
LED	16.6	0.0030
Low Flow Shower Head - Solar	42.0	0.0440
Low Flow Shower Head - Electric Water Heater	306.0	0.2300
Faucet Aerator - Solar	31.0	0.0350
Faucet Aerator - Electric Water Heater	226.0	0.1800

Measure life

Measure	Measure Lfe *(Years)*
Compact Fluorescent Lamp	119.7
Akamai Power Strip	78.0
LED	16.6
Low Flow Shower Head - Solar	42.0
Low Flow Shower Head - Electric Water Heater	306.0
Faucet Aerator - Solar	31.0
Faucet Aerator - Electric Water Heater	226.0

Savings Algorithms

CFL - Single and Multi Family Residential Home				
Quantity three (3) Pack		3		
60W Incandescent Lamp Demand		0.060	kW	
		2.30	Hours per Day	
	x	365	Days	839.5 Hours per Year
60W Incandescent Lamp Energy Usage		151.1	kWh per Year	
15W Compact Fluorescent Lamp Demand		0.015	kW	
		2.30	Hours per Day	
	x	365	Days	839.5 Hours per Year
15W Compact Fluorescent Lamp Energy Usage		12.6	kWh per Year	
60W Incandescent Lamp Energy Usage		151.1	kWh per Year	
15W Compact Fluorescent Lamp Energy Usage	-	12.6	kWh per Year	
CFL Savings Before Adjustments		138.5	kWh per Year	
		138.5	kWh per Year	
Persistance Factor	x	0.800	pf	20.0% Lamps not installed or replaced back
		110.8	kWh per Year	
Adjustment for Mix of CFL sizes found in CA study		110.8	kWh per Year	
	x	1.08		
		119.7	kWh per Year	
CFL Energy Savings		**119.7**	**kWh / Year Savings**	
Three (3) 60W Incandescent Lamp Demand		0.180	kW	
15W Compact Fluorescent Lamp Demand	-	0.015	kW	
CFL Demand Reduction Before Adjustments		0.165	kW	
CFL Demand Reduction Before Adjustments		0.165	kW	
Coincidence Factor		0.120	cf	12.0% Lamps on between 5 and 9 p.m.
Persistance Factor	x	0.800	pf	20.0% Lamps not installed or replaced back
		0.016	kW	
Adjustment for Mix of CFL sizes found in CA study		0.016	kw	
	x	1.08	factor	
		0.017	kWh per Year	
CFL Demand Savings		**0.017**	**kWh per Year**	

Akamai Power Strips			
Savings per Unit	56.5 kWh	102.8 kWh	*NYSERDA Measure Characterization for*
Plugs per Unit	5 plugs	7 plugs	Advanced Power Strips
Savings per Plug	11.3 kWh/plug	14.68571 kWh/plug	
Average Savings per Plug		13.0 kWh	
	x	6 plugs/unit	
Akamai Power Strip Energy Savings		**78 kWh per Unit first year**	
Hours of Operation		8760 hours/year	
Demand Savings		**0.0089 kW**	

First Year Savings		78 kWh first year
Measure Life	x	5 year measure life
Lifetime Savings		389.78571 kWh lifetime
Total Resource Cost		$ 30.96
Total Resource Benefit	÷	$ 46.15
Total Resource Cost Ratio		1.5 TRB Ratio
Potential Akamai Power Strip Incentive		$ 7.00
First Year Savings	÷	66 kWh first year
		$ 0.11 per kWh first year
Standard Power Strip Cost		$ 14.49
Akamai Power Strip Cost	-	$ 30.96
Incremental Akamai Power Strip Cost		$ 16.47
Incremental Akamai Power Strip Cost		$ 16.47
Potential Akamai Power Strip Incentive	÷	$ 7.00
Percentage of Incremental Cost		43%
Akamai Power Strip Cost		$ 30.96
Potential Akamai Power Strip Incentive	÷	$ 7.00
Percentage of Customer Measure Cost		23%

LED - Single and Multi Family Residential Home

Lamp Average Demand		0.035	kW	
		2.30	Hours per Day	
	x	365	Days	839.50 Hours per Year
Baseline Energy Usage		28.96	kWh per Year	
Enhanced LED Lamp Average Demand		0.010	kW	
		2.30	Hours per Day	
	x	365	Days	839.50 Hours per Year
Enhanced LED Lamp Energy Usage		8.19	kWh per Year	
Baseline Energy Usage		29.0	kWh per Year	
Enhanced LED Lamp Energy Usage	-	8.2	kWh per Year	
LED Savings Before Adjustments		20.78	kWh per Year	
		20.8	kWh per Year	
Persistance Factor	x	0.800	pf	20.0% Lamps not installed or replaced back
		16.6	kWh per Year	
LED Energy Savings		**16.6**	**kWh / Year Savings**	
Baseline Lamp Demand		0.035	kW	
Enhanced LED Lamp Demand	-	0.007	kW	
LED Demand Reduction Before Adjustments		0.028	kW	
LED Demand Reduction Before Adjustments		0.028	kW	
Coincidence Factor		0.120	cf	12.0% Lamps on between 5 and 9 p.m.
Persistance Factor	x	0.800	pf	20.0% Lamps not installed or replaced back
		0.003	kW	
LED Demand Savings		**0.003**	**kW Savings**	

Low Flow Showerhead w/Solar Water Heating

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE	
Average Occupants	x	3.77	Persons	KEMA 2008	
Household Hot Water Usage		50.2	Gallons per Day		
Mass of Water Conversion		8.34	lbs/gal		
Finish Temperature of Water		130	deg. F Finish Temp		
Initial Temperature of Water	-	75	deg. F Initial Temp		
Temperature Rise		55	deg. F Temperature Rise		
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.		
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day		
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day		
BTU to kWh Energy Conversion	÷	3,412	BTU/kWh		
Energy per Day (kWh)		6.7	kWh / Day		
Days per Month	x	30.4	Days per Month		
Energy (kWh) per Month		205	kWh / Month		
Days per Year	x	365	Days per Year		
Energy (kWh) Needed in Tank to Heat Water per Year		2,460	kWh / Year		
Elec. Res. Water Heater Efficiency	÷	0.90	COP		
Base SERWH Energy Usage per Year at the Meter		2,733	kWh / Year	KEMA 2008 - HECO	
Design Annual Solar Fraction		90%	Water Heated by Solar Syste	Program Design	
		10%	Water Heated by Remaining Backup Element		
Energy Usage per Year at the Meter		2,733	kWh / Year		
	x	10%	Water Heated by Remaining Backup Element		
Back Up Element Energy Used at Meter		273	kWh / Year		
Circulation Pump Energy		0.082	kW	KEMA 2008	
Pump Hours of Operation	x	1,292	Hours per Year	KEMA 2008	
Pump Energy used per Year		106	kWh / Year		
Back Up Element Energy Used at Meter		273	kWh / Year		72%
Pump Energy used per Year	+	106	kWh / Year		28%
Design Solar System Energy Usage		379	kWh / Year		
Utilization Factor		28%		Hot water used for showers (AMMA)	
Hot Water Usage from Showers		106			
Base Case Showerhead		2.5	GPM		
High Efficiency Case Showerhead		1.5	GPM		
Savings = (1 - High Efficiency/Base)		40%			
Energy Savings		**42**	**kWh / Year**		
Solar System Metered on Peak Demand		0.11	kW On Peak	KEMA 2008	
Demand Savings		40%			
Residential Low Flow Shower Head Demand Savings		**0.044**	**kW Savings**		

Low Flow Showerhead w/Standard Electric Resistance Water Heater (SERWH)

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.2	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	BTU/kWh	
Energy per Day (kWh)		6.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		205	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		2,460	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		2,733	kWh / Year	KEMA 2008 - HECO
Utilization Factor		28%		Hot water used for showers (AMMA)
Base SERWH Energy Usage per Year at the Meter		765	kWh / Year	Energy Usage for showers
Base Case Showerhead		2.5	GPM	
High Efficiency Case Showerhead		1.5	GPM	
Savings = (1 - High Efficiency/Base)		40%		
Energy Savings		**306**	**kWh / Year**	
SERWH Element Power Consumption		4.0	kW	
Coincidence Factor	x	0.143	cf	
SERWH On Peak Demand		0.57	kW On Peak	
				8.6 Minutes per hour
Demand Savings		40%		KEMA 2008
Residential Low Flow Shower Head Demand Savings		**0.23**	**kW Savings**	

Faucet Aerator w/Solar Water Heating

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.2	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	BTU/kWh	
Energy per Day (kWh)		6.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		205	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		2,460	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		2,733	kWh / Year	KEMA 2008 - HECO
Design Annual Solar Fraction		90%	Water Heated by Solar Syste	Program Design
		10%	Water Heated by Remaining Backup Element	
Energy Usage per Year at the Meter		2,733	kWh / Year	
	x	10%	Water Heated by Remaining Backup Element	
Back Up Element Energy Used at Meter		273	kWh / Year	
Circulation Pump Energy		0.082	kW	KEMA 2008
Pump Hours of Operation	x	1,292	Hours per Year	KEMA 2008
Pump Energy used per Year		106	kWh / Year	
Back Up Element Energy Used at Meter		273	kWh / Year	72%
Pump Energy used per Year	+	106	kWh / Year	28%
Design Solar System Energy Usage		379	kWh / Year	
Utilization Factor		26%		Hot water used for showers (AMMA)
Hot Water Usage from Faucets		99		
Base Case Aerator		2.2	GPM	
High Efficiency Case Aerator		1.5	GPM	
Savings = (1 - High Efficiency/Base)		32%		
Energy Savings		**31**	**kWh / Year**	
Solar System Metered on Peak Demand		0.11	kW On Peak	KEMA 2008
Demand Savings		32%		
Residential Aerator Demand Savings		**0.035**	**kW Savings**	

Faucet Aerator w/Standard Electric Resistance Water Heater (SERWH)

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water Temp)

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.2	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
Energy per Day (BTU) Needed in Tank		23,006	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	BTU/kWh	
Energy per Day (kWh)		6.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		205	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		2,460	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		2,733	kWh / Year	KEMA 2008 - HECO
Utilization Factor		26%		Hot water used for showers (AMMA)
Base SERWH Energy Usage per Year at the Meter		711	kWh / Year	Energy Usage for showers
Base Case Aerator		2.2	GPM	
High Efficiency Case Aerator		1.5	GPM	
Savings = (1 - High Efficiency/Base)		32%		
Energy Savings		**226**	**kWh / Year**	
SERWH Element Power Consumption		4.0	kW	
Coincidence Factor	x	0.143	cf	
SERWH On Peak Demand		0.57	kW On Peak	
				8.6 Minutes per hour
Demand Savings		32%		KEMA 2008
Residential Aerator Demand Savings		**0.18**	**kW Savings**	

11.1.3 CFL Exchange

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07)
- Econorthwest TRM Review – 6/23/10

TRM Review Actions:

- 6/23/10 Rec. # 8 – Starting with PY2010, adjust the hours used per day for CFLs from 4.98 to 2.3 in order to be consistent with other literature. Conduct additional research to verify the most appropriate hours of operation for the Hawaii customer base, which can be incorporated into future years. – Adopted.
- 6/23/10 Rec. # 9 - Starting with PY 2010, adjust the peak coincidence factor from 0.334 to 0.12 to be consistent with the literature. Conduct additional research to verify the most appropriate coincidence factor for the Hawaii customer base, which can be incorporated into future years.- Adopted.
- 10/5/11 – Currently Under Review.

Major Changes:

- Hours used per day for CFLs from 4.98 to 2.3 hrs.
- Peak coincidence factor from 0.334 to 0.12

Measure Description:
The replacement of incandescent screw-in lamps to standard spiral compact fluorescent lamps in Residential Single Family and Multi-family homes.

Lamps must comply with:

- Energy Star
- UL

Baseline Efficiencies:
Baseline usage is a 60W A-Shaped incandescent lamp with the energy consumption as follows:

Building Types	Demand Baseline(kW)	Energy Baseline (kWh)
Single Family	0.060	50.4
Multi Family	0.060	50.4

High Efficiency:
The high efficiency case is a 15W Spiral CFL with the energy consumption as follows:

Building Types	Demand High Efficiency (kW)	Energy High Efficiency (kWh)
Single Family	0.015	12.6
Multi Family	0.015	12.6

Energy Savings:
CFL Gross Savings before operational adjustments:

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Single Family	0.045	37.8
Multi Family	0.045	37.8

CFL Net Savings after operational adjustments:

Operational Factor	Adjustment Factor
Persistence Factor (pf)	1.0
Demand Coincidence Factor (cf)	0.12

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Single Family	0.005	37.8
Multi Family	0.005	37.8

Savings Algorithms

CFL Exchange - Single and Multi Family Residential Home

60W Incandescent Lamp Demand		0.060	kW		
		2.30	Hours per Day		
	x	365	Days	839.5	Hours per Year
60W Incandescent Lamp Energy Usage		50.4	kWh per Year		
15W Compact Fluorescent Lamp Demand		0.015	kW		
		2.30	Hours per Day		
	x	365	Days	839.5	Hours per Year
15W Compact Fluorescent Lamp Energy Usage		12.6	kWh per Year		
60W Incandescent Lamp Energy Usage		50.4	kWh per Year		
15W Compact Fluorescent Lamp Energy Usage	-	12.6	kWh per Year		
CFL Savings Before Adjustments		37.8	kWh per Year		
		37.8	kWh per Year		
Persistance Factor	x	1.000	pf	0.0%	Lamps not installed or replaced back
CFL Energy Savings		37.8	kWh per Year		

CFL Energy Savings	**37.8**	**kWh / Year Savings**

60W Incandescent Lamp Demand		0.060	kW		
15W Compact Fluorescent Lamp Demand	-	0.015	kW		
CFL Demand Reduction Before Adjustments		0.045	kW		
CFL Demand Reduction Before Adjustments		0.045	kW		
Coincidence Factor		0.120	cf	12.0%	Lamps on between 5 and 9 p.m.
Persistance Factor	x	1.000	pf	0.0%	Lamps not installed or replaced back
CFL Demand Savings		0.005	kW		

CFL Demand Savings	**0.005**	**kW Savings**

Adjustments based on Evergreen Economics Recommendations (2/23/12)

11.1.4 Hawaii Energy Hero Audits

Version Date & Revision History
Draft date: February 21, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- Increased focus and penetration of direct install and educational outreach

Measure Description:
- Work with grass roots organization(s) to develop a residential educational presentation and a high level household energy audit based on use of a Belkin Conserve Insight or Kill-A-Watt style single outlet energy monitor.
- Identify individuals/homes who accept participation in the program with an energy challenge commitment to reduce energy consumed within their household.
- Participants will receive the energy monitor and possibly other energy savings devices for the purpose of performing the energy audit, applying energy savings devices and achieving energy savings.
- Provide the energy monitors and possibly other energy savings devices along with funds to the grass roots organizations. The organizations will distribute energy monitors and devices, provide training to recipient households and perform a high level audit with selected individuals.

Energy Savings:

Monthly Usage	625
Percent Savings	4%
Hours per Year	8760

Savings	Energy Savings (kWh)	Demand Savings (kW)
Monthly Savings	25	0.0029
Yearly Savings	300	0.0342

Measure Costs and Incentive Levels

Description	Unit Incentive	Incremental Cost
Energy Hero Audits	$ 100.00	$ 400.00

11.2 Landlord / Tenant, AOAO Measures

11.2.1 Hawaii Energy Hero Landlord Program

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:

Energy Hero Landlord Program – this program will be targeted at landlords who own affordable rental units. The program will offer such landlords comprehensive audit, RFP and other support to help with projects that will drive the energy cost of their renters down. The program will work with local lenders to provide project financing support in conjunction with the program.

Custom SWH Proposals – with a lack of projects generated from solicitation through a tiered or split incentive, the plan to offer more flexibility within a custom proposal framework was favored for PY12. This offer is budgeted for the equivalent of 484 SWH systems.

Baseline Efficiencies:
TBD

High Efficiency:
TBD

Energy Savings:
TBD

Incentives:

	Incentive	Target Goal (kWh/year)
• Hawaii Energy Hero Landlord	$0.25/kWh	5,212 kWh
• Custom SWH Proposals	$0.65/kWh	1,000,000 kWh

12 (BEEM) Business Energy Efficiency Measures

12.1 High Efficiency Lighting

12.1.1 Compact Fluorescent Lighting (CFL)

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Econorthwest TRM Review – 6/23/10
- The California Energy Commission California Commercial End Use Summary http://www.energy.ca.gov/ceus/
- DEER - The Database for Energy Efficient Resources
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. 15 – For PY 2010, revise lighting hours of operation and peak coincidence factors, conduct additional research to evaluate the assumed hours of operation and coincidence factor for Hawaii customer base. - Adopted
- 6/23/10 Rec. # 16 – Consider developing commercial CFL measure categories by lamp size - Adopted.
- 10/5/11 – Currently Under Review.

Major Changes:

- Wholesale replacement of prior TRM using DEER operational data and CEUS Commercial CFL Data
- Added interactive effect factors for energy and demand Table 3.

Description: A compact fluorescent lamp is a type of fluorescent lamp. Many CFL's are designed to replace an incandescent lamp and can fit in the existing light fixtures formerly used for incandescent lamps. CFLs typically replace 100 watts or less of incandescent.

CFL retrofit savings are determined by the delta wattage between the incandescent and CFL lamp, annual hours of operation, and the percent of peak period the lamps are on. The average delta wattage is typically a readily available value. The annual hours, persistence factor and peak percent are utilized based on DEER data.

Although the breakdown of lamp sizes installed is reasonable, the savings for this measure could be broken up based on lamp size. This would allow greater flexibility in matching claimed savings to actual projects completed. Savings for each wattage category are based on the savings for typical CFL lighting replacement projects from DEER, with the DEER wattage categories are shown below:

	CFL Wattage Reduction		
	< 16W	16-26W	> 26W
Average Savings (W)	32	60	76

Energy Savings: Using the DEER operational hours the energy savings are (see Table 3 for Interactive Effect):

	CFL Energy Reduction		
Building Type	**< 16W**	**16-26W**	**> 26W**
All Commercial	131.5	246.5	312.3
Misc. Commercial	131.5	246.5	312.3
Cold Storage	126.5	237.1	300.4
Education	80.7	151.2	191.5
Grocery	177.0	332.0	420.5
Health	196.8	369.0	467.4
Hotel/Motel	150.2	281.6	356.7
Misc. Industrial	130.4	244.5	309.7
Office	85.4	160.1	202.7
Restaurant	160.5	300.8	381.1
Retail	128.0	240.0	304.0
Warehouse	126.5	237.1	300.4

Demand Savings: Using the CEUS coincidence factors the demand savings are (see Table 3 for Interactive Effect):

	CFL Demand Reduction		
Building Type	**< 16W**	**16-26W**	**> 26W**
All Commercial	0.015	0.029	0.036
Misc. Commercial	0.009	0.017	0.022
Cold Storage	0.015	0.029	0.036
Education	0.006	0.011	0.014
Grocery	0.026	0.048	0.061
Health	0.020	0.037	0.047
Hotel/Motel	0.018	0.034	0.043
Misc. Industrial	0.015	0.029	0.036
Office	0.015	0.029	0.036
Restaurant	0.023	0.043	0.054
Retail	0.018	0.034	0.043
Warehouse	0.014	0.026	0.032

CFL Operational Hours and Peak Coincidence Factors:

Commercial Lighting Factors

Building Type	Hours of Operation[1]	Peak Coincidence Factor[2]
All Commercial	4,325	0.50
Misc. Commercial	4,325	0.30
Cold Storage	4,160	0.50
Education	2,653	0.20
Grocery	5,824	0.85
Health	6,474	0.65
Hotel/Motel	4,941	0.60
Misc. Industrial	4,290	0.50
Office	2,808	0.50
Restaurant	5,278	0.75
Retail	4,210	0.60
Warehouse	4,160	0.45

[1] The Database for Energy Efficient Resources (DEER)

[2] California Commercial End Use Summary (CEUS)

Saving Algorithm:

CFL - Commercial Use (16-26W All Commercial Example Calculation)

Incandescent Lamp Demand		0.083	kW	
		11.85	Hours per Day	
	x	365	Days	4,325.0 Hours per Year
Incandescent Lamp Energy Usage		359.0	kWh per Year	
Compact Fluorescent Lamp Demand		0.023	kW	
		11.85	Hours per Day	
	x	365	Days	4,325.0 Hours per Year
Compact Fluorescent Lamp Energy Usage		99.5	kWh per Year	
Incandescent Lamp Energy Usage		359.0	kWh per Year	
Compact Fluorescent Lamp Energy Usage	-	99.5	kWh per Year	
CFL Savings Before Adjustments		259.5	kWh per Year	
		259.5	kWh per Year	
Persistance Factor	x	0.950	pf	5.0% Lamps not installed or replaced back
		246.5	kWh per Year	
CFL Energy Savings		**246.5**	**kWh / Year Savings**	
Incandescent Lamp Demand		0.083	kW	
Compact Fluorescent Lamp Demand	-	0.023	kW	
CFL Demand Reduction Before Adjustments		0.060	kW	
CFL Demand Reduction Before Adjustments		0.060	kW	
Coincidence Factor		0.500	cf	50.0% Lamps on between 5 and 9 p.m.
Persistance Factor	x	0.950	pf	5.0% Lamps not installed or replaced back
		0.029	kW	
CFL Demand Savings		**0.029**	**kW Savings**	

Measure
3 years (DEER)

Unit Incentive/Incremental Cost

Incentive = $2/unit

CFL – Military Homes

Military CFL - Single and Multi Family Residential Home					
60W Incandescent Lamp Demand		0.060	kW		
		3.45	Hours per Day		Updated number based on EMV 23 Feb 12. 2.3 hours (residential number) multiplied by 1.5.
	x	365	Days	1,259.3	Hours per Year
60W Incandescent Lamp Energy Usage		75.6	kWh per Year		
15W Compact Fluorescent Lamp Demand		0.015	kW		
		3.45	Hours per Day		
	x	365	Days	1,259.3	Hours per Year
15W Compact Fluorescent Lamp Energy Usage		18.9	kWh per Year		
60W Incandescent Lamp Energy Usage		75.6	kWh per Year		
15W Compact Fluorescent Lamp Energy Usage	-	18.9	kWh per Year		
CFL Savings Before Adjustments		56.7	kWh per Year		
		56.7	kWh per Year		
Persistance Factor	x	0.800	pf	20.0%	Lamps not installed or returned
CFL Energy Savings		45.3	kWh per Year		
CFL Energy Savings		**45.3**	**kWh / Year Savings**		
60W Incandescent Lamp Demand		0.060	kW		
15W Compact Fluorescent Lamp Demand	-	0.015	kW		
CFL Demand Reduction Before Adjustments		0.045	kW		
CFL Demand Reduction Before Adjustments		0.045	kW		
Coincidence Factor		0.120	cf	12.0%	Lamps on between 5 and 9 p.m.
Persistance Factor	x	0.800	pf	20.0%	Lamps not installed or returned
CFL Demand Savings		0.004	kW		
CFL Demand Savings		**0.004**	**kW Savings**		

12.1.2 T12 to standard T8 (Magnetic Ballast)

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07).
- Econorthwest TRM Review – 6/23/10
- DEER - The Database for Energy Efficient Resources
- The California Energy Commission California Commercial End Use Summary http://www.energy.ca.gov/ceus/
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. #18 – Break down T8 savings by lamp length – Adopted
- 10/5/11 – Currently Under Review.

Major Changes:

- Wholesale replacement of prior TRM using DEER operational data and CEUS Commercial Data
- Added interactive effect factors for energy and demand Table 3.

Description: This measure involves the replacement of an existing T12 lamp with a new high efficiency T8 lamp and T12 lamp to standard T8 (magnetic ballast), and savings are calculated assuming standard T12 lamps and magnetic ballasts. The average watt savings per lamp for replacing 2', 3', 4', and 8' lamps is calculated by weighting the average toward those replacements that most likely to occur; largely 4' 2 lamp and 4' 4 lamp fixtures. Based on the assumed fixture distribution, the average savings per lamp is 18.6W.

Base Efficiency

The base case efficiency is T12 lamp with magnetic ballast.

High Efficiency

The high efficiency case is a T8 lamp with electronic ballast or standard T8 lamp with magnetic ballast.

Demand Savings: Using the CEUS coincidence factors the demand savings are (see Table 3 for Interactive Effect):

	Demand Savings (kW)			
Building Type	**2' Lamp**	**3' Lamp**	**4' Lamp**	**8' Lamp**
All Commercial	0.0040	0.0070	0.0100	0.0200
Misc. Commercial	0.0020	0.0040	0.0060	0.0120
Cold Storage	0.0040	0.0070	0.0100	0.0200
Education	0.0020	0.0030	0.0040	0.0080
Grocery	0.0070	0.0110	0.0160	0.0340
Health	0.0050	0.0080	0.0130	0.0260
Hotel/Motel	0.0050	0.0080	0.0120	0.0240
Misc. Industrial	0.0040	0.0070	0.0100	0.0200
Office	0.0040	0.0070	0.0100	0.0200
Restaurant	0.0060	0.0100	0.0140	0.0300
Retail	0.0050	0.0080	0.0120	0.0240
Warehouse	0.0040	0.0060	0.0090	0.0180

Energy Savings: Using the DEER operational hours the energy savings are (see Table 3 for Interactive Effect):

	Energy Savings (kWh/year)			
Building Type	**2' Lamp**	**3' Lamp**	**4' Lamp**	**8' Lamp**
All Commercial	35.9	56.4	83.2	170.8
Misc. Commercial	35.9	56.4	83.2	170.8
Cold Storage	34.5	54.3	80.0	164.3
Education	22.0	34.6	51.0	104.8
Grocery	48.3	76.0	112.0	230
Health	53.7	84.5	124.5	255.7
Hotel/Motel	41.0	64.5	95.0	195.2
Misc. Industrial	35.6	56.0	82.5	169.5
Office	23.3	36.6	54.0	110.9
Restaurant	43.8	68.9	101.5	208.5
Retail	34.9	54.9	81.0	166.3
Warehouse	34.5	54.3	80.0	164.3

Incentive

Equipment Description	All Commercial Demand (kW) Savings	All Commercial Energy Savings (kWh)	Current Incentive
2'T12 - 2'T8	0.004	35.9	$4.80
3'T12 - 3'T8	0.007	56.4	$5.20
4'T12 - 4'T8	0.01	83.2	$5.60
8'T12 - 8'T8	0.02	170.8	$7.20

12.1.3 T12/T8 to T8 Low Wattage

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – (KEMA 2005-07).
- Econorthwest TRM Review – 6/23/10
- DEER-The Database for Energy Efficient Resources
- The California Energy Commission California Commercial End Use Summary http://www.energy.ca.gov/ceus/
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. #no number– Adjust with DEER/CEUS usage characteristics – Adopted
- 10/5/11 – Currently Under Review.

Major Changes:

- Adjustment of hours and coincidence factors of prior TRM using DEER operational data and CEUS Commercial Data
- Added interactive effect factors for energy and demand Table 3.

Description:
This measure involves the replacement of 4' standard T8 with low wattage T8 fixtures and electronic ballasts.

Base Efficiency

The baseline T8 fixtures are assumed to be standard T8 (32W) lamps with standard magnetic ballasts.

High Efficiency

The high efficiency case is super T8 low wattage (25W/28W) lamps with high performance electronic ballasts.

Energy and Demand Savings:
The Base Watts and New Watts values are taken from Appendix B of the KEMA Report Table B-2. Appendix G of the KEMA report gives the same value for all Building Types. The following table shows the savings for low wattage T8 lamps and ballast compared to standard T8 lamps.

Energy and Demand Savings and Incentive Levels: Using the DEER operational hours (Energy) and the CEUS coincidence factors (Demand) the savings are the following (see Table 3 for Interactive Effect):

T8 to low wattage T8 with HEEB		
Building Type	**Demand (kW) Savings**	**Energy (kWh) Savings**
All Commercial	0.009	78.1
Misc. Commercial	0.005	78.1
Cold Storage	0.009	75.1
Education	0.004	47.9
Grocery	0.015	105.1
Health	0.012	116.9
Hotel/Motel	0.011	89.2
Misc. Industrial	0.009	77.4
Office	0.009	50.7
Restaurant	0.014	95.3
Retail	0.011	76.0
Warehouse	0.008	75.1

Commercial Lighting Factors

Building Type	Hours of	Peak
All Commercial	4,325	0.50
Misc. Commercial	4,325	0.30
Cold Storage	4,160	0.50
Education	2,653	0.20
Grocery	5,824	0.85
Health	6,474	0.65
Hotel/Motel	4,941	0.60
Misc. Industrial	4,290	0.50
Office	2,808	0.50
Restaurant	5,278	0.75
Retail	4,210	0.60
Warehouse	4,160	0.45

[1] The Database for Energy Efficient Resources (DEER)

[2] California Commercial End Use Summary (CEUS)

Incentive

Equipment Description	All Commercial Demand (kW) Savings	All Commercial Energy Savings (kWh)	Current Incentive	¢ /kWh
4'T12 - LW 4'T8	0.01	78.1	$8.40	$0.11
4'T8 - LW 4'T8	0.006	78.1	$5.60	$0.07

12.1.4 Delamping

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07).
- Econorthwest TRM Review – 6/23/10
- DEER-The Database for Energy Efficient Resources
- The California Energy Commission California Commercial End Use Summary http://www.energy.ca.gov/ceus/
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. #20 – Break down the savings by lamp size**.** – Adopted
- 10/5/11 – Currently Under Review.

Major Changes:

- Adjustment of hours and coincidence factors of prior TRM using DEER operational data and CEUS Commercial Data
- Added interactive effect factors for energy and demand Table 3.

Description: The ballasts are re-wired for de-lamping.

Base Efficiency

The base case is no delamping

High Efficiency

The savings for this measure are determined by calculating the average watt reduction by removing either a 32 W T8, or a standard 40 W or reduced wattage 34 W T12 lamp from a standard ballast fixture, magnetic energy saving ballast fixture, or electric ballast fixture. This measure covers 2', 4' and 8' fixtures.

Incremental Cost
$4 per lamp

Energy and Demand Savings – see Table 3 for Interactive Effect.

	Delamping Avg. Wattage Reduction			
	2' Lamp	3' Lamp	4' Lamp	8' Lamp
Average	18.5	27.5	34.5	77.0

	Delamping Energy Reduction			
Building Type	2' Lamp	3' Lamp	4' Lamp	8' Lamp
All Commercial	80.0	118.9	149.2	333.0
Misc. Commercial	80.0	118.9	149.2	333.0
Cold Storage	77.0	114.4	143.5	320.3
Education	49.1	73.0	91.5	204.3
Grocery	107.7	160.2	200.9	448.4
Health	119.8	178.0	223.4	498.5
Hotel/Motel	91.4	135.9	170.5	380.5
Misc. Industrial	79.4	118.0	148.0	330.3
Office	51.9	77.2	96.9	216.2
Restaurant	97.6	145.1	182.1	406.4
Retail	77.9	115.8	145.2	324.2
Warehouse	77.0	114.4	143.5	320.3

	Delamping Demand Reduction			
Building Type	2' Lamp	3' Lamp	4' Lamp	8' Lamp
All Commercial	0.009	0.014	0.017	0.039
Misc. Commercial	0.006	0.008	0.010	0.023
Cold Storage	0.009	0.014	0.017	0.039
Education	0.004	0.006	0.007	0.015
Grocery	0.016	0.023	0.029	0.065
Health	0.012	0.018	0.022	0.050
Hotel/Motel	0.011	0.017	0.021	0.046
Misc. Industrial	0.009	0.014	0.017	0.039
Office	0.009	0.014	0.017	0.039
Restaurant	0.014	0.021	0.026	0.058
Retail	0.011	0.017	0.021	0.046
Warehouse	0.008	0.012	0.016	0.035

Commercial Lighting Factors

Building Type	Hours of Operation[1]	Peak Coincidence Factor[2]
All Commercial	4,325	0.50
Misc. Commercial	4,325	0.30
Cold Storage	4,160	0.50
Education	2,653	0.20
Grocery	5,824	0.85
Health	6,474	0.65
Hotel/Motel	4,941	0.60
Misc. Industrial	4,290	0.50
Office	2,808	0.50
Restaurant	5,278	0.75
Retail	4,210	0.60
Warehouse	4,160	0.45

[1] The Database for Energy Efficient Resources (DEER)
[2] California Commercial End Use Summary (CEUS)

Equipment Description	All Commercial Demand (kW) Savings	All Commercial Energy Savings (kWh)	Current Incentive
Delamping 2'	0.009	80	$2.50
Delamping 3'	0.014	118.9	N/A
Delamping 4'	0.017	149.2	$5.00
Delamping 8'	0.039	333	$7.50

12.1.5 Delamping with Reflectors

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- New Buildings Institute, Advanced Lighting Guidelines, 2003
- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07).
- Econorthwest TRM Review – 6/23/10
- DEER-The Database for Energy Efficient Resources
- The California Energy Commission California Commercial End Use Summary http://www.energy.ca.gov/ceus/
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. #20 – Break down the savings by lamp size. – Adopted
- 10/5/11 – Currently Under Review.

Major Changes:

- Adjustment of hours and coincidence factors of prior TRM using DEER operational data and CEUS Commercial Data
- Added interactive effect factors for energy and demand Table 3.

Description: Putting reflectors on the ballasts allows for more light, with less lamps. The ballasts are re-wired for de-lamping.

Base Case

The base efficiency case is no delamping with reflectors.

High Efficiency

The savings for this measure are determined by calculating the average watt reduction by removing either a 32 W T8, or a standard 40 W or reduced wattage 34 W T12 lamp from a standard ballast fixture, magnetic energy saving ballast fixture, or electric ballast fixture.

Energy and Demand Savings:
The wattage per lamp varies greatly depending on the size of the lamp. See Table 3 for Interactive Effect.

	Demand Savings (kW)			
Building Type	2' Lamp	3' Lamp	4' Lamp	8' Lamp
All Commercial	0.0090	0.0140	0.0170	0.0390
Misc. Commercial	0.0060	0.0080	0.0100	0.0230
Cold Storage	0.0090	0.0140	0.0170	0.0390
Education	0.0040	0.0060	0.0070	0.0150
Grocery	0.0160	0.0230	0.0290	0.0650
Health	0.0120	0.0180	0.0220	0.0500
Hotel/Motel	0.0110	0.0170	0.0210	0.0460
Misc. Industrial	0.0090	0.0140	0.0170	0.0390
Office	0.0090	0.0140	0.0170	0.0390
Restaurant	0.0140	0.0210	0.0260	0.0580
Retail	0.0110	0.0170	0.0210	0.0460
Warehouse	0.0080	0.0120	0.0160	0.0350

	Energy Savings (kWh/year)			
Building Type	2' Lamp	3' Lamp	4' Lamp	8' Lamp
All Commercial	80.0	118.9	149.2	333
Misc. Commercial	80.0	118.9	149.2	333
Cold Storage	77.0	114.4	143.5	320.3
Education	49.1	73.0	91.5	204.3
Grocery	107.7	160.2	200.9	448.4
Health	119.8	178.0	223.4	498.5
Hotel/Motel	91.4	135.9	170.5	380.5
Misc. Industrial	79.4	118.0	148.0	330.3
Office	51.9	77.2	96.9	216.2
Restaurant	97.6	145.1	182.1	406.4
Retail	77.9	115.8	145.2	324.2
Warehouse	77.0	114.4	143.5	320.3

Incentives

Equipment Description	All Commercial Demand (kW) Savings	All Commercial Energy Savings (kWh)	Current Incentive
Delamping w/ Refl. 2'	0.009	80	$5.00
Delamping w/ Refl. 3'	0.014	118.9	N/A
Delamping w/ Refl. 4'	0.017	149.2	$10.00
Delamping w/ Refl. 8'	0.039	333	$15.00

12.1.6 LED Refrigerated Case Lighting

Version Date & Revision History
Draft date: October 3, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:
TBD

Baseline Efficiencies:
40W F40 T8 Linear Fluorescent Lamp

High Efficiency:
23W LED Linear Lamp

Energy Savings:
223.6 kWh and .036 kW
EM&V recommends demand savings at 0.023 kW (note: program cannot mathematically come up with this figure – see algorithm next page).

Savings Algorithms

	LED Refrigerated Case Lighting				
			40.0	W	
Base	40W F40 T8 Linear Fluorescent Lamp		0.040	kW	
			17	Hours per Day	
		x	365	Days	6205 Hours per Year
	40W F40 T8 kWh/Year		248.2	kWh per Year	
Enhanced	23W LED Linear Lamp		0.023	kW	
			17	Hours per Day	
		x	365	Days	6205 Hours per Year
	LED Fixture kWh/Year		142.7	kWh per Year	
	40W F40 T8 kWh/Year		248.2	kWh per Year	
	LED Fixture kWh/Year	-	142.7	kWh per Year	
	LED Savings Before Adjustments		105.5	kWh per Year	
	Demand Compressor Load w/ Existing F40 T8		0.0448	kW	
			17	Hours per Day	
		x	365	Days	6205 Hours per Year
			278.0	kWh per Year	
	Demand Compressor Load w/ LED		0.0258	kW	
			17	Hours per Day	
		x	365	Days	6205 Hours per Year
			159.8	kWh per Year	
	kWh Reduction		105.5	kWh per Year	
	% of Lighting Savings reduced from Compressor Load	x	100%		
	Cooling Energy Reduced from System		105	kWh per Year	
	Lighting Contribution to Cooling Energy Reduced from System		105	kWh per Year	
	Refrigerator Compressor Efficiency	x	1.12	COP	
	Compressor Energy Reduced		118.1	kWh per Year	
	LED Savings Before Adjustments		105.5	kWh per Year	
	Compressor Energy Reduced	+	118.1	kWh per Year	
	Fixture Savings Per Year		223.6	kWh per Year	
	LED Peak Demand Savings per Lamp		**0.036**	**kW Savings per Lamp**	
Base	**F40 T8 Linear Fluorescent Fixture Demand kW**		**0.085**	**kW**	
Enhanced	**LED Demand kW**	-	**0.049**	**kW**	
			0.036	**kW Savings**	
	Total Annual Energy Savings (including compressor savings) per Lamp		**223.6**	**Annual Savings (kWh) per Lamp**	
Base	**F40 T8 Annual Energy Use**		**526.184**	**kWh per Lamp**	
Enhanced	**LED Case Lighting Fixtures Annual Energy Use**	-	**302.556**	**kWh per Lamp**	
	LED Energy Reduction		**223.6**	**kWh per Lamp**	

12.1.7 LED

Version Date & Revision History
Draft date: November 30, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- The Database for Energy Efficient Resources (DEER)
- California Commercial End Use Summary (CEUS)
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- 11/30/11 – Moved *LED Product Customized Process* measure to addendum (section 16.2.1) and created new prescriptive *LED* measure.
- Added interactive effect factors for energy and demand Table 3.
- Matched energy/demand savings for LED ENERGY STAR approved recessed-can retrofit kit to PAR30 short/long neck dimmable/non-dimmable.

Measure Description: Light Emitting Diodes (LED) are a lighting technology that utilizes solid-state technology to produce light, opposed to fluorescent or incandescent lighting sources. In general, LED technology will provide energy levels 15% of a comparable incandescent lamp (15W to a 100W equivalent).

Baseline & High Efficiency:

25% *Dimmable Demand Reduction*

Lamp	Base Case Incandescent Demand (kW)	Percent Incandescent Base	Base Case CFL Demand (kW)	Percent CFL Base	Base Mix Demand (kW)	Enhanced Case LED Demand (kW)	*LED* Demand Savings (kW)	*Dimmable LED* Demand Savings (kW)
MR16	0.0500	100%	n/a	0%	0.0500	0.0065	0.0435	0.0326
PAR20 8 deg.	0.0600	80%	0.0150	20%	0.0510	0.0086	0.0424	0.0318
PAR20 25 deg.	0.0550	80%	0.0130	20%	0.0466	0.0090	0.0376	0.0282
PAR30 Short Neck or ENERGY STAR approved recessed-can retrofit kit	0.0750	80%	0.0200	20%	0.0640	0.0163	0.0477	0.0358
PAR30 Long Neck or ENERGY STAR approved recessed-can retrofit kit	0.0750	80%	0.0200	20%	0.0640	0.0163	0.0477	0.0358
PAR38 25 deg.	0.0750	80%	0.0200	20%	0.0640	0.0203	0.0437	0.0328
A-19	0.0600	20%	0.0150	80%	0.0240	0.0078	0.0162	0.0122

Energy Savings by Building/Usage Type (see Table 3 for Interactive Effect):

Dimmable

			Dimmable Commercial Lighting													
			MR16		PAR20 8 deg.		PAR20 25 deg.		PAR30 Short Neck or ENERGY STAR approved recessed-can retrofit kit		PAR30 Long Neck or ENERGY STAR approved recessed-can retrofit kit		PAR38 25 deg.		A-19	
Building Type	Hours of Operation[1]	Peak Coincidence Factor[2]	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)
All Commercial	4,325	0.50	188.1	0.0218	183.4	0.0212	162.6	0.0188	206.3	0.0239	206.3	0.0239	189.0	0.0219	70.1	0.0081
Misc. Commercial	4,325	0.30	188.1	0.0131	183.4	0.0127	162.6	0.0113	206.3	0.0143	206.3	0.0143	189.0	0.0131	70.1	0.0049
Cold Storage	4,160	0.50	181.0	0.0218	176.4	0.0212	156.4	0.0188	198.4	0.0239	198.4	0.0239	181.8	0.0219	67.4	0.0081
Education	2,653	0.20	115.4	0.0087	112.5	0.0085	99.8	0.0075	126.5	0.0095	126.5	0.0095	115.9	0.0087	43.0	0.0032
Grocery	5,824	0.85	253.3	0.0370	246.9	0.0360	219.0	0.0320	277.8	0.0405	277.8	0.0405	254.5	0.0371	94.3	0.0138
Health	6,474	0.65	281.6	0.0283	274.5	0.0276	243.4	0.0244	308.8	0.0310	308.8	0.0310	282.9	0.0284	104.9	0.0105
Hotel/Motel	4,941	0.60	214.9	0.0261	209.5	0.0254	185.8	0.0226	235.7	0.0286	235.7	0.0286	215.9	0.0262	80.0	0.0097
Misc. Industrial	4,290	0.50	186.6	0.0218	181.9	0.0212	161.3	0.0188	204.6	0.0239	204.6	0.0239	187.5	0.0219	69.5	0.0081
Office	2,808	0.50	122.1	0.0218	119.1	0.0212	105.6	0.0188	133.9	0.0239	133.9	0.0239	122.7	0.0219	45.5	0.0081
Restaurant	5,278	0.75	229.6	0.0326	223.8	0.0318	198.5	0.0282	251.8	0.0358	251.8	0.0358	230.6	0.0328	85.5	0.0122
Retail	4,210	0.60	183.1	0.0261	178.5	0.0254	158.3	0.0226	200.8	0.0286	200.8	0.0286	184.0	0.0262	68.2	0.0097
Warehouse	4,160	0.45	181.0	0.0196	176.4	0.0191	156.4	0.0169	198.4	0.0215	198.4	0.0215	181.8	0.0197	67.4	0.0073

[1] The Database for Energy Efficient Resources (DEER)
[2] California Commercial End Use Summary (CEUS)

Non-Dimmable

			Non-Dimmable Commercial Lighting													
			MR16		PAR20 8 deg.		PAR20 25 deg.		PAR30 Short Neck or ENERGY STAR approved recessed-can retrofit kit		PAR30 Long Neck or ENERGY STAR approved recessed-can retrofit kit		PAR38 25 deg.		A-19	
Building Type	Hours of Operation[1]	Peak Coincidence Factor[2]	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)	Energy Savings (kWh/year)	Demand Savings (kW)
All Commercial	4,325	0.50	141.1	0.0163	137.5	0.0159	122.0	0.0141	154.7	0.0179	154.7	0.0179	141.8	0.0164	52.5	0.0061
Misc. Commercial	4,325	0.30	141.1	0.0098	137.5	0.0095	122.0	0.0085	154.7	0.0107	154.7	0.0107	141.8	0.0098	52.5	0.0036
Cold Storage	4,160	0.50	135.7	0.0163	132.3	0.0159	117.3	0.0141	148.8	0.0179	148.8	0.0179	136.3	0.0164	50.5	0.0061
Education	2,653	0.20	86.6	0.0065	84.4	0.0064	74.8	0.0056	94.9	0.0072	94.9	0.0072	87.0	0.0066	32.2	0.0024
Grocery	5,824	0.85	190.0	0.0277	185.2	0.0270	164.2	0.0240	208.4	0.0304	208.4	0.0304	190.9	0.0279	70.8	0.0103
Health	6,474	0.65	211.2	0.0212	205.9	0.0207	182.6	0.0183	231.6	0.0233	231.6	0.0233	212.2	0.0213	78.7	0.0079
Hotel/Motel	4,941	0.60	161.2	0.0196	157.1	0.0191	139.3	0.0169	176.8	0.0215	176.8	0.0215	161.9	0.0197	60.0	0.0073
Misc. Industrial	4,290	0.50	140.0	0.0163	136.4	0.0159	121.0	0.0141	153.5	0.0179	153.5	0.0179	140.6	0.0164	52.1	0.0061
Office	2,808	0.50	91.6	0.0163	89.3	0.0159	79.2	0.0141	100.5	0.0179	100.5	0.0179	92.0	0.0164	34.1	0.0061
Restaurant	5,278	0.75	172.2	0.0245	167.8	0.0239	148.8	0.0212	188.8	0.0268	188.8	0.0268	173.0	0.0246	64.1	0.0091
Retail	4,210	0.60	137.4	0.0196	133.9	0.0191	118.7	0.0169	150.6	0.0215	150.6	0.0215	138.0	0.0197	51.2	0.0073
Warehouse	4,160	0.45	135.7	0.0147	132.3	0.0143	117.3	0.0127	148.8	0.0161	148.8	0.0161	136.3	0.0147	50.5	0.0055

[1] The Database for Energy Efficient Resources (DEER)

[2] California Commercial End Use Summary (CEUS)

Equipment Qualifications: Incentivized LED lamps must be Energy Star labeled.

Incentives

Type	LED Incentive	Dimmable LED Incentive
MR16	$17.50	$20.00
PAR20 8 deg.	$17.50	$20.00
PAR20 25 deg.	$17.50	$20.00
PAR30 Short Neck	$17.50	$20.00
PAR30 Long Neck	$17.50	$20.00
PAR38 25 deg.	$17.50	$20.00
A-19	$5.00	$7.50

12.1.8 LED Exit Signs

Version Date & Revision History
Draft date: January, 2010
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Management Programs – KEMA (KEMA 2005-07). http://www.energystar.gov/ia/business/small_business/led_exitsigns_techsheet.pdf
- Econorthwest TRM Review – 6/23/10

TRM Review Actions:
- 6/23/10 No Changes
- 10/5/11 – Currently Under Review.

Major Changes:
- No changes

Measure Description:
Replacement of Incandescent Exit Signs with LED Exit Signs. Savings are equal across all building use types.

Baseline Efficiencies:
Demand Baseline has been determined by technical specifications of an incandescent exit sign, which typically holds two 20 W bulbs (40 W). The Energy Baseline is based on 24/7 operation of the sign (8,760 hours).

Building Types	Demand Baseline(kW)	Energy Baseline (kWh)
All Types	0.040	351

High Efficiency:
The typical technical specification on an LED Exit Sign (through energystar.gov) claims "less than 5W" of Demand. The Energy High Efficiency figure is based on 24/7 operation (8,760 hours).

Building Types	Demand High Efficiency (kW)	Energy High Efficiency (kWh)
All Types	0.005	44

Final Savings:
The Impact Evaluation Report by KEMA states that LED exit signs are expected to have high realization ratios and that measured savings were typically 100% of claimed savings. These figures match the suggested savings by the KEMA report.

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All Types	0.035	307

Saving Algorithm:

Exit Signs - Businesses				
Incandescent Exit Sign		0.040	kW	
		24.00	Hours per Day	
	x	365	Days	8,760 Hours per Year
Incandescent Exit Sign		350.4	kWh per Year	
LED Exit Sign		0.005	kW	
		24.00	Hours per Day	
	x	365	Days	8,760 Hours per Year
LED Exit Sign		43.8	kWh per Year	
Incandescent Exit Sign		350.4	kWh per Year	
LED Exit Sign	-	43.8	kWh per Year	
Savings Before Adjustments		306.6	kWh per Year	
		306.6	kWh per Year	
Persistance Factor	x	1.000	pf	0.0% Lamps not installed or replaced back
		307	kWh per Year	
CFL Energy Savings		**307**	**kWh / Year Savings**	
Incandescent Exit Sign		0.040	kW	
LED Exit Sign	-	0.005	kW	
Demand Reduction Before Adjustments		0.035	kW	
Demand Reduction Before Adjustments		0.035	kW	
Coincidence Factor		1.000	cf	100.0% Lamps on between 5 and 9 p.m.
Persistance Factor	x	1.000	pf	0.0% Lamps not installed or replaced back
		0.035	kW	
CFL Demand Savings		**0.035**	**kW Savings**	

Incentive
$25

12.1.10 HID Pulse Start Metal Halide

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07).
- Econorthwest TRM Review – 6/23/10
- DEER-The Database for Energy Efficient Resources
- The California Energy Commission California Commercial End Use Summary http://www.energy.ca.gov/ceus/
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. #17 – Break down savings by wattage ranges pulse start metal halides- Adopted
- 10/5/11 – Currently Under Review.

Major Changes:

- Wholesale replacement of prior TRM using DEER operational data and CEUS Commercial Data
- Added interactive effect factors for energy and demand Table 3.
- Updated document regarding persistence and coincident factors based on EM&V review.

Referenced Documents:

Description: Traditional probe-start metal halide lamps do not use an igniter and require three electrical contacts to ignite the gas and remain lit. Recently developed pulse-start metal halide lamps use only two contacts and use an igniter located inside the ballast pod. Pulse-start lamps offer higher light output per unit of electric power. Multiple Wattages of Pulse-Start Metal Halides are installed. The most common have rated wattages between 100 and 250, with the majority of installations being 250 W.

Incremental Cost
$150 (320W PS Replacing 400W HID)

Base Case
Probe start metal halide

High Efficiency
Lower wattage pulse start metal halide

Energy Savings

The savings for pulse start metal halide fixtures are calculated based on a wattage savings for the replacement of a metal halide fixture with a smaller wattage pulse start metal halide fixture. Based on the wattages provided, it appears that it was assumed that a 175W metal halide fixture would be replaced with a 100W pulse start metal halide fixture, 250W metal halide fixture would be replaced with either a 150W or 175W pulse start metal halide fixture, and a 400W metal halide would be replaced with a 250W pulse start metal halide fixture. Based on the expected fixture wattages and breakdown of fixture installations, an average savings of 123W per fixture was assumed.

Measure	Metal Halide (W)	Pulse Start Metal Halide (W)
Equivalent Replacement	175	100
	250	150 or 175
	400	250

Savings

	Pulse Start Wattage Reduction		
	<=100W	101-200W	201-350W
Average	48	70	109

Operating hours assumed 4,943 hr/year.

Energy Savings: Using the DEER operational hours the energy savings are (see Table 3 for Interactive Effect):

	Pulse Start Energy Reduction		
Building Type	**<=100W**	**101-200W**	**201-350W**
All Commercial	209.0	302.0	471.4
Misc. Commercial	209.0	302.0	471.4
Cold Storage	201.1	290.4	453.4
Education	128.2	185.2	289.2
Grocery	281.5	406.6	634.8
Health	312.9	452.0	705.7
Hotel/Motel	238.8	345.0	538.6
Misc. Industrial	207.4	299.5	467.6
Office	135.7	196.0	306.1
Restaurant	255.1	368.5	575.3
Retail	203.5	293.9	458.9
Warehouse	201.1	290.4	453.4

Demand Savings: Using the CEUS coincidence factors the demand savings are (see Table 3 for Interactive Effect):

	Pulse Start Demand Reduction		
Building Type	**<=100W**	**101-200W**	**201-350W**
All Commercial	0.024	0.035	0.055
Misc. Commercial	0.015	0.021	0.033
Cold Storage	0.024	0.035	0.055
Education	0.010	0.014	0.022
Grocery	0.041	0.059	0.093
Health	0.031	0.045	0.071
Hotel/Motel	0.029	0.042	0.065
Misc. Industrial	0.024	0.035	0.055
Office	0.024	0.035	0.055
Restaurant	0.036	0.052	0.082
Retail	0.029	0.042	0.065
Warehouse	0.022	0.031	0.049

12.1.11 Sensors

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Reference Documents:

- BC Hydro report: Smart Strip electrical savings and usability, October 2008 (unit can only take one surge, then needs to be replaced)
- Plug Load Characterization Study for Southern California Edison. Prepared by Research Into Action (2010)
- Based on assumption that office equipment will be running during the peak period
- Assumes 2 weeks of vacation and 2 weeks of holidays for a total of 48 work weeks annually
- See Table 'Standby Power Consumption of Devices Using Smart Strip Plug Outlets'
- Standby loads sourced from Lawrence Berkeley National Laboratory http://standby.lbl.gov/summary-table.html. Hours of operation based on engineering estimations.

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description
Plug load occupancy sensors are devices that control low wattage office equipment using an occupancy sensor. They typically use an infrared sensor to monitor movement, and use a smart strip to turn off connected devices, or put them in standby mode, when no one is present.

Definition of Efficient Equipment
In order for this characterization to apply, the installed equipment must be a 'smart' power strip with both control and peripheral outlets, and an occupancy sensor.

Definition of Baseline Equipment
The baseline assumes a mix of typical document station office equipment (printers, scanners, fax machines, etc.) each with uncontrolled standby load.

Deemed Savings for this Measure

Annual kWh Savings = 169 kWh/yr
Demand kW Savings = 0

Deemed O&M Cost Adjustments
n/a

Coincidence Factor
0

Energy Savings

ΔkWh = (WORKDAYS x ΔWsleep)/1000

Where:

WORKDAYS = Average number of workdays, or business days, in a year
= 240 (4)

ΔWsleep = The energy savings of devices plugged into the strip when in 'sleep' mode (Wh)
= 704 (5)

Coincident Peak Demand Savings

ΔkW = 0

Deemed O&M Cost Adjustment Calculation
n/a

Reference Tables
Standby Power Consumption for Devices Using Smart Strip Plug Outlets (6) (All values in Watts)

Computer Peripherals	Connected Load when 'On'	Connected Load in 'Sleep'	Hours in Sleep Mode	Daily Savings
Laser Printer	131	2	4	516
Multi-function device, laser (scanner, fax)	50	3	4	188
			Total	704

Lifetime of Efficient Equipment
The estimated useful life for a smart strip plug outlet is 8 years (1)

Measure Cost
The incremental cost for this measure is assumed to be $70 (2)

12.1.12 Stairwell Bi-Level Dimming Fluorescent

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:
This measure is evaluated and incentivized base on a customized approach comparing base case to enhanced case scenarios along with studies from Seattle City Lights based on reduced run time and height and type of building.

12.1.13 Daylighting

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
This measure is currently evaluated and incentivized base on custom program with pre and post data logging.

12.2 High Efficiency HVAC

12.2.1 Chiller

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Econorthwest TRM Review – 6/23/10
- IECC 2006

TRM Review Actions:
- 6/23/10 Rec. #23 – Utilize IECC 2006 Efficiencies as the Baseline Efficiency and Efficient Packaged
  Unit 15% better than IECC 2006 – Adopted
- 6/23/10 Rec. #24 - break down the savings by chiller type and size. Conduct additional research for future program years to calibrate claimed savings for Hawaii
  customer base.- Adopted

Major Changes:
- Chiller efficiency selected at 15% improvement over IECC 2006.

Description: The replacement of chillers with Energy Efficiency above the code efficiency values in place at the time of permitting the project. In multiple unit chiller plants, a review of operational chillers will be conducted to determine what fraction of installed chillers will be incentivized. This is to avoid paying for standby units.

High Efficiency Chiller - 15% higher than IECC 2006

		IECC 2006 IPLV (kW/Ton)	Hawaii Energy Premium Efficiency (kW/Ton)
Reciprocating	All	0.70	0.60
Rotary Screw and Scroll	< 150 tons	0.68	0.58
	150-300 tons	0.63	0.54
	> 300 tons	0.57	0.48
Centrifugal	< 150 tons	0.67	0.57
	150-300 tons	0.60	0.51
	> 300 tons	0.55	0.47

Energy Savings:

High Efficiency Chiller - 15% higher than IECC 2006 - Energy Reduction (kWh/Ton)

Building Type	Recipricating	Rotary Screw or Scroll			Centrifugal		
	All	<150	150-300	>300	<150	150-300	>300
All Commercial	312.5	303.6	281.2	254.4	299.1	267.8	245.5
Misc. Commercial	312.5	303.6	281.2	254.4	299.1	267.8	245.5
Cold Storage	536.7	521.3	483.0	437.0	513.7	460.0	421.7
Education	307.9	299.1	277.1	250.7	294.7	263.9	241.9
Grocery	536.7	521.3	483.0	437.0	513.7	460.0	421.7
Health	435.7	423.3	392.1	354.8	417.0	373.5	342.3
Hotel/Motel	312.4	303.5	281.2	254.4	299.0	267.8	245.5
Misc. Industrial	435.7	423.3	392.1	354.8	417.0	373.5	342.3
Office	520.1	505.3	468.1	423.5	497.8	445.8	408.7
Restaurant	349.0	339.0	314.1	284.2	334.1	299.2	274.2
Retail	273.9	266.1	246.5	223.1	262.2	234.8	215.2
Warehouse	536.7	521.3	483.0	437.0	513.7	460.0	421.7

Demand Savings:

High Efficiency Chiller - 15% higher than IECC 2006 - Demand Reduction (kW/Ton)

Building Type	Recipricating	Rotary Screw or Scroll			Centrifugal		
	All	<150	150-300	>300	<150	150-300	>300
All Commercial	0.064	0.062	0.058	0.052	0.061	0.055	0.050
Misc. Commercial	0.064	0.062	0.058	0.052	0.061	0.055	0.050
Cold Storage	0.072	0.070	0.065	0.059	0.069	0.062	0.057
Education	0.084	0.082	0.076	0.068	0.080	0.072	0.066
Grocery	0.056	0.054	0.050	0.045	0.053	0.048	0.044
Health	0.071	0.069	0.064	0.058	0.068	0.061	0.056
Hotel/Motel	0.055	0.053	0.049	0.044	0.052	0.047	0.043
Misc. Industrial	0.064	0.062	0.058	0.052	0.061	0.055	0.050
Office	0.048	0.047	0.043	0.039	0.046	0.041	0.038
Restaurant	0.056	0.054	0.050	0.045	0.053	0.048	0.044
Retail	0.069	0.067	0.062	0.056	0.066	0.059	0.054
Warehouse	0.063	0.061	0.057	0.051	0.060	0.054	0.050

Measure Life

20 years (DEER)

Incentive

$0.25/kWh

12.2.2 VFD – Chilled Water/Condenser Water

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Energy and Peak Demand Impact Evaluation Report of the 2005-2007
- Demand Management Programs – KEMA (KEMA 2005-07).
- Econorthwest TRM Review – 6/23/10
- IECC 2006

TRM Review Actions:
- 6/23/10 Rec. #25 - Breakdown the savings by building types. Conduct additional research for future program years to calibrate claimed savings for Hawaii customer base – Adopted
- 10/5/11 – Currently Under Review.

Major Changes:
- Energy savings separated into building type breakdown.

Description: The installation of variable frequency drives on chilled and/or condenser water pumps used in HVAC systems.

Qualification
- Require pre-notification before projects begin.
- The program reserves the right to perform on-site verifications, both pre- and post-installation.
- Existing equipment must not have a VFD. (i.e. – incentives are not available for replacement)
- The VFDs must actively control and vary the pump speed.

Energy and Demand Savings

Energy Savings = 902.7 kWh per HP
Demand Savings = 0.245 kW per HP

HVAC Pump Motor VFD

DSMIS Values for All Commercial
kW = 0.245 per HP
kWh = 902.7 per HP

KEMA 2008 Values for All Commercial (HECO):
kW = none available
kWh = none available

Base Pump Motor Use:

Base HP =	10 HP	Example
Motor Efficiency =	92%	Estimated Typical
Average Load =	75%	Estimated Typical
HP to kW conversion =	0.746	
kW load = HP*0.746*% Load/eff =	6.1 kW	
Hours of operation =	6000 hours	Estimated
kWh Used Annually = kW load * Hours =	36,489	

Pump Motor Savings with VFD:

Energy Savings percentage =	24.74%	Needed to meet the kWh savings from DSMIS
kWh savings = % savings * kWh annual use =	9,027 kWh	
kW average savings = kWh savings/Hours =	1.50 kW	
kW savings = average kW savings * CF =	2.45 kW	Based on DSMIS value of 245 watts per HP
CF needed = kW savings (program) / kW average =	1.63	

Incentive
$80/HP

Measure Life = 15 years (DEER)

12.2.3 VFD – AHU

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Management Programs – KEMA (KEMA 2005-07).
- Econorthwest TRM Review – 6/23/10
- IECC 2006
- Evergreen TRM Review – 2/23/12

TRM Review Actions:

- 6/23/10 Rec. #25 - Breakdown the savings by building types. Conduct additional research for future program years to calibrate claimed savings for Hawaii customer base – Adopted
- 10/5/11 – Currently Under Review.

Major Changes:

- Energy savings separated into building type breakdown.
- Updated energy and demand savings based on EM&V review.

Description: The installation of variable frequency drives on fans used in HVAC systems.

Values for this measure are not called out in the KEMA report. The DSMIS values for this measure are 200 watts and 760.9 kWh per horsepower. The primary assumption used for the savings calculation is that the percentage savings of the energy used before the VFD is applied. This percent savings is shown in the calculations below as about 21%. Based on information from the EPRI Adjustable Speed Drive directory and comparing energy use for outlet damper, inlet damper and VFD controls the average savings for this profile would be 50% for replacement of an outlet damper and 33% for replacement of an inlet damper. See table below.

Percentage of Full Load Power				Power Savings %	
% Flow	Outlet Dampers	Inlet Dampers	VFD	Outlet Savings	Inlet Savings
100	111	109	105	6	4
90	107	93	73	34	20
80	104	82	57	47	25
70	99	75	44	55	31
60	94	69	32	62	37
50	87	65	21	66	44
40	80	63	14	66	49
30	72	60	8	64	52
			Average	**50**	**33**

Therefore, the 21% of base case savings used in to match the DSMIS values in the calculations below appears to be reasonable and possibly conservative. The actually savings for the customer will depend on many factors related to their type of building, system and hours of operation.

VFD AHU – Energy and Demand Savings:

Building Type	Hours	Demand Savings (kW/HP)	Energy Savings (kWh/HP)
All Commercial	3,720	0.20	471.69
Misc. Commercial	3,720	0.20	471.69
Cold Storage	6,389	0.20	810.12
Education	3,665	0.20	464.72
Grocery	6,389	0.20	810.12
Health	5,187	0.20	657.71
Hotel/Motel	3,719	0.20	471.57
Misc. Industrial	5,187	0.20	657.71
Office	6,192	0.20	785.14
Restaurant	4,155	0.20	526.85
Retail	3,261	0.20	413.49
Warehouse	6,389	0.20	810.12

Example Calculation:

HVAC Fan Motor VFD

DSMIS Values for All Commercial
kW = 0.200 per HP
kWh = 760.9 per HP

KEMA 2008 Values for All Commercial (HECO):
kW = none available
kWh = none available

Base Pump Motor Use:

Base HP =	10	HP	Example
Motor Efficiency =	92%		Estimated Typical
Average Load =	75%		Estimated Typical
HP to kW conversion =	0.746		
kW load = HP*0.746*% Load/eff =	6.1	kW	
Hours of operation =	3,720	hours	Estimated
kWh Used Annually = kW load * Hours =	22,623		22623.26

Pump Motor Savings with VFD:

Energy Savings percentage =	20.85%		Needed to meet the kWh savings from DSMIS
kWh savings = % savings * kWh annual use =	4,717	kWh	
kW average savings = kWh savings/Hours =	1.268	kW	
kW savings = average kW savings * CF =	2.0	kW	Based on DSMIS value of 200 watts per HP
CF needed = kW savings (program) / kW average =	1.58		

12.2.4 Garage Demand Ventilation Control

Version Date & Revision History
Draft date: October 3, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- ASHRAE Standard 62
- International Mechanical Code
- Department of Health (DOH) Title 11 Chapter 39 (Air Conditioning and Ventilation)

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- New program offering.
- 11/22/11 – Under *Description,* the phrase “City Codes” was changed to “Codes” for accuracy.
- 85% cap of incentive was removed May 2013

Description:

Demand-controlled ventilation (DCV) using carbon monoxide (CO) sensing is a combination of two technologies: Sensors that monitor CO levels in the parking garage, and an air-handling system that uses data from the sensors to regulate the amount of ventilation air admitted. CO sensors continually monitor the air in a parking garage. Given a predictable activity level, automobiles will exhaust CO at a predictable level. Thus CO production in the parking garage will closely track activity. Given these two characteristics, a CO measurement can be used to measure and control the amount of outside air that is being introduced to dilute the CO generated by automobiles. The result is that ventilation rates can be measured and controlled to a specific cfm/ft2. This is in contrast to the traditional method of ventilating at a fixed rate regardless of occupancy.

City codes for enclosed parking areas require ventilation during all hours of operation to protect against an unhealthful build-up of carbon monoxide (CO). As a result, exhaust fans generally run 100% of operating hours. Although some buildings use timers to cut fan run time, it is important to note that the use of timers may not meet code compliance and health considerations. To achieve major energy savings and meet all health requirements, carbon monoxide sensors have now been authorized by code and mandated in some jurisdictions for new construction. Sensors measure CO levels, activating fans only when necessary to maintain CO at an acceptable level, saving upwards to 90% of energy cost.

Program Requirements:

1. Pre-notification before equipment is purchased and installed.
2. New construction is not eligible.
3. Incentive amount not to exceed Installed Cost.
4. Failure of devices causes the exhaust fans to operate in the ON position

Energy and Demand Savings:
All assumptions, data and formulas used in the calculations must be clearly documented. Standard engineering principles must be applied, and all references cited. Pre and post monitoring will be conducted to determine measured energy and demand savings.

Savings Algorithms
Gross energy and demand savings estimates for custom projects are calculated using engineering analysis and project-specific details including pre and post monitoring. A physical fan motor audit will be performed as well as spot amperage checks and logging of pre and post operational times.

Baseline Efficiency
The baseline efficiency case assumes compliance with the efficiency requirements as mandated by the Hawaii State Energy Code or industry accepted standard practice.

High Efficiency
The high efficiency case is the installation of a parking garage ventilation demand control device utilizing carbon monoxide sensors.

Persistance Factor
PF = 1 since all custom projects require verification of equipment installation.

Incentives
- $0.14/kWh
- Incentives is limited to 85% of incremental costs.
- Installations are subject to inspection for up to 5 years. Removal will be cause for incentive forfeiture.

Measure Life
8 years

Example

									100%	1.0%						
									8,760 hr/yr.	88 hr/yr.						
Zone	**New Fan Tag**	**Fan Location**	**Old Fan Tag**	**HP**	**Measured kW**						**6/7 to 6/15**		**Notes**			
1	GEF-1	1-B	PEF-2	10.0	7.2				63,072	631	100.0%		Data logger installed	7.5	0.3	96.5%
	GSF-1	1-B	PSF-4	5.0	3.4				29,784	298				3.7	0.3	91.2%
	GSF-2	1-B	PSF-4	5.0	3.4				29,784	298				3.7	0.3	91.2%
2	GEF-3	2-B	PEF-2	10.0	7.7				67,452	675				7.5	(0.2)	103.2%
	GSF-3	2-B	PSF-4	10.0	7.5				65,700	657	100.0%		Data logger installed	7.5	(0.0)	100.5%
3	GEF-6	3-B	PEF-2	10.0	7.4				64,824	648	99.9%		Data logger installed	7.5	0.1	99.2%
	GSF-4	3-B	PSF-2	10.0	7.4				64,824	648	100.0%		Data logger installed	7.5	0.1	99.2%
4	GEF-9	4-B	PEF-1	7.5	4.5				39,420	394	100.0%		Data logger installed	5.6	1.1	80.4%
	GEF-10	4-B	PEF-4	3.0	2.6				22,776	228				2.2	(0.4)	116.2%
5	GEF-7	4-A	PEF-1	7.5	4.5				39,420	394				5.6	1.1	80.4%
	GSF-5	4-A	PSF-3	7.5	5.8				50,808	508	100.0%		Data logger installed	5.6	(0.2)	103.7%
6	GEF-11	5-A	PEF-1	7.5	4.9				42,924	429				5.6	0.7	87.6%
	GSF-6	5-A	PSF-3	7.5	5.8				50,808	508	100.0%		Data logger installed	5.6	(0.2)	103.7%
7	GEF-13	6-A	PEF-2	10.0	7.5				65,700	657				7.5	(0.0)	100.5%
	GSF-7	6-A	PSF-3	7.5	5.0				43,800	438	100.0%		Data logger installed	5.6	0.6	89.4%
8	GEF-2	1-B	PEF-1	7.5	3.6				31,536	315				5.6	2.0	64.3%
	GEF-4	2-A	PEF-2	10.0	7.4				64,824	648				7.5	0.1	99.2%
	GEF-5	3-A	PEF-3	5.0	3.1				27,156	272				3.7	0.6	83.1%
	GEF-8	4-A	PEF-3	5.0	3.1				27,156	272				3.7	0.6	83.1%
	GEF-12	5-A	PEF-1	7.5	4.9				42,924	429	99.9%		Data logger installed	5.6	0.7	87.6%
	GEF-14	6-A	PEF-4	3.0	2.4				21,024	210				2.2	(0.2)	107.2%
TOTALS				**156.0**	**109.1**	kW		Pre-Project	955,716	9,557				116.4	7.3	
				Coincidence Factor	1.0			Post-Project	(9,557)							
				On Peak Demand Savings	109.1	kW		Energy Savings per Year	946,159	kWh						
					109.1	kW			946,159	kWh/yr.						
				Demand Cost per Unit	$ 12.60	/kW month		Energy Cost per Unit	$ 0.21	/kWh						
				Demand Cost Savings	$ 1,375	/month		Energy Cost Savings	$ 200,586	/yr.						
					12	months						Incentive	$ 0.18			
					$ 16,496	/Year										
								Demand Cost Savings	$ 16,496							
								Energy Cost Savings	$ 200,586							
									$ 217,082	/yr.						
								Project Cost	**$ 152,323**							
								Incentive not to exceed 100% of project cost	**170,308.6**							
								Incentive	**152,323.0**							

12.2.5 Package Unit AC

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Econorthwest TRM Review – 6/23/10
- Econorthwest Email Correspondence – 1/23/12
- IECC 2006, pg. 34

TRM Review Actions:

- 6/23/10 Rec. #21 – Utilize IECC 2006 Efficiencies as the Baseline Efficiency and Efficient Packaged Unit 15% better than IECC 2006 – Adopted
- 6/23/10 Rec. #22 - Break down packaged AC savings based on equipment size. – Adopted
- 10/5/11 – Currently Under Review.

Major Changes:

- Package chiller unit AC efficiency selected at 15% improvement over IECC 2006.
- 12/12/11 – kW/ton and EER values updated to match IECC 2006 package unit values as per Econorthwest's direction, high efficiency numbers adjusted accordingly. Energy & demand savings updated accordingly.

Description: The replacement of package and split unit air conditioners with Energy Efficiency above the Hawaii Model Energy Code.

Package Units

Unit Size (Btu/Hr.)	IECC 2006 Efficiency (kW/ton)	SEER/EER	Hawaii Energy Premium Efficiency (kW/ton)	SEER/EER
< 65,000	1.364	9.7 SEER	1.159	11.2 SEER
65,000 to 134,999	1.165	10.3 EER	0.990	11.8 EER
135,000 to 239,999	1.237	9.7 EER	1.052	11.2 EER
240,000 to 759,999	1.263	9.5 EER	1.074	10.9 EER
> 760,000	1.304	9.2 EER	1.109	10.6 EER

Energy Savings

Package Unit AC - 15% higher than IECC 2006 - Energy Reduction - kWh

Building Type	< 65,000	65,001 to 135,000	135,001 to 240,000	240,001 to 760,000	> 760,000
All Commercial	608.7	520.1	552.2	563.9	582.3
Misc. Commercial	608.7	520.1	552.2	563.9	582.3
Cold Storage	1,045.4	893.2	948.5	968.4	1,000.0
Education	599.7	512.4	544.1	555.5	573.7
Grocery	1,045.4	893.2	948.5	968.4	1,000.0
Health	848.8	725.2	770.0	786.2	811.9
Hotel/Motel	608.5	519.9	552.1	563.7	582.1
Misc. Industrial	848.8	725.2	770.0	786.2	811.9
Office	1,013.2	865.7	919.2	938.6	969.2
Restaurant	679.9	580.9	616.8	629.8	650.3
Retail	533.6	455.9	484.1	494.3	510.4
Warehouse	1,045.4	893.2	948.5	968.4	1,000.0

Demand Savings

Package Unit AC - 15% higher than IECC 2006 - Demand Reduction - kW

Building Type	< 65,000	65,001 to 135,000	135,001 to 240,000	240,001 to 760,000	> 760,000
All Commercial	0.102	0.087	0.093	0.095	0.098
Misc. Commercial	0.061	0.052	0.056	0.057	0.059
Cold Storage	0.102	0.087	0.093	0.095	0.098
Education	0.041	0.035	0.037	0.038	0.039
Grocery	0.174	0.149	0.158	0.161	0.166
Health	0.133	0.114	0.121	0.123	0.127
Hotel/Motel	0.123	0.105	0.111	0.114	0.117
Misc. Industrial	0.102	0.087	0.093	0.095	0.098
Office	0.102	0.087	0.093	0.095	0.098
Restaurant	0.153	0.131	0.139	0.142	0.147
Retail	0.123	0.105	0.111	0.114	0.117
Warehouse	0.092	0.079	0.084	0.085	0.088

Measure Life = 15 years
Incentive = $200/ton

12.2.6 Inverter Variable Refrigerant Flow (VRF) Split Air Conditioning Systems

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- Original TRM values was divided by .8 but should have been multiplied by 1.2 in order to obtain a 20% increase in efficiency.

Description: Inverter driven variable refrigerant flow (VRF) air conditioning systems are direct expansion AC systems that utilize variable speed evaporator/condenser fans, and a combination of fixed and variable speed compressors along with most often multiple individual zone evaporators to provide the ability to more closely match the AC system's output with the building's cooling requirements.

Savings comes from:
- *Part Load Efficiencies*: Increased part-load efficiency operation
- *High Efficiency Motors*: Many systems use ECM motors
- *Higher Room Temperatures*: The capacity matching allows for better humidity control through longer
- cooling operation.
- *Reduction of Distribution Losses*: Duct losses are reduced with DX systems. This may be offset by
  dedicated outside air distribution systems when needed.

Payback Qualifications: VRF products need a payback requirement of 1 year or greater. The TRB/TRC must be greater than 1.

Energy and Demand Savings: VRF systems have demonstrated a 20-30% reduction in energy consumption as compared to standard DX equipment. The energy savings and demand tables that follow provide the savings by building type and system size for VRF systems. These figures are conservatively determined to be 20% greater than provided by the "Standard" Package Unit AC measures that require EERs 15% greater than IECC 2006 requirements.

The VRF applications have been new construction projects with no ability to perform pre and post measurements. Hawaii Energy will perform field pre and post field measurements to determine the measure effectiveness in the local environment

Savings for retrofit and new construction

Variable Refrigerant Flow AC

20% better than Non-VRF with efficiencies 15% over IECC 2006 - Energy Reduction

Building Type	< 65,000	65,001 to 135,000	135,001 to 240,000	240,001 to 760,000	> 760,000
All Commercial	494.5	636.5	676.7	676.7	698.8
Misc. Commercial	494.5	636.5	676.7	676.7	698.8
Cold Storage	849.2	1,093.1	1,162.1	1,162.1	1,200.0
Education	487.2	627.0	666.6	666.6	688.4
Grocery	849.2	1,093.1	1,162.1	1,162.1	1,200.0
Health	689.5	887.4	943.4	943.4	974.3
Hotel/Motel	494.4	636.2	676.4	676.4	698.5
Misc. Industrial	689.5	887.4	943.4	943.4	974.3
Office	823.1	1,059.4	1,126.3	1,126.3	1,163.0
Restaurant	552.2	710.9	755.8	755.8	780.4
Retail	433.4	557.9	593.2	593.2	612.5
Warehouse	849.2	1,138.6	1,162.1	1,162.1	1,200.0

Variable Refrigerant Flow AC

Same as Non-VRF with efficiencies 15% over IECC 2006 - Demand Reduction

Building Type	< 65,000	65,001 to 135,000	135,001 to 240,000	240,001 to 760,000	> 760,000
All Commercial	0.069	0.089	0.095	0.095	0.098
Misc. Commercial	0.042	0.053	0.057	0.057	0.059
Cold Storage	0.069	0.089	0.095	0.095	0.098
Education	0.028	0.036	0.038	0.038	0.039
Grocery	0.118	0.151	0.161	0.161	0.166
Health	0.090	0.116	0.123	0.123	0.127
Hotel/Motel	0.083	0.107	0.114	0.114	0.117
Misc. Industrial	0.069	0.089	0.095	0.095	0.098
Office	0.069	0.089	0.095	0.095	0.098
Restaurant	0.104	0.134	0.142	0.142	0.147
Retail	0.083	0.107	0.114	0.114	0.117
Warehouse	0.062	0.080	0.085	0.085	0.088

Incentive = $250/ton (new construction)
= $300/ton (retrofit)

12.3 High Efficiency Water Heating

12.3.1 Commercial Solar Water Heating

Version Date & Revision History
Draft date: May 30, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:
Replacement of a Standard Electric Resistance Water Heater (SERWH) or heat pump with a Solar Water Heater. Solar equipment must comply with Solar Rating and Certification Corporation (SRCC) standards.

Baseline Efficiencies:
Baseline usage is a 0.9 COP Electric Resistance Water Heater or heat pump with a COP of 3.5.

The baseline water heater energy consumption is by a single 4.0 kW electric resistance element that is controlled thermostatically on/off controller based of tank finish temperature set point. The tank standby loss differences between baseline and high efficiency case are assumed to be negligible.

The baseline water heater energy consumption by a heat pump is 6.0 kW.

Energy Savings

Base Case	Annual Energy Savings (kWh/year) (per 5,000 BTU capacity derated)	Demand Savings (kW)
Standard Electric Resistance Water Heater (COP = 0.9)	429	0.46
Heat Pump (COP 3.5)	32	0.75

Savings Algorithm (Standard Electric Water Heater) – BASE CASE

Commercial Solar Water Heating - Standard Electric Water Heater (SERWH) - BASE CASE				
Energy per Day (BTU) Needed in Tank		5,000	BTU/Day	
Energy per Day (BTU) Needed in Tank		5,000	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	kWh / BTU	
Energy per Day (kWh)		1.5	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		45	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		535	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.90	COP	
Base SERWH Energy Usage per Year at the Meter		594	kWh / Year	
Design Annual Solar Fraction		90%	Water Heated by Solar System	Program Design
		10%	Water Heated by Remaining Backup Element	
Energy Usage per Year at the Meter		594	kWh / Year	
	x	10%	Water Heated by Remaining Backup Element	
Back Up Element Energy Used at Meter		59	kWh / Year	
Circulation Pump Energy		0.082	kW	KEMA 2008
Pump Hours of Operation	x	1,292	Hours per Year	KEMA 2008
Pump Energy used per Year		106	kWh / Year	
Back Up Element Energy Used at Meter		59	kWh / Year	36%
Pump Energy used per Year	+	106	kWh / Year	64%
Design Solar System Energy Usage		165	kWh / Year	
Design Solar System Energy Usage		165	kWh / Year	
Performance Factor		0.94	pf	HE
Persistance Factor	x	0.93	pf	KEMA 2008
Residential Solar Water Heater Energy Savings		145	kWh/ Year	KEMA 2008
Base SERWH Energy Usage per Year at the Meter		594	kWh / Year	
Design Solar System Energy Usage	-	165	kWh / Year	
		429	kWh / Year	
Energy Savings		**429**	**kWh/year (Per 5,000 BTU panel installed derated)**	
SERWH Element Power Consumption		4.0	kW	
Coincidence Factor	x	0.143	cf	8.6 Minutes per hour
SERWH On Peak Demand		0.57	kW On Peak	KEMA 2008
Solar System Metered on Peak Demand		0.11	kW On Peak	KEMA 2008
Commercial Solar Water Heating Demand Savings		**0.46**	**kW Savings**	

Savings Algorithm (Heat Pump) – BASE CASE

Commercial Solar Water Heating - Heat Pump - BASE CASE				
Energy per Day (BTU) Needed in Tank		5,000	BTU/Day	
Energy per Day (BTU) Needed in Tank		5,000	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	kWh / BTU	
Energy per Day (kWh)		1.5	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		45	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		535	kWh / Year	
Heat Pump Efficiency	÷	3.50	COP	
Base Heat Pump Energy Usage per Year at the Meter		153	kWh / Year	
Design Annual Solar Fraction		90%	Water Heated by Solar System	Program Design
		10%	Water Heated by Remaining Backup Element (Heat Pump)	
Energy Usage per Year at the Meter		153	kWh / Year	
	x	10%	Water Heated by Remaining Backup Element (Heat Pump)	
Back Up Element Energy Used at Meter		15	kWh / Year	
Circulation Pump Energy		0.082	kW	KEMA 2008
Pump Hours of Operation	x	1,292	Hours per Year	KEMA 2008
Pump Energy used per Year		106	kWh / Year	
Back Up Element Energy Used at Meter		15	kWh / Year	13%
Pump Energy used per Year	+	106	kWh / Year	87%
Design Solar System Energy Usage		121	kWh / Year	
Design Solar System Energy Usage		121	kWh / Year	
Performance Factor		0.94	pf	HE
Persistance Factor	x	0.93	pf	KEMA 2008
Residential Solar Water Heater Energy Savings		106	kWh/ Year	KEMA 2008
Base Heat Pump Energy Usage per Year at the Meter		153	kWh / Year	
Design Solar System Energy Usage	-	121	kWh / Year	
		32	kWh / Year	
Energy Savings		**32**	**kWh/year (Per 5,000 BTU panel installed derated)**	
SERWH Element Power Consumption		4.0	kW	
Coincidence Factor	x	0.143	cf	8.6 Minutes per hour
SERWH On Peak Demand		0.57	kW On Peak	KEMA 2008
Solar System Metered on Peak Demand		0.11	kW On Peak	KEMA 2008
Commercial Solar Water Heating Demand Savings		**0.46**	**kW Savings**	

Incentive

$50 per 5,000 BTU panel output after derated based on orientation and tilt factor.

Measure Life

15 years

12.3.2 Heat Pump

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- Adjust the assumptions so the description and calculations are consistent.

Measure Description
This measure relates to the installation of a heat pump water heater (HPWH) in place of a standard electric water heater. HPWHs can be added to existing domestic hot water (DHW) systems to improve the overall efficiency. HPWHs utilize refrigerants (like an air source heat pump) and have much higher coefficients of performance (COP) than standard electric water heaters. HPWHs remove waste heat from surrounding air sources and preheat the DHW supply system. HPWHs come in a variety of sizes and the size of HPWH will depend on the desired temperature output and amount of hot water needed by application. The savings from water heater heat pumps will depend on the design, size (capacity), water heating requirements, building application and climate. This measure could relate to either a retrofit or a new installation.

Definition of Efficient Equipment
In order for this characterization to apply, the efficient equipment is assumed to be a heat pump water heater with or without an auxiliary water heating system.

Definition of Baseline Equipment
In order for this characterization to apply, the baseline equipment is assumed to be a standard electric storage tank type water heater with a thermal efficiency of 98%. This measure does not apply to natural gas-fired water heaters.

Deemed Lifetime of Efficient Equipment
The expected measure life is assumed to be 10 years

Deemed Measure Cost
Due to the complexity of heat pump water heater systems, incremental capital costs should be determined on a case by- case basis. High capacity heat pump water heaters will typically have a supplemental heating source such as an electric resistance heater. For new construction applications, the incremental capital cost for this measure should be calculated as the difference in installed cost of the entire heat pump water heater system including any auxiliary heating systems and a standard electric storage tank water heater of comparable capacity. For retrofit applications, the total installed cost of heat pump water heater should be used.

Savings Algorithm

Heat Pump Water Heater

Energy per Day (BTU) = (Gallons per Day) x (lbs. per Gal.) x (Temp Rise) x (Energy to Raise Water

Hot Water needed per Person		13.3	Gallons per Day per Person	HE
Average Occupants	x	3.77	Persons	KEMA 2008
Household Hot Water Usage		50.1	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		130	deg. F Finish Temp	
Initial Temperature of Water	-	75	deg. F Initial Temp	
Temperature Rise		55	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		12,000	BTU/Ton	
Energy per Day (BTU) Needed in Tank		12,000	BTU/Ton	
BTU to kWh Energy Conversion	÷	3,412	kWh / BTU	
Energy per Day (kWh)		3.5	kWh /Ton	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		107	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		1,283	kWh /Ton	
Elec. Res. Water Heater Efficiency	÷	0.98	COP	
Base SERWH Energy Usage per Year at the Meter		1,309	kWh /Ton	KEMA 2008 - HECO
Energy (kWh) Needed to Heat Water per Year		1,283	kWh /Ton	
Heat Pump Water Heating Efficiency	÷	3.50	COP	
Heat Pump Water Heating Energy Usage		367	kWh /Ton	
Base SERWH Energy Usage per Year at the Meter		1,309	kWh /Ton	
Heat Pump Water Heating Energy Usage	-	367	kWh /Ton	
Commercial Heat Pump Water Heating Savings		943	kWh /Ton	
Hours per Day		10		
Hours per Year		3,650		
Heat Pump Power Consumption		0.3	kW	
Coincedence Factor	x	0.08	cf	4.80 Minutes per hour
		0.02	kW On Peak	
Base SERWH Element Power Consumption		0.4	kW	
Coincidence Factor	x	0.143	cf	8.6 Minutes per hour
Base SERWH On Peak Demand		0.05	kW On Peak	KEMA 2008
Base SERWH On Peak Demand	-	0.05	kW On Peak	
Heat Pump Water Heater Demand	-	0.02	kW On Peak	KEMA 2008
		0.03	kW On Peak	

Commercial Solar Water Heater Demand Savings	**0.03**	**kW Savings per Ton**

Incentive

$65/ton

12.4 High Efficiency Water Pumping

12.4.1 VFD Domestic Water Booster Packages

Version Date & Revision History
Draft date: May 23, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- The increased incentive was based on previous paid booster pump installations and measured energy/demand savings. Previous Incentive Level = $0.06/kWh. New Incentive Levels = $0.08/kWh
- The energy and demand impacts are based on HECO's evaluation from past projects and monitoring.

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- <u>Effective 7/1/10 through 3/6/11</u>
  Previous Incentive = $1,600 + [(Existing System hp – New System hp) x $65]
- <u>Effective 3/7/11 through 6/30/11</u>
  New Incentive = $3,000 + [(Existing System hp – New System hp) x $80]

Description: Pump improvements can be done to optimize the design and control of water pumping systems. The measurement of energy and demand savings for commercial and industrial applications will vary with the type of pumping technology, operating hours, efficiency and current and proposed controls. Depending on the specific application, slowing the pump, trimming or replacing the impeller, or replacing the pump may be suitable options for improving pumping efficiency.

Base Efficiency
The baseline equipment is assumed to be a non-optimized existing pumping system.

High Efficiency
In order for this characterization to apply, the efficient equipment is assumed to be an optimized pumping system meeting applicable program efficiency requirements. The proposed Booster Pump System must be a more efficient design than the existing system. (i.e. Installed with VFD.). All pump motors must meet NEMA Premium Efficiency standards.

Qualification

- Booster Pump applications require pre-notification before equipment is purchased and installed.
- The new Booster Pump System's total horsepower must be equal to or less than that of the existing system.
- The system horsepower reduction must be between 0 to 129 hp. For projects with greater than 129hp, please contact the program
- Booster Pump applications do not apply to New Constructions.

Energy and Demand Savings:

Demand Savings = 2.62 + (HP Reduction) x 0.115
Energy Savings = 25,500 + (HP Reduction) x 989

	No HP Reduction	W/HP Reduction	HP Reduction Multiplier
Demand Savings (kW/HP)	2.620	2.735	0.115
Energy Savings (kWh/HP-year)	25,500	26,489	989

Savings Algorithm:

	No HP Reduction	W/HP Reduction	HP Reduction Multiplier
Demand Savings (kW/HP)	2.620	2.735	0.115
Energy Savings (kWh/HP-year)	25,500	26,489	989

Based on HECO's evaluation from past projects and monitoring

Previous Incentive	$ 1,600	$ 1,600
Cost/kWh	$ 0.06	$ 0.06
Base HP Reduction		$ 65.00
New Incentive	$ 3,000	$ 3,000
Cost/kWh	$ 0.12	$ 0.11
Proposed HP Reduction		$ 80.00

Demand Savings = 2.62 + (HP Reduction) x 0.115
Energy Savings = 25,500 + (HP Reduction) x 989

Example

	Existing System	New System
Small Building	7.5 HP	3 HP
12 Floors (83 Units)	7.5 HP	3 HP
	15 HP	6 HP
Cost	$ 31,000	

Savings Summary

HP Reduction	kW	kWh
9	3.77	34,401

Previous Rebate	HP Reduction	Total	$/kWh
$ 1,600	$ 585	$ 2,185	$ 0.064
7%	Incremental Cost		

New Rebate	HP Reduction	Total	$/kWh
$ 3,000	$ 720	$ 3,720	$ 0.108
12%	Incremental Cost		

Incentives:

Incentive = [(Existing System hp – New System hp) x $80] + $3000

12.4.2 VFD Pool Pump Packages

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- 12/15/11 – Updated algorithm average pump size from 1.5 HP pump to 1 HP pump. Updated baseline and high efficiency calculations accordingly.

Measure Description
A variable speed commercial pool pump motor in place of a standard single speed motor of equivalent horsepower.

Definition of Efficient Equipment
The high efficiency equipment is a variable speed commercial pool pump.

Definition of Baseline Equipment
The baseline efficiency equipment is assumed to be a single speed commercial pool pump.

$$\Delta kWh = (kWBASE \times Hours) \times 55\%$$

Where:

Unit	= 2-speed or variable speed pool pump
ΔkWh	= Average annual kWh reduction
Hours	= Average annual operating hours of pump
kWBASE	= connected kW of baseline pump
55%	= average percent energy reduction from switch to 2-speed or variable speed pump (1)

Baseline Efficiency
The baseline efficiency case is a single speed pump.

High Efficiency
The high efficiency case is a 2-speed or variable speed pump.

Energy and Demand Savings
Demand Savings: 0.093 kW / HP
Energy Savings: 1123 kWh per year / HP

(1) Davis Energy Group (2008). Proposal Information Template for Residential Pool Pump Measure Revisions. Prepared for Pacific Gas and Electric Company; Page 2.

Savings Algorithm

Commercial Pool Pump

Average Pool Pump Horesepower	1	HP
Efficiency	0.8	
Hours of operation per day	6	hours
Number of days pool in use	365	days per year
1 HP Equals	0.746	kW

Based Demand	0.93	kW
Base Energy Usage per day	5.60	kWh/day
Base Energy Usage per year	2042	kWh/year

Demand Reduction	10%	
High Efficiency Demand	0.84	kW
Energy Savings	55%	
High Efficiency Energy Usage	919	kWh/year

Energy Savings per year	1123	kWh/year
Demand Savings	0.093	kW

Deemed Lifetime of Efficient Equipment

The estimated useful life for a variable speed pool pump is 10 years.

Deemed Measure Cost

The incremental cost is estimated to be $350 for a two speed motor and $1,500 for a variable speed motor

Incremental Cost

$161 per motor. – (from: 2001 DEER Update Study, CCIG-CRE-02, p. 4-84, Xenergy, Oakland, CA.

Incentives

$225/HP

12.5 High Efficiency Motors

12.5.1 CEE Listed Premium Efficiency Motors

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- 11/22/11 – Removed the following sentence from *Measure Description*: "Therefore, this measure should be suspended at that time."

Measure Description
This measure relates to the installation of premium efficiency three phase Open Drip Proof (ODP) and Totally Enclosed Fan-Cooled (TEFC) motors less than or equal to 450 HP, meeting minimum qualifying efficiency for the following HVAC applications: supply fans, return fans, exhaust fans, chilled water pumps, and boiler feed water pumps. On December 9, 2010, new federal efficiency standards will take effect requiring motors in this size category to meet National Electric Manufacturers Association (NEMA) premium efficiency levels.

Baseline
2007 EISA nominal efficiency (as defined in NEMA MG1 Table 12-12) motors.

Demand	0.746 kW
Base Efficiency	80%
Base Demand	0.933 kW
Base Energy	1531.6 kWh/year

High Efficient Condition
The CEE Motors List includes motors that are 1-200 hp NEMA Design A/B, 460 volts, TEFC or ODP and 1200rpm, 1800 rpm, or 3600 rpm. To be eligible to be included, a motor's nominal efficiency must be at least one full NEMA band higher than the 2007 EISA nominal efficiency (as defined in NEMA MG1 Table 12-12) and the motor and corresponding nominal efficiency must be listed in a publicly available document, such as product catalog or cut sheet amounting to an advertised claim of performance, or the reporting entity must wish it to be treated as publicly available (and expressly claim to achieve performance based upon the noted test procedure).

Demand	0.746 kW
High Efficiency	82.50%
High Efficiency Demand	0.904 kW
High Efficiency Energy	1485.2 kWh/year

Energy Savings
Based on per HP

Demand Savings	0.0283 kW
Energy Savings	46.4 kWh/year

Savings Algorithm

$$\Delta kWh = HP \times 0.746 \times ((1/\eta BASE)-(1/\eta EE)) \times LF \times HOURS$$

Where:

HP	= Motor Horse Power
	= Actual installed
ηBASE	= Efficiency of baseline motor. Based on EPACT 92 for installed HP
ηEE	= Efficiency of premium efficiency motor
	= Actual installed
LF	= Load factor of motor = 0.75
HOURS	= Annual motor run hours

1	HP	equals	0.746 kW
Hours of Operation		6 per day	
Hours of Operation		2190 per year	
Load Factor		0.75	

Demand	0.746	kW
Base Efficiency	80%	
Base Demand	0.933	kW
Base Energy	1531.6	kWh/year
Demand	0.746	kW
High Efficiency	82.50%	
High Efficiency Demand	0.904	kW
High Efficiency Energy	1485.2	kWh/year
Demand Savings	0.0283	kW
Energy Savings	46.4	kWh/year

MOTOR INCENTIVES REFERENCE TABLE							
Motor Size (hp)	**3600 RPM**		**1800 RPM**		**1200 RPM**		**Incentive Per Motor**
	ODP	**TEFC**	**ODP**	**TEFC**	**ODP**	**TEFC**	
1	77.0	77.0	85.5	85.5	82.5	82.5	$15
1.5	84.0	84.0	86.5	86.5	86.5	87.5	$23
2	85.5	85.5	86.5	86.5	87.5	88.5	$30
3	85.5	86.5	89.5	89.5	88.5	89.5	$45
5	86.5	88.5	89.5	89.5	89.5	89.5	$50
7.5	88.5	89.5	91.0	91.7	90.2	91.0	$75
10	89.5	90.2	91.7	91.7	91.7	91.0	$100
15	90.2	91.0	93.0	92.4	91.7	91.7	$120
20	91.0	91.0	93.0	93.0	92.4	91.7	$160
25	91.7	91.7	93.6	93.6	93.0	93.0	$200
30	91.7	91.7	94.1	93.6	93.6	93.0	$210
40	92.4	92.4	94.1	94.1	94.1	94.1	$240
50	93.0	93.0	94.5	94.5	94.1	94.1	$300
60	93.6	93.6	95.0	95.0	94.5	94.5	$360
75	93.6	93.6	95.0	95.4	94.5	94.5	$450
100	93.6	94.1	95.4	95.4	95.0	95.0	$600
125	94.1	95.0	95.4	95.4	95.0	95.0	$750
150	94.1	95.0	95.8	95.8	95.4	95.8	$900
200	95.0	94.4	95.8	96.2	95.4	95.8	$1,200
250	95.0	95.8	95.8	96.2	95.4	95.8	$1,500
300	95.4	95.8	95.8	96.2	95.4	95.8	$1,800
350	95.4	95.8	95.8	96.2	95.4	95.8	$2,100
400	95.8	95.8	95.8	96.2	95.8	95.8	$2,400
450	95.8	95.8	96.2	96.2	96.2	95.8	$2,700

Measure Life
15 years

Incremental Cost
1 to 5HP ($35.20 per HP)
7.5 to 20HP ($17.30 per HP)
25 to 100HP ($10.28 per HP)
125 to 250HP ($5.95 per HP)

12.5.2 ECM Evaporator Fan Motors for Walk-in Coolers and Freezers

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- 2007 Arkansas Deemed Savings Quick Start Programs
  http://www.aepefficiency.com/oklahoma/ci/downloads/Deemed_Savings_Report.pdf

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
An electronically commutated motor (ECM) is a fractional horsepower direct current (DC) motor used most often in commercial refrigeration applications such as display cases, walk-in coolers/freezers, refrigerated vending machines, and bottle coolers. ECMs generally replace shaded pole (SP) motors and offer at least 50% energy savings. Analysis efforts summarized in this report focused on the most prevalent use of ECMs – refrigeration, where motor sizes are typically listed in watts (10-140 W).

Measure/Technology Review
Five of the primary data sources reviewed for this effort contained data for ECMs in refrigeration and HVAC applications. The NPCC study gave savings estimates for upgrading a CAV box single speed motor to an ECM. The other four studies gave wide ranging savings and cost data for compressor, condenser, and evaporator fan motors. KW Engineering completed a study for PacifiCorp in October of 2005 regarding the market for ECMs in walk-in refrigerators (kW Engineering, 2005). This study included the market share in each state for refrigeration ECMs as well as cost and energy savings data. These values for energy and demand savings are given in Table 1 below.

Measure Information Available	Resource	Application	Annual Energy Savings[1] (kWh/unit)	Demand Savings[1] (kW/unit)
Yes	Ecotope 2003	Small Evaporator Fan ECM	200	-
Yes	PG&E 2003	Evaporator Fan	673	0.077
Yes	Stellar Processes 2006	Small Evaporator Fan ECM	200	-
No	Xcel Energy 2006			
No	Quantec 2005			
No	DEER			
No	KEMA 2006			
Yes	CEE	Evaporator Fan – Freezer Condenser Fan – Freezer Compressor Fan – Freezer Evaporator Fan – Refrigerator Condenser Fan – Refrigerator Compressor Fan - Freezer	115 141 985 294 141 690	0.013 0.016 0.112 0.034 0.016 0.079
No	Energy Star			
No	RTF			
Yes	NPCC 2005	CAV Box	517	0.397
Yes	kW Engineering 2005	Evaporator Fan	734	0.084

[1] Savings values reflect gross savings at the customer meter

Table 1

Baseline Efficiencies:
The standard motor type for this application is a shaded pole (SP) motor. Table 2 contains the baseline annual energy consumption and demand for ECM equivalent SP motors.

Table 2 (Baseline Efficiency)

Measure	Annual Energy Consumption	Demand
Shaded Pole (SP) motor	18 kWh/W	0.002 kW/W

Minimum Requirements/High Efficiency
Any ECM up to 1 hp in size will meet the minimum requirements for both retrofit and new construction installations. Table 3 contains the estimated annual energy consumption, demand, and cost for the ECM application.

Table 3 (High Efficiency)

Measure	Annual Energy Consumption	Demand
ECM	8.7 kWh/W	0.001 kW/W

Energy Savings:

Annual Energy Savings	Demand Savings
9.3 kWh/W	0.001 kW/W

<u>Savings Algorithms</u>

Deemed demand and energy savings should be calculated by the following formulas for Refrigeration applications:

kW savings = Rated Wattage x (kW/Wpre - kW/Wpost)

kWh savings = Rated Wattage x (kWh/Wpre – kWh/Wpost)

Where:

Rated Wattage = Rated Wattage of the electronically commutated motor

kW /W pre = Demand of the existing electronically commutated motor. If unavailable, demand listed in Table 2 should be used

kW /W post = Demand of the new electronically commutated motor. If unavailable, demand listed in Table 3 should be used

kWh /W pre = Annual energy consumption of the existing electronically commutated motor. If unavailable, annual energy consumption listed in Table 2 should be used

kWh /W post = Annual energy consumption of the new electronically commutated motor. If unavailable, annual energy consumption listed in Table 3 should be used

Lifetime

DEER – 15 years

Measure Costs and Incentive Levels

$85 per motor and controller set

12.5.3 EC Motors – Fan Coil Units

Measure ID:

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:

Electronically commutated motors provide clear advantages over AC or conventional DC motors in terms of service life, controllability, flexibility, and cost-effectiveness.

For the past 30 years, forward-bladed centrifugal fans in fan coil-units have been driven by AC motors, which are typically around 45% efficient. However, the latest electronically commutated (EC) motors are 80% efficient, leading to significant operational benefits. The term EC is applied to a DC motor having electronic commutation achieved with a microprocessor.

Commutation means applying a current to the motor phases to produce the best torque at the motor's shaft. In brush-type motors, commutation is done electromechanically using graphite brushes and a commutator. In brushless motors, however, it is achieved by switching electronics using rotor-position information obtained by sensors. Thus, the EC motor is essentially a DC motor that can be connected direct to an AC mains supply.

Baseline Efficiencies:

BASE CASE		
Base demand 4 pole (1800 rpm)	107	watts

High Efficiency:

ENHANCED CASE		
High efficiency DC/EC demand	54	watts

The major advantage of EC motors over their AC counterparts is far higher efficiency, which enables a fan-coil unit to achieve a specific fan power (SFP) of 0.3 compared with 0.8 for an AC motor (the limit in the latest Building Regulations is 0.8 W/l/s).

This higher efficiency can be maintained at low speeds, so less motor heat is absorbed by the cold air discharged from the FCU, which in turn leads to more cooling applied in the space. Lower temperatures increase motor life, and in-built soft starting gives longer bearing life.

Speed control is simple, and results in impressive energy saving performance. The maximum cooling load on an FCU may only apply for 500 hour out of a total annual running time of 3,000 hour. With a typical fan coil unit, the fans deliver more air than necessary for 2500 hour/year — a shocking waste of energy.

By using the temperature controller on an FCU to reduce the speed of the EC motor during periods of reduced cooling demand, we can cut energy wastage dramatically. For example, an annual fan energy consumption of 620 kWh can be reduced to 140 kWh using speed control.

The reduction of air volume is, however, limited by considerations of the room air distribution. That is why we recommend that tests are undertaken in a suitable test facility to determine the optimum range of air volume.

Energy Savings:

ENERGY SAVINGS		
Energy savings 4 pole	232	kWh/year

PEAK DEMAND SAVINGS (5PM-9PM)		
Coincidence factor	0.5	
Peak demand savings (4 pole)	0.0265	kW

Electronically commutated motors offer six major benefits when used in fan-coil units.

• High efficiency of 85%, leading to lower input power.
• Lower rise in air temperature on the air stream.
• Efficient speed control.
• Longer motor life resulting from lower running temperatures.
• Longer bearing life because of the soft-start feature.
• Suitable for a 230 V supply.

By considering a typical 2 fan, fan coil unit providing 190l/s of air against an external resistance of 30Pa, from the testing undertaken by Caice the following figures were derived:
• 4 pole AC Motor Fan Unit powered by 2 off fans energy consumed = 107 watts, sfp 0.55 = w/l/s
• DC/EC Motor Fan Unit powered by 2 off fans energy consumed = 54 watts, sfp = 0.28 w/l/s.

Savings Algorithms

BASE CASE		
Base demand 4 pole (1800 rpm)	107	watts
ENHANCED CASE		
High efficiency DC/EC demand	54	watts
DEMAND SAVINGS		
Demand savings 4 pole	53	watts
hours of operation	12	hours/day
hours of operation	4380	hours/year
ENERGY SAVINGS		
Energy savings 4 pole	232	kWh/year
PEAK DEMAND SAVINGS (5PM-9PM)		
Coincidence factor	0.5	
Peak demand savings (4 pole)	0.0265	kW

Operating Hours
4,380 hours/year (12 hours/day)

Demand Coincidence Factor
0.5

Lifetime
15 years

Measure Costs and Incentive Levels
$55/unit

12.6 Commercial Industrial Processes

12.6.1 Waste Water Process Improvements

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
Wastewater facilities are 24/7 facilities that have specific technical requirements, high capital costs and long procurement process. This targeted program will target the two highest energy consumers in the plants, air systems & UV lighting through process improvements. A list of private waste water facilities will be leveraged in targeting opportunities.

Baseline Efficiencies:
TBD

High Efficiency:
TBD

Energy Savings:
The methodology for energy savings will be based on a customized approach.

Incentives
This measure will be in the $0.50/kWh range.

12.6.2 Air Compressor Technologies and Operations

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:
This program is to encourage the newer VFD rotary and screw air compressor systems that provide 25% to 30% savings. The program will be vendor driven to provide them direct incentives and the support of Hawaii Energy technology papers and sales call assistance.

Baseline Efficiencies:
No action

High Efficiency:
Corrective measure

Energy Savings:
The methodology would be based on a customized approach with industry studies with energy savings associated to leakage correction.

Incentives
This measure will be in the $0.25/kWh range.

12.6.3 Demand Control Kitchen Ventilation (DCKV)

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- Detailed Energy Savings Report, Melink Corporation, http://www.melinkcorp.com/Intellihood/Energy_Analysis.pdf

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
Kitchen ventilation with DCKV hood exhaust. Demand ventilation uses temperature and/or smoke sensing to adjust ventilation rates. This saves energy comparing with the traditional 100% on/off kitchen ventilation system.

Baseline Efficiencies:
Kitchen ventilation without DCKV. Usage per HP:

Basecase = (HP x .746 KW/HP x Hours per Year)/efficiency

Basecase fan motor usage per HP (kWh/year)	4827
Basecase fan motor demand (kW)	0.83

High Efficiency:

Usage per HP:

Enhanced case fan motor usage per HP (kWh/year)	2194
Enhanced case fan motor demand (kW)	0.38

Energy Savings:
The demand control kitchen ventilation savings were determined using the method described in the Melink Detailed Energy Savings Report.

Energy Savings from fan motor per HP (kWh/year)	2633
Demand Savings from fan motor per HP (kW)	0.45

Savings Algorithms

% Rated RPM	% Run Time	Time HRS/YR	Output KW/HP	System Efficiency	Input KW/HP	KWH/HP/YR
H	I	J=GXI	K	L	M=K/L	N=JXM
100	5%	291.2	0.746	0.9	0.829	241
90	20%	1164.8	0.544	0.9	0.604	704
80	25%	1456	0.382	0.9	0.424	618
70	25%	1456	0.256	0.9	0.284	414
60	15%	873.6	0.161	0.9	0.179	156
50	10%	582.4	0.093	0.9	0.103	60
40	0%	0	0.048	0.9	0.053	0
30	0%	0	0.02	0.9	0.022	0
20	0%	0	0.015	0.9	0.017	0
10	0%	0	0.01	0.9	0.011	0
Total kWh/HP/YR						**2194**

Basecase = (HP x .746 KW/HP x Hours per Year)/efficiency

Basecase fan motor usage per HP (kWh/year)	4827
Basecase fan motor demand (kW)	0.83

Enhanced case fan motor usage per HP (kWh/year)	2194
Enhanced case fan motor demand (kW)	0.38

Energy Savings from fan motor per HP (kWh/year)	2633
Demand Savings from fan motor per HP (kW)	0.45

Operating Schedule	
16	HR/DAY
7	DAY/WK
52	WK/YR
5824	

Demand Coincidence Factor
TBD

Persistence
TBD

Lifetime
15 Years (Hawaii Energy assumption)

Measure Costs and Incentive Levels
Measure Cost: $1,200 - $1,700 per HP based on business vertical and site complications (provided my Melink)

12.6.4 Low Flow Spray Nozzles for Food Service (Retrofit)

Measure ID:

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
All pre-rinse valves use a spray of water to remove food waste from dishes prior to cleaning in a dishwasher. They reduce water consumption, water heating cost, and waste water (sewer) charges. Pre-rinse spray valves include a nozzle, squeeze lever, and dish guard bumper. The spray valves usually have a clip to lock the handle in the "on" position. Pre-rinse valves are inexpensive and easily interchangeable with different manufacturers' assemblies.

Baseline Efficiencies:
The baseline equipment is assumed to be a spray valve with a flow rate of 3 gallons per minute.

High Efficiency:
The efficient equipment is assumed to be a pre-rinse spray valve with a flow rate of 1.6 gallons per minute, and with a cleanability performance of 26 seconds per plate or less.

Energy Savings:

$$\Delta kWh = \Delta Water \times HOT_{\%} \times 8.33 \times (\Delta T) \times (1/EFF) \times 10^{-6}$$

ΔWater = Water savings (gallons)
$HOT_{\%}$ = The percentage of water used by the pre-rinse spray valve that is heated = 69%
8.33 = The energy content of heated water (Btu/gallon/°F)
ΔT = Temperature rise through water heater (°F) = 70°F
EFF = Water heater thermal efficiency = 0.97
10^{-6} = Factor to convert Btu to MMBtu

$$\Delta Water = (FLO_{base}-FLO_{eff}) \times 60 \times HRS_{day} \times 365$$

FLO_{base} = The flow rate of the baseline spray nozzle = 3 gallons per minute
FLO_{eff} = The flow rate of the efficient equipment = 1.6 gallons per minute
60 = minutes per hour
365 = days per year
HRS = Hours used per day – depends on facility type as below

Savings Algorithms

Base Case Flow		3	Gallons per Minute	
Enhanced Case Flow		1.6	Gallons per Minute	
Average useage time per day		120	Minutes per Day	*Average hour estimate based on PG&E savings estimates, algorithms, sources (2005).*
Reduce Shower		1.4	Gallon per Minute	
Water Usage Reduction		168.0	Gallons per Day	
Mass of Water Conversion		8.34	lbs/gal	
Finish Temperature of Water		140	deg. F Finish Temp	
Initial Temperature of Water	-	70	deg. F Initial Temp	
Temperature Rise		70	deg. F Temperature Rise	
Energy to Raise Water Temp		1.0	BTU / deg. F / lbs.	
Energy per Day (BTU) Needed in Tank		98,078	BTU/Day	
Energy per Day (BTU) Needed in Tank		98,078	BTU/Day	
BTU to kWh Energy Conversion	÷	3,412	kWh / BTU	
Energy per Day (kWh)		28.7	kWh / Day	
Days per Month	x	30.4	Days per Month	
Energy (kWh) per Month		874	kWh / Month	
Days per Year	x	365	Days per Year	
Energy (kWh) Needed in Tank to Heat Water per Year		10,486	kWh / Year	
Elec. Res. Water Heater Efficiency	÷	0.97	COP	
		10,811	kWh / Year	
Percentage of water used by nozzle that is heated		69%		
Annual Energy Savings		7,459	kWh / Year	
Coincident Peak Demand Savings		0	kW	

Operating Hours

Facility Type	Hours of Pre-Rinse Spray Valve Use per Day (HOURS)
Full Service Restaurant	4
Other	2
Limited Service (Fast Food) Restaurant	1

Demand Coincidence Factor
TBD

Persistence
TBD

Lifetime
5 years

Measure Costs and Incentive Levels
The actual measure installation cost should be used (including material and labor).

12.6.5 ENERGY STAR Commercial Kitchen Equipment - Ice Makers

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- PG&E Work Paper PGECOFST108 Commercial Ice Machines Revision 3 – May 30, 2012

TRM Review Actions:

- Currently Under Review.

Major Changes:

- New measure

Measure Description:
This measure applies to Energy Efficient air-cooled commercial ice makers in retrofit and new construction applications installed in conditioned spaces. Commercial ice makers are classified into three equipment types; ice-making heads (IMHs), remote condensing units (RCUs) and self-contained units (SCUs). The measure described here applies to ice makers that use a batch process to make cubed ice.

The industry standard for energy use and performance of commercial ice machines is AHRI Standard 810. Key parameters reported for ice makers include the Equipment Type, Harvest Rate (lbs of ice/24hrs) and Energy Consumption Rate. The AHRI Directory of Certified Equipment150 lists these values by equipment manufacturer and model number.

Baseline and Efficiency Standard:
The Energy Efficient criteria for ice makers define efficiency requirements for both energy and potable water use.

Market Applicability
Hospitals account for 39.4 percent of all commercial icemaker purchases, followed by hotels (22.3 percent), restaurants (13.8 percent), retail outlets (8.5 percent), schools (8.5 percent), offices (4.3 percent), and grocery stores (3.2 percent).

Measure Savings Calculations:
Annual electric savings can be calculated by determining the energy consumed for baseline ice makers compared against ENERGY STAR performance requirements using the harvest rate of the more efficient unit. Peak demand savings can then be derived from the electric savings.

$$\Delta kWh = (kWh_{\textit{base,per100lb}} - kWh_{\textit{ee,per100lb}})/100 \times DC \times H \times 365$$

$$\Delta kW = \Delta kWh / HRS$$

Where:

- 100 = conversion factor to convert kWh***base,per100lb*** and kWh***ee,per100lb*** into maximum kWh consumption per pound of ice.
- DC = Duty Cycle of the ice maker representing the percentage of time the ice machine is making ice
- H = Harvest Rate (lbs of ice made per day)
- 365 = days per year
- kWh = Annual energy savings
- HRS = Annual operating hours
- CF = 1.0

The baseline and energy efficient energy usage per 100lbs of ice produced is dependent on the category of ice maker, as well as the capacity of the energy efficient ice maker. The equations used to determine the energy per 100lbs of ice produced can be seen below.

This incentive applies towards the purchase of new or replacement energy efficient Air-cooled ice machines. Used or rebuilt equipment is not eligible. Customers must provide proof that the appliance meets the energy efficiency specifications listed in Table below.

This specification covers machines generating 60 grams (2 oz.) or lighter ice cubes, as well as flaked, crushed, or fragmented ice machines that meet the Energy Efficiency thresholds by Ice harvest (IHR) rate listed below. Only air cooled machines (icemaker heads, self-contained unites, and remote condensing units) are eligible for incentives. Performance data is based on ARI Standard 810.

Energy Efficiency Requirements

Equipment Type	Ice Harvest Rate Range (lbs of ice/24 hrs)	Energy Effficient Ice Makers		Federal Minimum Standard Energy Consumption Rate (kWh/100 lbs ice) (H = Harvest Rate)
		Energy Consumption Rate (kWh/100 lbs ice) (H = Harvest Rate)	Potable Water Use Limit (gal/100 lbs ice)	
Ice Making Heads	<450	$\leq$ 8.72 - 0.0073H	$\leq$ 20	10.26 - 0.0086H
	$\geq$ 450	$\leq$ 5.86 - 0.0009H	$\leq$ 20	6.89 - 0.0011H
Remote Condensing Units	< 1,000	$\leq$ 7.52 - 0.0032H	$\leq$ 20	8.85 - 0.0038H
	$\geq$ 1,000	$\leq$ 4.34	$\leq$ 20	5.10
Remote Condensing Units	< 934	$\leq$ 7.52 - 0.0032H	$\leq$ 20	8.85 - 0.0038H
	$\geq$ 934	$\leq$ 4.51	$\leq$ 20	5.30
Self-Contained Units	< 175	$\leq$ 15.3 - 0.0399H	$\leq$ 30	18.0 - 0.069H
	$\geq$ 175	$\leq$ 8.33	$\leq$ 30	9.80

Example Savings Calculations

Savings calculation for varying Harvest Rates (H) can be seen below:

Performance	IHR	IHR	IHR	IHR	IHR
Ice Harvest Rate (IHR) (lbs per 24 hrs.)	101-300	301-500	501-1,000	1,001-1,500	> 1,500
Average IHR Used in Energy Calculations (lbs/day)	200	400	750	1,250	1,750
Baseline Model Energy Usage (kWh/100 lbs)	9.8	6.82	6.07	5.1	5.1
Energy Efficient Model Energy Usage (kWh/100 lbs)	8.33	5.8	5.19	4.34	4.34
Baseline Model Daily Energy Consumption (kWh)	14.7	20.5	34.1	47.8	66.9
Energy Efficient Model Daily Energy Consumption (kWh)	12.5	17.4	29.2	40.7	57
Baseline Model Average Demand (kW)	0.613	0.853	1.421	1.992	2.789
Energy Efficient Model Average Demand (kW)	0.521	0.725	1.215	1.695	2.373
Estimated Demand Reduction (kW)	0.092	0.128	0.206	0.297	0.416
Baseline Model Annual Energy Consumption (kWh/yr)	5,366	7,468	12,452	17,452	24,432
Energy Efficient Model Annual Energy Consumption (kWh/yr)	4,561	6,351	10,645	14,851	20,791
Estimated Annual Energy Savings (kWh/yr)	805	1,117	1,807	2,601	3,641
Electric Cost ($/kWh)	$0.25	$0.25	$0.25	$0.25	$0.25
Baseline Model Annual Energy Cost ($/yr)	$1,342	$1,867	$3,113	$4,363	$6,108
Energy Efficient Model Annual Energy Cost ($/yr)	$1,140	$1,588	$2,661	$3,713	$5,198
Estimated Annual Energy Cost Savings ($/yr)	$201	$279	$452	$650	$910
Estimated Incremental Cost	$306	$266	$249	$589	$939
Estimated Useful Life (EUL)	12	12	12	12	12

Demand Coincidence Factor
CF = 1.0

Lifetime
12 years

Incentive Levels

12.6.6 ENERGY STAR Commercial Kitchen Equipment - Electric Steam Cooker

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:
- ENERGY STAR Commercial Kitchen Equipment Savings Calculator: Steam Cooker Calcs.
- PG&E Work Paper PGECOFST104 Commercial Steam Cooker Revision #4 (5/22/12)

TRM Review Actions:
- Currently Under Review.

Major Changes:
- New measure

Measure Description:
The installation of a qualified ENERGY STAR commercial steam cooker. ENERGY STAR steam cookers save energy during cooling and idle times due to improved cooking efficiency and idle energy rates.

Baseline Efficiencies:
The Baseline Efficiency case is a conventional electric steam cooker with a cooking energy efficiency of 30%, pan production of 23.3 pounds per hour, and an idle energy rate of 1.2 kW.

High Efficiency:
The High Efficiency case is an ENERGY STAR electric steam cooker with a cooking energy efficiency of 50%, pan production capacity of 16.7 pounds per hour, and an idle energy rate of 0.4 kW.

Energy Savings:
Unit savings are deemed based on study results:

ΔkWh/year = 3,258 kWh/pan
ΔkW = 2.23 kW

Savings Algorithms

Steam Cooker Calculations for the ENERGY STAR Commercial Kitchen Equipment Calculato

Inputs

	USER ENTRY	
	Electric	
Average daily operation	12	hours
Annual days of operation	365	days
Food cooked per day	100	pounds
Number of pans per unit	3	
Incremental cost	$2,000	

Assumptions

	Electric		
	Conventional	ENERGY STAR	
Type	steam generator	boilerless	
Water Use	40	3	gallons/hour
Time in constant steam mode	40%	40%	
Cooking energy efficiency	30%	50%	
Production capacity per pan	23.3	16.7	pounds/hour
Number of preheats per day	1	1	
Preheat length	15	15	minutes
Preheat energy rate	6,000	6,000	W
Idle energy rate	1,200	400	W
ASTM energy to food	30.8		Wh/pound
Equipment lifetime	12		years

Calculations

	Electric		
	Conventional	ENERGY STAR	
Annual operation	4,380		hours
Daily preheat energy	1,500	1,500	Wh
Daily cooking energy	10,267	6,160	Wh
Daily idle time	10.32	9.75	hour
Daily idle energy	37,052	14,382	Wh
Total daily energy	48,819	22,042	Wh

Annual energy consumption per steam cooker

	Conventional	ENERGY STAR	Savings (3 Pan)	Savings per Pan
Electric Usage (kWh/year)	17,819	8,045	9,774	3258

Operating Hours
The average steam cooker is assumed to operate 4,380 hours per year.

Demand Coincidence Factor
CF = 1.0

Persistence
100% persistence factor

Lifetime
12 years

Measure Costs and Incentive Levels
Incremental cost = $2,000,   Incentive Level = $750/steamer

12.6.7 ENERGY STAR Commercial Kitchen Equipment - Griddle

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- The industry standard for energy use and cooking performance of griddles are ASTM F1275-03: Standard Test
- Method for the Performance of Griddles and ASTM F1605-01: Standard Test Method for the Performance of Double-Sided Griddles
- ENERGY STAR Commercial Griddles Program Requirements Version 1.1, effective May 2009 for gas griddles and effective January 1, 2011 for electric.
- Database for Energy Efficient Resources, 2008, http://www.deeresources.com/deer0911planning/downloads/EUL_Summary_10-1-08.xls
- Assumptions based on PG&E Commercial Griddles Work Paper developed by FSTC, May 22, 2012.

TRM Review Actions:

- Currently Under Review.

Major Changes:

- New measure

Measure Description:
This measure applies to ENERGY STAR or equivalent electric commercial griddles in retrofit and new construction applications. This appliance is designed for cooking food in oil or its own juices by direct contact with either a flat, smooth, hot surface or a hot channeled cooking surface where plate temperature is thermostatically controlled.

Energy-efficient commercial electric griddles reduce energy consumption primarily through the application of advanced controls and improved temperature uniformity.

Baseline and Efficiency Standard
Key parameters for defining griddle efficiency are Heavy Load Cooking Energy Efficiency and Idle Energy Rate. There are currently no federal minimum standards for Commercial Griddles, however, the American Society of Testing and Materials (ASTM) publishes Test Methods155 that allow uniform procedures to be applied to each commercial cooking appliance for a fair comparison of performance results.

ENERGY STAR efficiency requirements apply to single and double sided griddles. The ENERGY STAR criteria should be reviewed on an annual basis to reflect the latest requirements.

ENERGY STAR Criteria for Electric Single and Double Sided Griddles

Performance Parameters	Electric Griddles
Heavy-Load Cooking Energy Efficiency	>= 70%
Idle Energy Rate	<= 320 watts per ft^2

Energy Savings:
Annual savings can be calculated by determining the energy consumed by a standard efficiency griddle as compared with an ENERGY STAR rated griddle.

ΔkWh = kWh(base) – kWh(eff)

ΔkWh(base or eff) = kWh(cooking) + kWh(idle) + kWh(preheat)

kWh(cooking) = [LB(food) x E(food)/Cook(eff)] x Days

kWh(idle) = IdleEnergy x [DailyHrs – LB(food)/Capacity – PreheatTime/60] x Days

kWh(preheat) = PreheatEnergy x Days

Parameter	Description	Value	Source
Daily Hrs	Daily Operating Hours	12 hours	FSTC
Preheat Time	Time to Preheat (min)	15 min	FSTC
E(food)	ASTM defined Energy to Food	0.139 kWh/lb	FSTC
Days	Number of days of operation	365 days	FSTC
CookEff	Cooking energy efficiency (%)	See Table below	FSTC, ENERGY STAR
IdleEnergy	Idle energy rate (kW)		
Capacity	Production capacity (lbs/hr)		FSTC
Preheat Energy	kWh/day		FSTC
LB(food)	Food cooked per day (lb/day)		FSTC

General assumptions used for deriving deemed electric savings are values taken from the Food Service Technology Center (FSTC) work papers. These deemed values assume that the griddles are 3 x 2 feet in size. Parameters in the table are per linear foot, with an assumed depth of 2 feet.

Baseline and Efficient Assumptions for Electric Griddles

Parameter	Baseline Electric Griddles	Efficient Electric Griddles
Preheat Energy (kWh/ft)	1.33	0.67
Idle Energy Rate (kW/ft)	0.80	0.64
Cooking Energy Efficiency (%)	65%	70%
Production Capacity (lbs/h/ft)	11.7	16.33
Lbs of food cooked/day/ft	33.33	33.33

Base (kWh/year) per linear foot	
Cooking	2602
Idle	2599
Preheat	485
Total Base Energy Usage (kWh)	**5686**
Demand (kW)	**1.30**

Efficient (kWh/year) per linear foot	
Cooking	2416
Idle	2268
Preheat	245
Total Efficient Energy Usage (kWh)	**4928**
Demand (kW)	**1.13**

Energy Savings (kWh/year) per linear foot	**758**
Demand Savings (kW)	**0.17**

Operating Hours
The average steam cooker is assumed to operate 4,380 hours per year.

Demand Coincidence Factor
Coincidence factor is 1.0 because the cooking equipment is assumed to operate throughout the on-peak demand periods (5PM – 9PM).

Persistence
100% persistence factor

Lifetime
12 years – DEER (2008)

Measure Costs and Incentive Levels
Incremental cost = $774
(Assumptions based on PG&E Commercial Griddles Work Paper developed by FSTC, May 22, 2012).

12.6.8 ENERGY STAR Commercial Kitchen Equipment - Fryer

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- The industry standards for energy use and cooking performance of fryers are ASTM Standard Test Method for the Performance of Open Deep Fat Fryers (F1361) and ASTM Standard Test Method for the Performance of Large Vat Fryers (FF2144).
- ENERGY STAR Version 2.0, effective April 22, 2011
- Assumptions based on PG&E Commercial Fryers Work Paper developed by FSTC, June 13, 2012

TRM Review Actions:

- Currently Under Review.

Major Changes:

- New measure

Measure Description:
This measure applies to ENERGY STAR or its equivalent electric commercial open-deep fat fryers in retrofit and new construction applications. Commercial fryers consist of a reservoir of cooking oil that allows food to be fully submerged without touching the bottom of the vessel. Electric fryers use a heating element immersed in the cooking oil. High efficiency standard and large vat fryers offer shorter cook times and higher production rates through the use of heat exchanger design. Standby losses are reduced in more efficient models through the use of fry pot insulation.

Baseline and Efficiency Standard
Key parameters for defining fryer efficiency are Heavy Load Cooking Energy Efficiency and Idle Energy Rate. ENERGY STAR requirements apply to a standard fryer and a large vat fryer. A standard fryer measures 14 to 18 inches wide with a vat capacity from 25 to 60 pounds. A large vat fryer measures 18 inches to 24 inches wide with a vat capacity greater than 50 pounds. The ENERGY STAR criteria should be reviewed on an annual basis to reflect the latest requirements.

There are currently no federal minimum standards for Commercial Fryers, however, the American Society of Testing and Materials (ASTM) publishes Test Methods183 that allow uniform procedures to be applied to each commercial cooking appliance for a fair comparison of performance results.

ENERGY STAR Criteria and FSTC Baseline for Open Deep-Fat Electric Fryers

Performance Parameters	ENERGY STAR Electric Fryer Criteria	
	Standard Fryers	Large Vat Fryers
Heavy-Load Cooking Energy Efficiency	>= 80%	>= 80%
Idle Energy Rate	<+ 1.0 kW	<= 1.1 kW

Energy Savings:

Annual savings can be calculated by determining the energy consumed by a standard efficiency fryer as compared with an ENERGY STAR rated fryer.

ΔkWh = kWh(base) – kWh(eff)

ΔkWh(base or eff) = kWh(cooking) + kWh(idle) + kWh(preheat)

kWh(cooking) = [LB(food) x E(food)/Cook(eff)] x Days

kWh(idle) = IdleEnergy x [DailyHrs – LB(food)/Capacity – PreheatTime/60] x Days

kWh(preheat) = PreheatEnergy x Days

Parameter	Description	Value	Source
Daily Hrs	Daily Operating Hours	12 hours	FSTC
Preheat Time	Time to Preheat (min)	15 min	FSTC
E(food)	ASTM defined Energy to Food	0.167 kWh/lb	FSTC
Days	Number of days of operation	365 days	FSTC
CookEff	Cooking energy efficiency (%)	See Table below	FSTC, ENERGY STAR
IdleEnergy	Idle energy rate (kW)		
Capacity	Production capacity (lbs/hr)		FSTC
Preheat Energy	kWh/day		FSTC
LB(food)	Food cooked per day (lb/day)		FSTC

General assumptions used for deriving deemed electric savings are values taken from the Food Service Technology Center (FSTC) work papers.

Baseline and Efficient Assumptions for Electric Standard and Large Vat Fryers

Parameter	Baseline Electric Fryers		Efficient Electric Fryers	
	Standard	Large Vat	Standard	Large Vat
Preheat Energy (kWh/ft)	2.3	2.5	1.7	2.1
Idle Energy Rate (kW/ft)	1.05	1.35	1.00	1.1
Cooking Energy Efficiency (%)	75%	70%	80%	80%
Production Capacity (lbs/h/ft)	65	100	70	110
Lbs of food cooked/day/ft	150	150	150	150

Baseline Electric Fryers	Standard	Large Vat
Cooking	12191	13062
Idle	3619	5051
Preheat	840	913
Total Energy Usage (kWh/year) per Vat	16649	19025
Demand	3.80	4.34

Efficient Electric Fryers	Standard	Large Vat
Cooking	11429	11429
Idle	3507	4170
Preheat	621	767
Total Energy Usage (kWh/year) per Vat	15556	16366
Demand	3.55	3.74

Savings	Standard	Large Vat
Energy Savings (kWh/year) per Vat	1093	2659
Demand Savings (kW)	0.25	0.61

Operating Hours
The average steam cooker is assumed to operate 4,380 hours per year.

Demand Coincidence Factor
Coincidence factor is 1.0 because the cooking equipment is assumed to operate throughout the on-peak demand periods (5PM – 9PM).

Persistence
100% persistence factor

Lifetime
12 years – DEER (2008)

Measure Costs and Incentive Levels
Incremental cost = $769
(Assumptions based on PG&E Commercial Fryers Work Paper developed by FSTC, May 22, 2012).

12.6.9 ENERGY STAR Commercial Kitchen Equipment - Hot Food Holding Cabinet

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:
- PG&E Work Paper PGEFST105 (Revision 3) – June 8, 2012

TRM Review Actions:
- Currently Under Review.

Major Changes:
- New measure

Measure Description:
Commercial insulated hot food holding cabinet models that meet program requirements incorporate better insulation, reducing heat loss, and may also offer additional energy saving devices such as magnetic door electric gaskets, auto-door closures, or dutch doors. The insulation of the cabinet also offers better temperature uniformity within the cabinet from top to bottom. This means that qualified hot food holding cabinets are more efficient at maintaining food temperature while using less energy.

- **Full-size holding cabinets** are defined as any holding cabinet with an internal measured volume of greater than or equal to 15 cubic feet (≥15 ft.3). This measure does not include cook-and-hold equipment. All measures must be electric hot food holding cabinets that are fully insulated and have doors. Qualifying cabinets must not exceed the maximum idle energy rate of 20 Watts per cubic foot in accordance with the ASTM Standard test method.

- **Half-size holding cabinets** are defined as any holding cabinet with an internal measured volume of less than 15 cubic feet (<15 ft.3). This measure does not include cook-and-hold or retherm equipment. All measures must be electric hot food holding cabinets that are fully insulated and have doors. Qualifying cabinets must not exceed the maximum idle energy rate of 20 Watts per cubic foot in accordance with the ASTM Standard test method.

Baseline Efficiency:
The baseline equipment is assumed to be a standard hot food holding cabinet with an idle energy rate of 40 watts per cubic foot.

High Efficiency:
The efficient equipment is assumed to be an ENERGY STAR qualified hot food holding cabinet with an idle energy rate of 20 watts per cubic foot.

Energy Savings:
Energy usage calculations are based on 15 hours a day, 365 days per year operation at a typical temperature setting of 150°F. The different sizes for the holding cabinets (half size and full size) have proportional operating energy rates. Operating energy rate for the full size holding cabinets was obtained in accordance with the ASTM Standard.

The energy savings calculations listed in the following tables use Title 20 (California) as the baseline for potential energy savings requiring all hot food holding cabinets sold in California to meet a normalized idle energy rate of 40 Watts/ft³.

Insulated Hot Food Holding Cabinet - Full Size

Performance	Baseline	High Efficiency Qualifying Model
Demand (kW)	1	0.28
Annual Energy Use (kWh/year)	5475	1533
Estimated Demand Reduction (kW)	-	0.72
Annual Energy Savings (kWh/year)	-	3942
Incremental Measure Cost ($)		2336
Estimated Useful Life (years)	12	12

Insulated Hot Food Holding Cabinet - Half Size

Performance	Baseline	High Efficiency Qualifying Model
Demand (kW)	0.38	0.05
Annual Energy Use (kWh/year)	2081	274
Estimated Demand Reduction (kW)	-	0.33
Annual Energy Savings (kWh/year)	-	1807
Incremental Measure Cost ($)		381
Estimated Useful Life (years)	12	12

The demand reduction estimation is based on measured data for standard efficiency insulated holding cabinets and for high-efficiency insulated holding cabinets. The measured data are derived from tests conducted under ASTM Standard Test Method for the Performance of Hot Food Holding Cabinets.

Measure ASTM test results for Hot Food Holding Cabinets

Cabinet Size	Cabinet Volume (ft³)	Normalized Idle Energy Rate (W/ft³)	Total Cabinet Idle Energy Rate (W)
Full-Size	25	11.3	0.28
Half-Size	10	5.7	0.05

Operating Hours
15 hr/day, 365 day/year = 5,475 hours/year

Demand Coincidence Factor
CF = 1.0

Lifetime
12 years

Measure Costs and Incentive Levels
The incremental cost for ENERGY STAR hot food holding cabinet is $2,336 (full size) & $381 (half size)

12.6.10 ENERGY STAR Commercial Kitchen Equipment -Combination Ovens

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- U.S. Department of Energy, Energy Star website: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COO
- Energy Star Commercial Kitchen Equipment Savings Calculator
- PG&E Work Paper PGEFST105 (Revision 3) – June 8, 2012
- Arkansas TRM Version 2.0 Volume 2
- KEMA report titled "Business Programs: Deemed Savings Parameter Development", November 2009 - Coincidence factor for food service building type listed as 0.84

TRM Review Actions:

- Currently Under Review.

Major Changes:

- New measure

Measure Description:

Commercial combination ovens offer the ability to steam food in the oven cavity. These oven are capable of steaming, proofing and reheating various food products in addition to the normal functions of baking and roasting. Foods can be cooked in a variety of ways: in a convection oven dry heat only mode, a steam only mode, and a combination of dry heat and steam modes. Food to be cooked partially in one mode at a certain temperature and then finished in another mode and at a separate temperature by utilizing the programmability of combination ovens. Combination ovens range in size from 6 pan countertop models up to 40 pan stand-alone models.

Baseline Efficiency:

Parameter	< 15 Pans	15-28 Pans	> 28 Pans
Assumptions			
% Time in Steam Mode	50%	50%	50%
Preheat Energy (kWh/day)	3.0	3.75	5.63
Convection Idle Energy Rate (kW)	1.5	3.75	5.25
Steam Idle Energy Rate (kW)	10.0	12.5	18.0
Convection Cooking Energy Efficiency (%)	65%	65%	65%
Steam Cooking Energy Efficiency (%)	40%	40%	40%
Convection Production Capacity (lbs/hour)	80	100	275
Steam Production Capacity (lbs/hour)	100	150	350
Lbs of Food Cooked/day	200	250	400
Total Energy			
Annual Energy Consumption (kWh)	35,263	48,004	74,448
Demand (kW)	6.8	9.2	14.3

High Efficiency:

Parameter	< 15 Pans	15-28 Pans	> 28 Pans
Assumptions			
% Time in Steam Mode	50%	50%	50%
Preheat Energy (kWh/day)	1.5	2.0	3.0
Convection Idle Energy Rate (kW)	1.0	2.5	4.0
Steam Idle Energy Rate (kW)	5.0	6.0	9.0
Convection Cooking Energy Efficiency (%)	70%	70%	70%
Steam Cooking Energy Efficiency (%)	50%	50%	50%
Convection Production Capacity (lbs/hour)	100	152	325
Steam Production Capacity (lbs/hour)	120	200	400
Lbs of Food Cooked/day	200	250	400
Total Energy			
Annual Energy Consumption (kWh)	23,658	32,001	50,692
Demand (kW)	4.5	6.1	9.7

Energy Savings

Energy usage calculations are based on 12 hours a day, 365 days per year (4,380 hours/year). The different sizes for the combination ovens (< 15 pans, 15-28 pans, and > 28 pans) have proportional operating energy rates.

Performance	< 15 Pans	15-28 Pans	> 28 Pans
Annual Energy Savings (kWh)	11,604	16,003	23,756
Estimated Demand Reduction (kW)	2.6	3.7	5.4

Operating Hours
12 hr/day, 365 day/year = 4,380 hours/year

Demand Coincidence Factor
CF = 0.84

Lifetime
12 years

Measure Costs and Incentive Levels

12.6.11 ENERGY STAR Commercial Kitchen Equipment - Convection Ovens

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- U.S. Department of Energy, Energy Star website: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COO
- Energy Star Commercial Kitchen Equipment Savings Calculator
- PG&E Work Paper PGEFST105 (Revision 3) – June 8, 2012
- Arkansas TRM Version 2.0 Volume 2
- KEMA report titled "Business Programs: Deemed Savings Parameter Development", November 2009 - Coincidence factor for food service building type listed as 0.84

TRM Review Actions:

- Currently Under Review.

Major Changes:

- New measure

Measure Description:
Commercial convection ovens are widely used in the foodservice industry and have a wide variety of uses from baking and roasting to warming and reheating. Convection ovens are also used for nearly all types of food preparation, including foods typically prepared using other types of appliances (e.g., griddles, fryers, etc.). ENERGY STAR commercial ovens are about 20 percent more energy efficient than standard models.

- **Full-size electric convection ovens** are defined by the ability to accept a minimum of five (5) standard full-size sheet pans (18 in. x 26 in. x 1 in.). Qualifying ovens must meet Energy Star requirements by having a tested heavy-load (potato) cooking efficiency in accordance with ASTM F1496. Cooking energy efficiency must be greater than or equal to 70 percent (≥70%) and must not exceed the maximum idle energy rate of 1.6 kW (≤ 1.6kW).

- **Half-size electric convection ovens** are defined by the ability to accept a minimum of five (5) sheet pans measuring (18 in. x 13 in. x 1 in.). Qualifying ovens must meet Energy Star requirements by having a tested heavy-load (potato) cooking efficiency in accordance with ASTM F1496. Cooking energy efficiency must be greater than or equal to 70 percent (≥70%) and must not exceed the maximum idle energy rate of 1.0 kW (≤ 1.0kW).

Baseline Efficiency:

Parameter	Half Size	Full Size
Assumptions		
Preheat Energy (kWh/day)	1.0	1.5
Idle Energy Rate (kW)	1.5	2.0
Cooking Energy Efficiency (%)	65%	65%
Production Capacity (lbs/hour)	45	70
Lbs of food cooked/day	100	100
Energy per pound of food (kWh/lb)	0.0732	0.0732
Total Energy		
Annual Energy Consumption (kWh)	9,692	12,193
Demand (kW)	1.86	2.34

High Efficiency:

Parameter	Half Size	Full Size
Assumptions		
Preheat Energy (kWh/day)	0.9	1.0
Idle Energy Rate (kW)	1.0	1.6
Cooking Energy Efficiency (%)	70%	70%
Production Capacity (lbs/hour)	50	80
Lbs of food cooked/day	100	100
Energy per pound of food (kWh/lb)	0.0732	0.0732
Total Energy		
Annual Energy Consumption (kWh)	7,704	10,314
Demand (kW)	1.48	1.98

Energy Savings
Energy usage calculations are based on 12 hours a day, 365 days per year. The different sizes for the holding cabinets (half size and full size) have proportional operating energy rates.

Performance	Half Size	Full Size
Annual Energy Savings (kWh)	1,988	1,879
Estimated Demand Reduction (kW)	0.38	0.36

Operating Hours
12 hr/day, 365 day/year = 4,380 hours/year

Demand Coincidence Factor
CF = 0.84

Lifetime
12 years

Measure Costs and Incentive Levels

12.6.12 ENERGY STAR Commercial Kitchen Equipment - Solid Door Refrigerators & Freezers

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- Southern California Edison Work Paper SCE13CC001 Commercial Reach-In Refrigerators and Freezers – April 6, 2012

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- New measure

Measure Description:
This measure relates to the installation of a new reach-in commercial refrigerator or freezer meeting ENERGY STAR efficiency standards. ENERGY STAR labeled commercial refrigerators and freezers are more energy efficient because they are designed with components such as ECM evaporator and condenser fan motors, hot gas anti-sweat heaters, or high-efficiency compressors, which will significantly reduce energy consumption. This measure could relate to the replacing of an existing unit at the end of its useful life, or the installation of a new system in a new or existing building.

Baseline Efficiencies:
In order for this characterization to apply, the baseline equipment is assumed to be a solid or glass door refrigerator or freezer meeting the minimum federal manufacturing standards.

High Efficiency:
In order for this characterization to apply, the efficient equipment is assumed to be a solid or glass door refrigerator or freezer meeting the minimum ENERGY STAR efficiency level standards.

Energy Savings:

Annual Energy Savings (kWh/year) = (kWhbase – kWhee) * 365

Demand Savings = Annual Energy Savings / HOURS * CF

Baseline Energy Usage

Type	kWhbase
Solid Door Refrigerator	0.10 * V + 2.04
Glass Door Refrigerator	0.12 * V + 3.34
Solid Door Freezer	0.40 * V + 1.38
Glass Door Freezer	0.75 * V + 4.10

Energy Efficient Usage

Equipment Description (cubic feet)	kWhee Daily Energy Usage (kWh/day)
Solid-Door Reach-In Refrigerator	
0 ≤ V < 15	≤ 0.089V + 1.411
15 ≤ V < 30	≤ 0.037V + 2.200
30 ≤ V < 50	≤ 0.056V + 1.635
50 ≤ V	≤ 0.060V + 1.416
Solid-Door Reach-In Freezer	
0 ≤ V < 15	≤ 0.250V + 1.250
15 ≤ V < 30	≤ 0.400V -1.000
30 ≤ V < 50	≤ 0.163V + 6.125
50 ≤ V	≤ 0.158V + 6.333
Glass-Door Reach-In Refrigerator	
0 ≤ V < 15	≤ 0.118V + 1.382
15 ≤ V < 30	≤ 0.140V + 1.050
30 ≤ V < 50	≤ 0.0888V + 2.625
50 ≤ V	≤ 0.110V + 1.500
Glass-Door Reach-In Freezer	
0 ≤ V < 15	≤ 0.607V + 0.893
15 ≤ V < 30	≤ 0.733V - 1.000
30 ≤ V < 50	≤ 0.250V + 13.500
50 ≤ V	≤ 0.450V + 3.500

Operating Hours
8760 hours/year

Demand Coincidence Factor
CF = 1.0

Lifetime
12 years

Measure Costs and Incentive Levels

Incremental Measure Refrigerator and Freezer Costs

Description	Under-Counter	Single-Door	Double-Door	Triple-Door
Nominal Size	1 door	1 door	2 doors	3 doors
Nominal Volume Range (cubic feet)	0 ≤ V < 15	15 ≤ V < 30	30 ≤ V 50	50 ≤ V
Solid-Door Reach-In Refrigerators Incremental Cost	$1,092.00	$ 1,410.73	$ 1,968.70	$2,723.28
Solid-Door Reach-In Freezers Incremental Cost	$ 257.60	$ 1,363.18	$15,556.71	$1,968.03
Glass-Door Reach-In Refrigerators Incremental Cost	$ 103.60	$ 863.80	$ 1,076.11	$1,548.96
Glass-Door Reach-In Freezers Incremental Cost	$ 25.48	$ 124.04	$ 214.20	$ 899.30

12.7 Building Envelope Improvements

12.7.1 Window Tinting

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- Basis for a Prescriptive Window Film Rebate Program (Attachment G) prepared for HECO (XENERGY Inc.) November 5, 1999

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- Rebate increased from $0.35 to $1.00 per square foot
- Changed from 0.4 shading coefficient (SC) to 0.5 SC

Description:

- *Warranty* – Film must have a minimum five-year manufacturer's warranty and one-year installer's warranty
- *Conditioned Space* – Rebates shall be paid on actual square footage of glass in a conditioned space
- *Eligible Types* – Windows may be clear or factory tinted, single or double pane, but must not have reflected glass. All orientations are eligible.
- *Unshaded* – Windows significantly shaded by buildings, trees or awnings are not eligible for rebates.
- *Replacement Film* – Replacement of deteriorated window film is eligible for 50% of the rebate if the customer did not receive a rebate for the existing film.

Equipment Qualifications:

Shading Coefficient < 0.5
Solar Heat Gain Coefficient (SHGC) < 0.435
SC = 0.87*SHGC

Payback Qualifications:

None

Energy and Demand Savings:

Savings	Hotel	Office	Other	Average
Energy Savings (kWh/ft2)	5.6	4.5	4.5	**4.9**
Demand Savings (kW/ft2)	0.0014	0.0008	0.0016	**0.0013**

Incentives:

Description	Unit Incentive	Incremental Cost
Window Film per square feet	$ 1.00	$ 3.00

Persistence Factor

1.0

Coincidence Factor

1.0

Lifetime

10 years (DEER)

12.7.2 Cool Roof Technologies

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Evergreen TRM Review – 2/23/12

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description
This section covers installation of "cool roof" roofing materials in commercial buildings. The cool roof is assumed to have a solar absorptance of 0.3(1) compared to a standard roof with solar absorptance of 0.8(2). Energy and demand saving are realized through reductions in the building cooling loads. The approach utilizes DOE-2.2 simulations on a series of commercial prototypical building models. Energy and demand impacts are normalized per thousand square feet of roof space.

Definition of Efficient Equipment
The efficient condition is a roof with a solar absorptance of 0.30.

Definition of Baseline Equipment
The baseline condition is a roof with a solar absorptance of 0.80

Deemed Lifetime of Efficient Equipment
The expected lifetime of the measure is 15 years (3)

Deemed Measure Cost
The full installed cost for retrofit applications is $8,454.67 per one thousand square feet (4).

Deemed O&M Cost Adjustments
There are no expected O&M cost adjustments for this measure.

Coincidence Factor
The coincidence factor is 0.74(5).
REFERENCE SECTION
Calculation of Savings

Energy Savings
ΔkWh = SF / 1000 * ΔkWhkSF

(1) Maximum value to meet Cool Roof standards under California's Title 24
(2) Itron. 2004-2005 Database for Energy Efficiency Resources (DEER) Update Study. December 2005.
(3) 2008 Database for Energy-Efficiency Resources (DEER), Version 2008.2.05, "Effective/Remaining Useful Life Values",California Public Utilities Commission, December 16, 2008
(4) 2005 Database for Energy-Efficiency Resources (DEER), Version 2005.2.01, "Technology and Measure Cost Data",California Public Utilities Commission, October 26, 2005
(5) Coincidence factor supplied by Duke Energy for the commercial HVAC end-use. Pending verification based on information from the utilities.

Hawaii Building Example:

ΔkWh = 0.25 kWh / square feet

Coincident Peak Demand Savings
ΔkW ΔkW x CF

Where:

CF = The coincident peak factor, or 0.50

Demand Savings per square feet

ΔkW = 0.0001 * 0.50
= 0.00005 kW

Baseline Adjustment
There are no expected future code changes to affect this measure.

Deemed O&M Cost Adjustment Calculation
There are no expected O&M costs or savings associated with this measure.

Unit energy, demand, and gas savings data is based on a series of prototypical small commercial building simulation runs.

Incentive
$0.20/Square Foot (Roof Surface Area)

12.8 Energy Star Business Equipment

12.8.1 Refrigerators w/Recycling

Measure ID: See Table 7.3

Version Date & Revision History
Draft date: February 24, 2010
Effective date: July 1, 2011
End date: June 30, 2012

Referenced Documents:

- HECO DSM Docket – Backup Worksheets - Global Energy (07-14-06)
- Econorthwest TRM Review – 6/23/10
- Department of Energy Refrigerator Profile – Updated December 2009

TRM Review Actions:

- 6/23/10 Rec. # 11 – Revise savings to be consistent with ENERGY STAR estimates. – Adopted with modifications on refrigerator figures based on DOE Refrigerator profile and the addition of bounty, recycle with new figures.
- 6/23/10 Rec. # 12 – Split the claimed savings by appliance. – Adopted.
- 6/23/10 Rec. # 14 – Revise demand savings values for ENERGY STAR appliances – Adopted.
- 10/5/11 – Currently Under Review.

Major Changes:

- Split between ESH appliances
- Incorporation of three refrigerator categories (new, new with turn in, and bounty (turn in only))
- All ESH 313 kWh and 0.12 kW changed to:
    - New ES Refrigerator Only – 105 kWh, .017 kW
    - New ES Refrigerator with Turn-In – 822 kWh, .034 kW

Measure Description:
The replacement of standard Refrigerators for business locations.

Appliances must comply with:

- Energy Star

Refrigerators – ENERGY STAR refrigerators utilize improvements in insulation and compressors.

Baseline Efficiencies:
Baseline energy usage based on 2009 Energy Star Information for the appliances are as follows:

	Demand Baseline (kW)	Energy Baseline (kWh)	Notes
Non ES Qualifying Refrigerator		537	19.0-21.4 Top Freezer

High Efficiency:

The high efficiency case Energy Star energy usage based on 2009 Energy Star Calculator Information and DOE Refrigerator Market Profile for the appliances is as follows:

	Demand High Efficiency (kW)	Energy High Efficiency (kWh)	Notes
ES Qualifying Refrigerator		435	19.0-21.4 Top Freezer

Energy Savings:

Energy Star Appliance Gross Savings before operational adjustments:

	Demand Savings (kW)	Energy Savings (kWh)
ES Refrigerator	0.017	105
ES Refrigerator with Turn-In	0.034	822

Energy Star Appliance Net Savings operational adjustments:

Operational Factor	Adjustment Factor
Persistence Factor (pf)	1.0
Demand Coincidence Factor (cf)	1.0

Savings Algorithms

Energy Star Refrigerator and Turn In Refrigerator - Single and Multi Family Residential Home

Opportunity		Energy Usage		
New Non-ENERGY STAR		540		Table 2
New ENERGY STAR Refrigerator	-	435		Table 2
		105	kWh/Year	Table 1
#1 - Purchase of ENERGY STAR Refrigerator		105		Table 1
#2 - Removal of Old Unit from Service (off the grid)	+	717		Table 1
#1 + #2 = Purchase ES and Recycle old unit		822	kWh/Year	

	Energy Usage	Ratio	Contribution		
Post-1993 Refrigerator	640	55%	354.54		Table 3
Pre-1993 Refrigerator	1,131	45%	504.46		Table 3
			859	kWh/Year	

Table 1

Energy Savings Opportunities for Program Sponsors

Opportunity	Annual Savings			
	Per Unit		Aggregate U.S. Potential	
	kWh	$	MWh	$ million
1. Increase the number of buyers that purchase ENERGY STAR qualified refrigerators. • 9.3 million units were sold in 2008. • 70 percent were not ENERGY STAR. • 6.5 million potential units per year could be upgraded.	105	11.64	675,928	75
2. Decrease the number of units kept on the grid when new units are purchased. • 8.7 million primary units were replaced in 2008. • 44 percent remained in use, whether they were converted to second units, sold, or given away. • 3.8 million units are candidates for retirement every year.	717	79.53	2,746,062	305
3. Decrease the number of second units. • 26 percent of households had a second refrigerator in 2008. • 29.6 million units are candidates for retirement.	859	95.28	25,442,156	2,822
4. Replace pre-1993 units with new ENERGY STAR qualified models. • 19 percent of all units in use in 2008 were manufactured before 1993. • 27.3 million total potential units are candidates for targeted replacement.	730	81	19,946,440	2,212

Sources: See endnote 10.

Table 2

Energy and Cost Comparison for Upgrading to ENERGY STAR

Purchase Decision	New Non-ENERGY STAR Qualified Refrigerator	New ENERGY STAR Qualified Refrigerator
Annual Consumption	540 kWh	435 kWh
	$60	$48
Annual Savings	–	105 kWh
	–	$12
Average Lifetime	12 years	12 years
Lifetime Savings	–	1,260 kWh
	–	$140
Price Premium	–	$30 - $100
Simple Payback Period	–	3-9 years

Note: Calculations based on shipment-weighted average annual energy consumption of 2008 models. An ENERGY STAR qualified model uses 20 percent less energy than a new non-qualified refrigerator of the same size and configuration.

Source: See endnote 10.

Table 3

Energy and Cost Comparison for Removing a Second Refrigerator from the Grid

Fate of Unit	Post-1993 Unit		Pre-1993 Unit	
	Remains on the Grid	Removed from the Grid	Remains on the Grid	Removed from the Grid
Annual Consumption	640 kWh	–	1,131 kWh	–
	$71	–	$125	–
Annual Savings	–	640 kWh	–	1,131 kWh
	–	$71	–	$125
Average Lifetime*	6	–	6	–
Lifetime Savings*	–	3,840 kWh	–	6,788 kWh
	–	$426	–	$753
Removal Cost	–	$50 - $100	–	$50 - $100
Simple Payback Period	–	1-2 years	–	<1 year

*Assumes unit has six years of functionality remaining.

Sources: See endnote 10.

Operating Hours
Refrigerators = 8,760 hours per year

Loadshape
TBD

Freeridership/Spillover Factors
TBD

Demand Coincidence Factor
NA

Persistence
NA

Lifetime
14 years

Measure Costs and Incentive Levels

Residential Measure Costs and Incentive Levels

Description	Unit Incentive	Incremental Cost HECO DSM Docket 2006	Average Incremental Cost Energy Star 2009
ES Refrigerator	$50	$ 60.36	$ 65
ES Refrigerator w/turn in	$125		$130*

***Estimated value**

Component Costs and Lifetimes Used in Computing O&M Savings
TBD

Reference Tables
None

12.9 Energy Awareness, Measurement and Control Systems

12.9.1 Condominium Submetering Pilot

Measure ID: See Table 7.3 (TBD)
Measure Code:

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description:

Equipment Qualifications:
This program is to assist master-metered condominiums and their Association of Apartment Owners (AOAO) efforts to reduce energy consumption and implement the current submetering proposal as one that will insure both equity and fairness in allocating energy costs as well as encouraging energy conservation through direct feedback of personal energy use to tenants.

The combination of billing submeters, along with education, peer group comparisons and special equipment offerings, will assist the tenant achieve significant energy conservation and efficiency.

Requirements:
- The metering system must remain in place and billing to occur for a period of at least five (5) years or a pro-rated portion of the incentive will be recovered by Hawaii Energy. Provide Hawaii Energy with energy meter data for analysis purposes.
- A joint educational and monitoring program will be undertaken with AOAO to assist in the verification of savings and development of an ongoing energy incentive offering for other condominiums in Hawaii.

Baseline

The base case is no submetering. Baseline Annual Energy Usage is the actual average usage (kWh/year) based on historical usage for past 24 months (or as appropriate) for entire condominium (master metered) divided by the number of condominium units. Baseline demand (kW) is the Average Historical Demand divided by the number of condominium units.

Building Types	Demand Baseline (kW)	Energy Baseline (kWh/year)
Condominium	1.42	7,200

High Efficiency

The high efficiency case is with submetering. It is expected there will be a 10% reduction in energy usage and 8% reduction in peak demand during (5PM – 9PM).

Building Types	Efficient Case (kW)	Efficient Case (kWh/year)
Condominium	1.30	6,480

Energy and Demand Savings:

Building Types	Gross Customer Savings (kW)	Gross Customer Savings (kWh/year)
Condominium	0.113	720

Operational Factor	Adjustment Factor
Persistence Factor (pf)	1.00
Demand Coincidence Factor (cf)	1.00

Building Types	Net Customer Savings (kW)	Net Customer Savings (kWh/year)
Condominium	0.113	720

Example Savings Algorithm:

Submetering (Condominium)

Average Master Meter Energy Usage (kWh/month)		180,000	kWh per month	
Number of tenant Units	÷	300	Units	
Average Tenant Energy Usage (Example)		600	kWh per home per month	
	x	12	month per year	
Baseline Annual Household Energy Usage		7,200	kWh per Year	
Average Master Meter Demand (kW)		425		
Number of tenant Units	÷	300		
Baseline Demand (kW)		1.42	kW	
Energy Reduction		10.0%		
Actively Informed Household Energy Usage		6,480	kWh per Year	
Baseline Annual Household Energy Usage		7,200	kWh per Year	
Actively Informed Household Energy Usage	-	6,480	kWh per Year	
Gross Customer Level Energy Savings		720	kwh per Year	
Gross Customer Level Energy Savings		720	kwh per Year	
Persistance Factor	x	1.0		
Net Customer Level Savings		720	kwh per Year	
Submetering Energy Savings		720	kWh / Year Savings	
Baseline Household Demand		1.42	kW	HECO 2008 Load Study
Peak Demand Reduction		8.00%		
Actively Informed Household Demand		1.30	kW	
Baseline Household Demand		1.42	kW	
Actively Informed Household Demand	-	1.30	kW	
Gross Customer Demand Savings		0.113	kW	
Gross Customer Demand Savings		0.113	kW	
Persistance Factor	x	1.0		
Coincidence Factor	x	1.0		
		0.113	kW	
Condominium Sub-Metering Demand Savings		0.113	kW Savings	

Incentives/Incremental Cost

- $150 per unit metered, payable to the AOAO for distribution to owners on a percentage of ownership basis to comply with condominium regulations.
- Incentive payment will be made upon billing individual tenants.
- Incentive payment cannot exceed 50% of total project cost.
- The payment of the incentive will be based on the AOAO securing the approval, installing and utilizing the submeters for billing purposes.
- There is no minimum reduction in electrical use to be required by AOAO to retain the incentive.

Description	Incentive	Incremental Cost
Condominium Submeter	$150	$750

Measure Life: 8 years (based on DEER. Similar technology as time-clocks and occupancy sensors)

12.9.2 Small Business Submetering

Version Date & Revision History
Draft date: October 3, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description:

Equipment Qualifications:

This program is to assist master-metered small businesses to reduce energy consumption that will insure both equity and fairness in allocating energy costs as well as encouraging energy conservation through direct feedback of personal energy use to business tenants.

The combination of billing submeters, along with education, peer group comparisons and special equipment offerings, will assist the tenant achieve significant energy conservation and efficiency.

Requirements:
- The metering system must remain in place and billing to occur for a period of at least five (5) years or a pro-rated portion of the incentive will be recovered by Hawaii Energy. Provide Hawaii Energy with energy meter data for analysis purposes.
- A joint educational and monitoring program will be undertaken with the businesses to assist in the verification of savings and development of an ongoing energy incentive offering for other condominiums in Hawaii.

Baseline

The base case is no submetering

Building Types	Demand Baseline (kW)	Energy Baseline (kWh/year)
Small Business	3.00	10,800

High Efficiency

The high efficiency case is with submetering

Building Types	Efficient Case (kW)	Efficient Case (kWh/year)
Small Business	2.76	9,720

Energy and Demand Savings:

Building Types	Gross Customer Savings (kW)	Gross Customer Savings (kWh/year)
Small Business	0.24	1,080

Operational Factor	Adjustment Factor
Persistence Factor (pf)	1.00
Demand Coincidence Factor (cf)	1.00

Building Types	Net Customer Savings (kW)	Net Customer Savings (kWh/year)
Small Business	0.24	1,080

It is expected there will be at least 10% reduction in energy usage and 8% reduction in peak demand during (5PM – 9PM), however, there is no minimum reduction in electrical use to be required to retain the incentive.

Savings Algorithm:

Small Business Submetering			
Average Tenant Energy Usage		900	kWh per business per month (Schedule G)
	x	12	
Baseline Business Energy Usage		10,800	kWh per Year
Energy Reduction		10.0%	
Actively Informed Business Energy Usage		9,720	kWh per Year
Baseline Business Energy Usage		10,800	kWh per Year
Actively Informed Business Energy Usage	-	9,720	kWh per Year
Gross Customer Level Energy Savings		1,080	kwh per Year
	x	1,000	Watts per kW
	÷	8,760	Hours per Year
Average 24/7 Demand Reduction		123	Watts
Gross Customer Level Energy Savings		1,080	kwh per Year
Persistance Factor	x	1.0	
Net Customer Level Savings		1,080	kwh per Year
Submetering Energy Savings		1,080	kWh / Year Savings
Baseline Business Demand		3.00	kW
Peak Demand Reduction		8.00%	
Actively Informed Business Demand		2.76	kW
Baseline Business Demand		3.00	kW
Actively Informed Business Demand	-	2.76	kW
Gross Customer Demand Savings		0.240	kW
Gross Customer Demand Savings		0.240	kW
Persistance Factor	x	1.00	
Coincidence Factor	x	1.00	
		0.240	kW
Small Business Demand Savings		0.24	kW Savings

Incentives/Incremental Cost

- Incentive payment will be made upon billing individual tenants.
- Incentive payment cannot exceed 50% of total project cost.
- Incentive = $150/unit

12.9.3 Vending Misers

Measure ID: See Table 7.3 (TBD)
Measure Code:

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2010
End date: TBD

Referenced Documents:

(1) USA Technologies Energy Management Product Sheets (2006). http://www.usatech.com/energy_management/energy_productsheets.php. Accessed 9/1/09.

TRM Review Actions:

- n/a

Measure Description

Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintain a cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.

Algorithms for Calculating Primary Energy Impact

Unit savings are deemed based on the following algorithms and assumptions:

ΔkWh = (kWrated)(Hours)(SAVE)
ΔkW = ΔkWh/ Hours

Where:

kWrated = Rated kW of connected equipment. See Table below for default rated kW by connected equipment type.
Hours = Operating hours of the connected equipment: default of 8,760 hours
SAVE = Percent savings factor for the connected equipment. See table below for values.

Vending Machine and Cooler Controls Savings Factors(1)

Equipment Type	kWRATED	SAVE (%)	ΔkW	ΔkWh
Refrigerated Beverage Vending Machines	0.40	46	0.184	1612

Baseline Efficiency

The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated
snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

High Efficiency

The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Hours
It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.

Measure Life
5 Years

Incentive
$50/unit

13 (CBEEM) Custom Business Energy Efficiency Measures

13.1 Customized Project Measures

13.1.1 Customized Project Measures

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:

Description: The Custom project measure is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Measure Life	Reduction in Energy Use Incentive	Evening Peak Demand Reduction (5:00 p.m. to 9:00 p.m. weekdays)	Day Peak Demand Reduction (12:00 p.m. to 2:00 p.m. weekdays)	First Year Energy Savings (kWh)	Demand Savings (kW)
< 5 years	$0.10 /kWh	$125 / kW	*$100 / kW		
> 5 years	$0.15 /kWh	$125 /kW	*$100 /kW		

Program Requirements:
- Approval is required prior to the start of work on any customized project.
- Total resource benefit ratio is greater than or equal to 1.
- Incremental simple payback greater than one year or six months for LED projects.

Requirements for Non ENERGY STAR® LED Lamps	
• Five year manufacturer warranty or three year manufacturer warranty with LM79 and LM80 (1,000 hour) tests	• UL Listed

Energy and Demand Savings:

All assumptions, data and formulas used in the calculations must be clearly documented. Standard engineering principles must be applied, and all references cited. Energy saving calculations shall also reflect the interactive effects of other simultaneous technologies to prevent the overstatement of the actual savings. Proposed base and enhanced cases must be performed by a qualified person or firm. In some cases, a professional engineer may be required to provide verification of the analysis.

Savings Algorithms

Gross energy and demand savings estimates for custom projects are calculated using engineering analysis and project-specific details. Custom analyses typically include a weather dependent load bin analysis, whole building energy model simulation, or other engineering analysis and include estimates of savings, costs, and an evaluation of the project's cost-effectiveness.

Baseline Efficiency

The baseline efficiency case assumes compliance with the efficiency requirements as mandated by the Hawaii State Energy Code or industry accepted standard practice.

High Efficiency

The high efficiency scenario is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective and pass total resource benefit and have a payback greater than or equal to 1.

Persistance Factor
PF = 1 since all custom projects require verification of equipment installation.

Incentives
- Incentives are limited to 50% of incremental costs.
- Installations are subject to inspection for up to 5 years. Removal will be cause for incentive forfeiture.

14 (BESM) Business Energy Services and Maintenance

14.1 Business Direct Installation

14.1.1 Small Business Direct Lighting Retrofits

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
This program provides small business owners with an economical, quick and easy switch to more energy efficient lighting. The program is designed to address the needs of small business owners and help them overcome the barriers of time, trust and technical knowledge to make lighting technology changes.

- Provide complete process to provide direct installation of lighting retrofits for small business customers.
- Participating Hawaii Energy Participating contractors will offer six month payment plans for the lighting retrofits
- Use of workforce development groups and grass roots volunteer organizations to generate leads and perform initial audits to lower cost of sales for Lighting contractors
- Quick Inventory worksheet to ID potential targeting for future mechanical measures (AC/Water heating/Appliances/Refrigeration)

Small Business Lighting Retrofit providing a “Turnkey” program consisting of audits, 100% incentivized lighting measures, installation by participating Hawaii Energy Participating contractors and 6 month financing of lighting retrofit costs of custom measures beyond the cost per kWh incentive.

A “Turnkey” program consisting of audits, 100% incentivized lighting measures, installation by participating Hawaii Energy Participating contractors.

The following lighting technology changes will be 100% incentivized under this measure:

	Measure Description		Measure Description
28W Retrofits	Two 8 ft. T12HO 110W to Four 4 ft. T8 28W Normal BF / Reflector	25W Retrofits	Two 8 ft. T12HO 110W to Four 4 ft. T8 25W Normal BF / Reflector
	One 8 ft. T12HO 110W to Two 4 ft. T8 28W High BF		One 8 ft. T12HO 110W to Two 4 ft. T8 25W High BF
	Two 8 ft. T12HO 110W to Two 4 ft. T8 28W High BF / Reflector		Two 8 ft. T12HO 110W to Two 4 ft. T8 25W High BF / Reflector
	Two 8 ft. T12 75W to Two 4 ft. T8 28W Normal BF		Two 8 ft. T12 75W to Two 4 ft. T8 25W Normal BF
	One 8 ft. T12 75W to Two 4 ft. T8 28W Normal BF		One 8 ft. T12 75W to Two 4 ft. T8 25W Normal BF
	Four 4 ft. T12 40W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T12 40W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T12 40W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T12 40W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T12 40W to One 4 ft. T8 28W Normal BF		One 4 ft. T12 40W to One 4 ft. T8 25W Normal BF
	Four 4 ft. T12 34W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T12 34W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T12 34W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T12 34W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T12 34W to One 4 ft. T8 28W Normal BF		One 4 ft. T12 34W to One 4 ft. T8 25W Normal BF
	Four 4 ft. T8 32W to Four 4 ft. T8 28W Normal BF		Four 4 ft. T8 32W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF / Reflector		Four 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T8 32W to Three 4 ft. T8 28W Normal BF		Three 4 ft. T8 32W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF / Reflector		Three 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF		Two 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T8 32W to One 4 ft. T8 28W Normal BF		One 4 ft. T8 32W to One 4 ft. T8 25W Normal BF
	Two 4ft. FB40 T8 to Three 2 ft. F17	Refrigerated Case Lighting	6 ft. T12HO Refrigerated Case to LED - Center
			6 ft. T12HO Refrigerated Case to LED - Single/Ends
LED Retrofit	PAR20 Halogen 50W to LED		6 ft. T12 Refrigerated Case to LED - Center
	PAR30 Halogen 75W to LED		6 ft. T12 Refrigerated Case to LED - Single/Ends
	PAR38 Halogen 75W to LED		6 ft. T8HO Refrigerated Case to LED - Center
	PAR38 Halogen 90W to LED		6 ft. T8HO Refrigerated Case to LED - Single/Ends
	MR16 Halogen 20W to LED		
	MR16 Halogen 50W to LED		5 ft. T12HO Refrigerated Case to LED - Center
	Par20 CFL to LED		5 ft. T12HO Refrigerated Case to LED - Single/Ends
	Par30 CFL to LED		5 ft. T12 Refrigerated Case to LED - Center
	Par38 CFL to LED		5 ft. T12 Refrigerated Case to LED - Single/Ends
			5 ft. T8HO Refrigerated Case to LED - Center
CFL	A19 Incandescent 100W to CFL 26W		5 ft. T8HO Refrigerated Case to LED - Single/Ends
	A19 Incandescent 60W to CFL 13W		
	A19 Incandescent 75W to CFL 19W		LED Refrigerated Case Light Drivers
Exit	Incandescent Exit Sign Retrofit with LED Kit		
	Incandescent Exit Sign to New LED Fixture		

Program Requirements:
Small Business Customers receiving eclectic power under a Schedule “G” rate, or are similar to Schedule “G” but are under master-metered accounts, are eligible under this program.

Example Savings Algorithms

Small Business Direct Install Lighting Retrofit Pilot Program
Summary Sheet

Business Name:	
Contact Name:	
Address:	
Phone:	
Fax:	
Email:	

Contractor Name:	
Auditor Name:	
Address:	
Phone:	
Fax:	
Email:	

Total Watts Saved	Energy Savings	Energy Cost Savings	Hawaii Energy Participating Contractor NTE Pricing	Hawaii Energy Cash Incentive	Net Customer Cost	Simple Payback	4 Month Monthly Payment	Monthly Savings % of Payment
1,323 W	3,324 kWh/yr.	$ 776 / yr.	$ 2,300	$ 833	1,467	23	367	18%

Step 1	
f2	
Oahu	Island of Project Location
$ 0.234 /kWh	2010 "G" Marginal Cost of Electricity

Measure Code	Existing Technology	New Technology	Step 2: Total Units	Step 3: M-F Hours per Day	Sat. Hours per Day	Sun. Hours per Day	Annual Hours of Operation	Step 4: Wkdays Hours on between 5 and 9 p.m.	On-Peak Fraction	Total Watts Saved	Energy Savings	Energy Cost Savings	Hawaii Energy Participating Contractor NTE Pricing	Hawaii Energy Cash Incentive	Net Customer Cost	Simple Payback	6 Month Monthly Payment	Monthly Savings % of Payment
			(each)				(hrs/year)	(hrs)	(%)	(Watts)	(kWh/Year)	($/year)	($)	($)	($)	(Months)	($/month)	(%)
			a	b1a	b1b	b2a	b3 = b1*b2*(365/7)	c	c2 = c / 4	d = a x o	e = b x (d/1000)	f = e x f2	g = a x p	h = a x q	i = a x (p-q)	j = (i/f) x 12	k = i /6	l = (f/12)/k
8L1-4L2	8 ft. 1 Lamp F96	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 75	$ 62	$ 13	6	$ 2.24	100%
8L2-4L2	8 ft. 2 Lamp F96	4 ft. 2 lamp F25/28 H	1	8	8	0	2,503	-	0%	57	143	$ 33	$ 84	$ 53	$ 31	11	$ 5.17	54%
8L2HO-4L2R	8 ft. 2 Lamp F96 HO	4 ft. 2 lamp F25/28 N, Reflct.	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 85	$ 27	$ 58	26	$ 9.67	23%
8L2HO-4L4	8 ft. 2 Lamp F96 HO	4 ft. 4 lamp F25/28 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 138	$ 53	$ 85	19	$ 14.17	32%
4L4-4L4	4 ft. 4 Lamp F40	4 ft. 4 lamp F25/28 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 83	$ 51	$ 32	7	$ 5.33	84%
4L4-4L2R	4 ft. 4 lamp F40	4 ft. 2 lamp F25/28 N, Reflct.	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 65	$ 27	$ 38	17	$ 6.33	35%
4L3-4L3	4 ft. 3 lamp F40	4 ft. 3 lamp F25/28 N, Reflct.	1	8	8	0	2,503	-	0%	69	173	$ 40	$ 74	$ 38	$ 36	11	$ 6.00	56%
4L3-4L2R	4 ft. 3 lamp F40	4 ft. 2 lamp F25/28 N, Reflct.	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 65	$ 27	$ 38	17	$ 6.33	35%
4L2-4L2	4 ft. 2 lamp F40	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 35	$ 27	$ 8	4	$ 1.33	168%
4L1-4L1	4 ft. 1 lamp F40	4 ft. 1 lamp F25/28 N	1	8	8	0	2,503	-	0%	23	58	$ 13	$ 30	$ 14	$ 16	14	$ 2.67	42%
4L4-4L4	4 ft. 4 lamp F32	4 ft. 4 lamp F25/28 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 83	$ 34	$ 49	11	$ 8.17	55%
4L4-4L2	4 ft. 4 lamp F32	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 65	$ 53	$ 12	5	$ 2.00	112%
4L3-4L3	4 ft. 3 lamp F32	4 ft. 3 lamp F25/28 N	1	8	8	0	2,503	-	0%	69	173	$ 40	$ 74	$ 26	$ 48	14	$ 8.00	42%
4L3-4L2	4 ft. 3 lamp F32	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 65	$ 25	$ 40	18	$ 6.67	34%
4L2-4L2	4 ft. 2 lamp F32	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 35	$ 27	$ 8	4	$ 1.33	168%
4L1-4L1	4 ft. 1 lamp F32	4 ft. 1 lamp F25/28 N	1	8	8	0	2,503	-	0%	23	58	$ 13	$ 35	$ 9	$ 26	23	$ 4.33	26%
1L400-4L6	HID Pendant 1 lamp 400W	4 foot 6 lamp F25/T8 N	1	8	8	0	2,503	-	0%	138	345	$ 81	$ 360	$ 76	$ 284	42	$ 47.33	14%
1L250-4L4	HID Pendant 1 lamp 250W	4 foot 4 lamp F25/T8 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 330	$ 51	$ 279	62	$ 46.50	10%
1L175-4L4	HID Pendant 1 lamp 175W	4 foot 4 lamp F25/T8 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 330	$ 51	$ 279	62	$ 46.50	10%
UBL2-2L2	4 ft. U-Bend 2 lamp FB40	2 ft. 2 lamp F17 N	1	8	8	0	2,503	-	0%	32	80	$ 19	$ 40	$ 22	$ 18	12	$ 3.00	52%
UBL2-2L2R	4 ft. U-Bend 2 lamp FB40	2 ft. 2 lamp F17 L, Reflector	1	8	8	0	2,503	-	0%	27	68	$ 16	$ 50	$ 30	$ 20	15	$ 3.33	39%
100-23	100 Watt Incandescent	23 Watt CFL	1	8	8	0	2,503	-	0%	23	58	$ 13	$ 10	$ 4	$ 6	5	$ 1.00	112%
75-19	75 Watt Incandescent	19 Watt CFL	1	8	8	0	2,503	-	0%	19	48	$ 11	$ 8	$ 4	$ 4	4	$ 0.67	139%
60-13	60 Watt Incandescent	13 Watt CFL	1	8	8	0	2,503	-	0%	13	33	$ 8	$ 6	$ 4	$ 2	3	$ 0.33	190%
Exit	40W Incandecent	2 Watt LED	1	24	24	24	8,760	-	0%	2	18	$ 4	$ 75	$ 38	$ 37	109	$ 6.17	6%
OverHeight	Cost Adder for Fixtures above or out of the reach of a 10' Ladd		0										$ -		$ -			
										1,323 W	3,324 kWh/yr.	$ 776 / yr.	$ 2,300	$ 833	$ 1,467	23	$ 366.86	18%

WORKBOOK INPUTS

Measure Code	Existing per Unit Watts	Unit New Watts	Unit Watts Saved	Hawaii Energy Participating Contractor Pricing	Hawaii Energy Cash Incentive	Public Benefit Fee Investment
	(Watt/unit)	(Watt/unit)	(Watt/unit)	($/unit)	($)	($/kWh)
	m	n	o = m-n	p	q	r
8L1-4L2	85	46	39	$ 75	$ 62	$ 0.53
8L2-4L2	142	57	85	$ 84	$ 53	$ 0.37
8L2HO-4L2R	170	46	124	$ 85	$ 27	$ 0.23
8L2HO-4L4	170	92	78	$ 138	$ 53	$ 0.23
4L4-4L4	168	92	76	$ 83	$ 51	$ 0.22
4L4-4L2R	168	46	122	$ 65	$ 27	$ 0.23
4L3-4L3	126	69	57	$ 74	$ 38	$ 0.22
4L3-4L2R	126	46	80	$ 65	$ 27	$ 0.23
4L2-4L2	84	46	38	$ 35	$ 27	$ 0.23
4L1-4L1	42	23	19	$ 30	$ 14	$ 0.24
4L4-4L4	112	92	20	$ 83	$ 34	$ 0.15
4L4-4L2	112	46	66	$ 65	$ 53	$ 0.46
4L3-4L3	84	69	15	$ 74	$ 26	$ 0.15
4L3-4L2	84	46	38	$ 65	$ 25	$ 0.22
4L2-4L2	56	46	10	$ 35	$ 27	$ 0.23
4L1-4L1	28	23	5	$ 35	$ 9	$ 0.16
1L400-4L6	475	138	337	$ 360	$ 76	$ 0.22
1L250-4L4	300	92	208	$ 330	$ 51	$ 0.22
1L175-4L4	225	92	133	$ 330	$ 51	$ 0.22
UBL2-2L2	84	32	52	$ 40	$ 22	$ 0.27
UBL2-2L2R	84	27	57	$ 50	$ 30	$ 0.44
100-23	100	23	77	$ 10	$ 4	$ 0.07
75-19	75	19	56	$ 8	$ 4	$ 0.08
60-13	60	13	47	$ 6	$ 4	$ 0.12
Exit	40	2	38	$ 75	$ 38	$ 2.17
OverHeight				$ 8		
						0

14.2 Business Design, Audits and Commissioning

14.2.1 Central Plant Optimization Competition Program

Measure ID: See Table 7.3 (TBD)
Measure Code:

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2011
End date: June 30, 2012

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description:
This program is designed to improve building operations through a systematic approach of installing critical metering, performing retro-commissioning activities to identify and optimize system operations, and then measuring and sharing results.

Claimed Savings
Energy and Demand savings (100%) will be claimed upfront and 50% payment of claimed energy savings will be paid at $0.10/kWh upon implementation (1 month after start of Operational Period).

Adjustment of Incentive Funding

- **Return of Incentive Funds for Decreased Energy Savings**
  If overfunded, customer shall return the difference between the actual and estimated claimed energy saving to the Program.

- **Additional Funding for Increased Energy Savings**
  If underfunded, payment will be made to customer (up to 100% of investment).

Process

A baseline energy usage will be determined based on both metering and engineering calculations. Post meter installation review along with spot measurements will be conducted.

Initial Meeting
Application
Preliminary Systems Review

- Consultant Price Proposal
- Consultant Perform Systems Review
    - Consultant Provide Metering and Commissioning Plan

Metering and Commissioning Plan

- Approve Metering Plan
- Approve Metering Budget
- Metering Installation
- Design/Oversight/Test Metering/Base Meter Readings – 2 weeks

System Commissioning Plan

- Approve Commissioning Plan
- Investigation
- Analysis/Documentation
- Field Commissioning/Tuning
- Development of Sequence of Operations
- Recommend Operational Improvements
- Recommended System Upgrades
- Maintenance and Operations Plan
- Operational Training
- System Commissioning Budget

Final Metering and Commissioning Report & Documentation Submittal

Operational Performance Period

- Start Operation Period (after commissioning, training)
    - Estimated Performance Assessment 1 – (1 month after start of Operational Period)
    - Estimated Performance Assessment 2 – (6 month after start of Operational Period)
    - Estimated Performance Assessment 3 – (End of Operational Period)
- End Operational Period (1 – year after start of operational period)
- Review Savings Achievement

Central Plant Optimization Competition Process and Project Review Worksheet

Deliverable	Action		Customer Cost	Incentive Rate	Committed Incentive	Set Aside Incentive	
Initial Meeting	Scope review, Program review						
Application							
Preliminary Systems Review	Price Proposal		$ -	50%	**$ -**		***Payment 1***
	Perform Systems Review						
Metering and Commissioning Plan	Approve Metering Plan						
	Metering Budget		$ -				
	Metering Installation		$ -				
	Design/Oversight/Test Metering/Base Meter Readings-2 Weeks		$ -	100%		**$ -**	***Payment 2***
			$ -				
System Commissioning Program	Approve Commissioning Plan						
	Investigation		$ -	50%		$ -	
	Analysis /Documentation		$ -	50%		$ -	
	Field Commissioning / Tuning		$ -	50%		$ -	
	Development of Sequence of Operations		$ -	50%		$ -	
	Recommend Operational Improvements		$ -	50%		$ -	
	Recommended System Upgrades		$ -	50%		$ -	
	Maintenance and Operations Plan		$ -	50%		$ -	
	Operational Training		$ -	50%		$ -	
	System Commissioning Budget		$ -			**$ -**	***Payment 3***
	Final Report & Documentation						
Operational Performance Period	Start Operational Period (after commissioning, training)						
						Incentive $ 0.10	*Multiply Est. Performance Assessments by Incentive to achieve potential savings*
						Potential Savings	
	Estimated Performance Assessment **1**	(1mo after start of Operational Period)	#REF!	50%		**#REF!**	***Payment 4***
	Estimated Performance Assessment **2**	(6mo after start of Operational Period)	#REF!	25%		**#REF!**	***Payment 5***
	Estimated Performance Assessment **3**	(End of Operational Period)	#REF!	25%		**#REF!**	***Payment 6***
	Potential Savings per Year		#REF!	100%		#REF!	
	End Operational Period (1 - year after start of operational period)						
	Review Savings Achievement						

Incentives and Responsibilities:

Incentive	Amount	Responsibilities
Commissioning Contract	50% incentive up to $0.20 per sq. ft.	• Preliminary Systems Review • Metering Plan • Development of Sequence of Operations • Operational Improvements • System Upgrade Improvements • Maintenance and Operations Plan • Operational Training • Owner commitment to participate in the Optimization Competition
Metering System	100% incentive for approved metering equipment and data collection systems	• Access to performance data for five years. • Owner commitment to perform operational and system upgrade recommendations with less than 2 year paybacks up to the cost of the metering incentive within two years or forfeit metering incentive
Energy Reduction	$0.10 per kWh saved for one year	• 50% upon implementation • 25% for performance at sixth month • 25% for performance at one year

*Total incentives not to exceed customer cost.

14.2.3 Cooling Tower Optimization

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:
This program combines the water and energy savings potential of cooling towers. The water treatment processes drive both water consumption and the persistence of energy savings by keeping the heat exchange processes in the chillers and in the tower itself at optimum levels. The program will work with the local water departments, water treatment companies and mechanical service contractors to drive the program.

Baseline Efficiencies:
TBD

High Efficiency:
TBD

Energy Savings:
Energy savings will be based on a customized approach.

Savings Algorithms

Incentive = $0.25/kWh

14.2.4 Decision Maker – Real Time Submetering

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Measure Description:
There are individuals within business organizations who have influence over a large number of employees whose behavior within the work environment drive unnecessary energy consumption (e.g. leaving on lights, additional electronic equipment, etc.). This offer is the direct installation of a web-based electrical metering device. This metering will be monitored by the decision makers within the organization to identify usage patterns and be the basis of peer group competitions within the organization.

Baseline Efficiencies:
TBD

High Efficiency:
TBD

Energy Savings:
TBD

Savings Algorithms

Incentive = $12,000/group (5 group budget @ $60,000)

14.2.5 Energy Study

Version Date & Revision History
Draft date: September 20, 2011
Effective date: July 1, 2012
End date: June 30, 20123

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description: The Energy Study is an indirect impact product that offers Hawaii businesses with analysis services to identify energy saving opportunities. The goal of the energy study is to provide a method for commercial and industrial customers to learn how their business uses energy today and to identify measures that will help them save energy and reduce operating costs in the future. The focus is on a customer's core energy efficiency opportunities.

Program Requirements:
- Program approval is required prior to the start of work on the energy study
- The program reserves the right to review all materials that result from a program-supported study including, but not limited to, final reports, consultant recommendations, and metered data
- The study must be performed by a qualified person or firm. A brief summary of the consultant's qualifications should be submitted with the application. In some cases, a professional engineer may be required to provide verification of the analysis
- At any time, customers may contact program staff to discuss a project, get assistance in preparing an application, or with any program-related questions

Energy and Demand Savings:

All assumptions, data and formulas used in energy efficiency calculations must be clearly documented. Standard engineering principles must be applied, and all references cited. Energy saving calculations shall also reflect the interactive effects of other simultaneous technologies to prevent the overstatement of the actual savings.

Savings Algorithms

Gross energy and demand savings estimates for energy studies are calculated using engineering analysis and project-specific details. Energy study analyses typically include estimates of savings, costs, and an evaluation of the cost-effectiveness of potential projects/upgrades.

Energy Study

The Energy Study shall include the following information and be presented in the following format:

1) Executive Summary
    a) Energy Conservation Measures (ECMs) Proposed
    b) Summary of Baseline and Enhanced Case Assumptions
    c) Actionable Recommendations in "loading order."
2) Technical Information and Analysis
    a) Energy Consumption Analysis
        i) Two years of billing data (weatherized and compared to some pertinent operating metric)
    b) Description of the project
    c) Proposed Energy Conservation Measures (ECM)
        i) Descriptive Name
        ii) Schematic System Drawing
        iii) Current Peak Demand (kW), Energy Usage (kWh), Effective Full Load Run Hours
        iv) Proposed Peak Demand (kW), Energy Usage (kWh), Effective Full Load Run Hours
        v) % Change for above
        vi) Estimated Installation Cost
        vii) Project timeline
        viii) Measure Life
        ix) Simple Payback
    d) Base case information
        i) Short term/spot baseline thermal, fluid, and electrical measurements for major equipment to be changed with ECMs
        ii) Permanent metering data (This metering will qualify for additional cost assistance)
        iii) Sizing/Performance Reviews (Pump Curves, Cooling Bin Data etc.)
    e) Enhanced case information
        i) How will performance be measured in the future.
        ii) Description of where energy savings occurs (lower run time, more efficient operations etc.)
    f) Estimated energy and demand savings associated with your proposed project
        i) Applicable figures and tables
        ii) Simple payback period and/or life cycle costs
    g) Estimated costs including design, materials, and installation
3) Appendix
    a) Raw and Analyzed Data (Cooling Models, Field Data, Pictures, Metering Data etc.)
    b) Building Plans (Mechanical, Electrical Schedules, Layouts etc.)

Incentives

- Incentives are limited to 50% of the cost of the study up to $15,000

14.2.6 Design Assistance

Measure ID:
Measure Code:

Version Date & Revision History
Draft date: September 20, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- 12/22/11 – Program requirement changed to require project be in planning or initial design phase.

Description: Design Assistance is available to building owners and their design teams to encourage the implementation of energy efficient building systems. Considering energy efficiency during the initial phases of planning and design greatly increase the feasibility of implementation. Incentives for energy efficiency are project-specific and offered as upfront assistance for additional costs incurred during the design phase. The long-term benefits include energy use reduction for the state of Hawaii and a reduction in operating costs, equipment lifecycle improvement for building owners, and improved comfort for building users.

Program Requirements:
- Application with written pre-approval from Hawaii Energy
- Project in planning or initial design phase
- Total resource benefit ratio greater than or equal to 1

Energy and Demand Savings:
A base case and enhanced case model must be produced with a clear comparison. All assumptions, data, and formulas used in energy efficiency calculations must be clearly documented. Standard engineering principles must be applied, and all references cited. Energy saving calculations shall also reflect the interactive effects of other simultaneous technologies to prevent the overstatement of actual savings. Proposed base and enhanced cases must be performed by a qualified person or firm. In some cases, a professional engineer may be required to provide verification of the analysis.

Savings Algorithms
Gross energy and demand savings estimates for design assistance are calculated using engineering analysis and project-specific details. Custom analyses typically include a weather dependent load bin analysis, whole building energy model simulation, or other engineering analysis and include estimates of savings, costs, and an evaluation of the project's cost-effectiveness.

Baseline Efficiency
The baseline efficiency case assumes compliance with the efficiency requirements as mandated by the Hawaii State Energy Code or industry accepted standard practice.

High Efficiency

The high efficiency scenario is specific to each project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on comparing a base case analysis and enhanced cased analysis on equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The energy efficiency measures must be proven cost-effective, pass total resource benefit, and have a payback greater than or equal to 1.

Persistence Factor

PF = 1 since all custom projects require verification of equipment installation.

Incentives

- Incentive applications are processed on a first-come, first-serve basis
- Incentives are limited to a maximum of $15,000

14.2.7 Energy Project Catalyst

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
The objective of the catalyst program is to accelerate stalled high impact energy efficiency projects from an idea to reality as follows:
• Full Cost Incentives - Provide up to 30% cost incentive to proposals that fulfill program needs
• Commitment to Implement - Recipients must commit to implementing all projects with less than a 1 year payback including incentives.
• Desired Project Profiles
  o High potential for energy savings (>30% reduction in consumption).
  o Commitment and high probability of owner taking action on Site Audit / Commissioning / Energy Study report
  o Typical site that can be repeated, such as chain convenience stores
  o Sites with Energy Usage Density over 2.5 kWh/Sq. ft./month
  o Site with Peak Demand Density over 6.0 kW/ Sq. ft.
  o Control System Recommissioning - Sequence of operation documentation, review, testing.
  o Demonstrate usefulness of the addition of critical system efficiency metering such as total central plant kW/ton.

Baseline Efficiencies:
TBD

High Efficiency:
TBD

Energy Savings:
Energy savings will be based on a customized approach.

<u>Savings Algorithms</u>

Incentive = $0.40/kWh

15 (BHTR) Business Hard to Reach

15.1 Energy Efficiency Equipment Grants

15.1.1 SBDI - Demand Control Kitchen Ventilation (DCKV)

Version Date & Revision History
Draft date:
Effective date: July 1, 2013
End date: June 30, 2014

Referenced Documents:

- Detailed Energy Savings Report, Melink Corporation, http://www.melinkcorp.com/Intellihood/Energy_Analysis.pdf

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
Kitchen ventilation with DCKV hood exhaust. Demand ventilation uses temperature and/or smoke sensing to adjust ventilation rates. This saves energy comparing with the traditional 100% on/off kitchen ventilation system.

Baseline Efficiencies:
Kitchen ventilation without DCKV. Usage per HP:

Basecase = (HP x .746 KW/HP x Hours per Year)/efficiency

Basecase fan motor usage per HP (kWh/year)	4827
Basecase fan motor demand (kW)	0.83

High Efficiency:

Usage per HP:

Enhanced case fan motor usage per HP (kWh/year)	2194
Enhanced case fan motor demand (kW)	0.38

Energy Savings:
The demand control kitchen ventilation savings were determined using the method described in the Melink Detailed Energy Savings Report.

Energy Savings from fan motor per HP (kWh/year)	2633
Demand Savings from fan motor per HP (kW)	0.45

Savings Algorithms

% Rated RPM	% Run Time	Time HRS/YR	Output KW/HP	System Efficiency	Input KW/HP	KWH/HP/YR
H	I	J=GXI	K	L	M=K/L	N=JXM
100	5%	291.2	0.746	0.9	0.829	241
90	20%	1164.8	0.544	0.9	0.604	704
80	25%	1456	0.382	0.9	0.424	618
70	25%	1456	0.256	0.9	0.284	414
60	15%	873.6	0.161	0.9	0.179	156
50	10%	582.4	0.093	0.9	0.103	60
40	0%	0	0.048	0.9	0.053	0
30	0%	0	0.02	0.9	0.022	0
20	0%	0	0.015	0.9	0.017	0
10	0%	0	0.01	0.9	0.011	0
Total kWh/HP/YR						2194

Basecase = (HP x .746 KW/HP x Hours per Year)/efficiency

Basecase fan motor usage per HP (kWh/year)	4827
Basecase fan motor demand (kW)	0.83

Enhanced case fan motor usage per HP (kWh/year)	2194
Enhanced case fan motor demand (kW)	0.38

Energy Savings from fan motor per HP (kWh/year)	2633
Demand Savings from fan motor per HP (kW)	0.45

Operating Schedule	
16	HR/DAY
7	DAY/WK
52	WK/YR
5824	

Demand Coincidence Factor
TBD

Persistence
TBD

Lifetime
15 Years (Hawaii Energy assumption)

Measure Costs and Incentive Levels
Measure Cost: $1,200 - $1,700 per HP based on business vertical and site complications (provided my Melink)

15.1.2 Small Business Direct Installation – Restaurant Lighting

Version Date & Revision History
Draft date: March 2, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- n/a

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description: This program provides small business owners with an economical, quick and easy switch to more energy efficient lighting. The program is designed to address the needs of small business owners and help them overcome the barriers of time, trust and technical knowledge to make lighting technology changes.

- Provide complete process to provide direct installation of lighting retrofits for small business customers.
- Participating Hawaii Energy Participating contractors will offer six month payment plans for the lighting retrofits
- Use of workforce development groups and grass roots volunteer organizations to generate leads and perform initial audits to lower cost of sales for Lighting contractors
- Quick Inventory worksheet to ID potential targeting for future mechanical measures (AC/Water heating/Appliances/Refrigeration)

Small Business Lighting Retrofit providing a “Turnkey” program consisting of audits, 100% incentivized lighting measures, installation by participating Hawaii Energy Participating contractors and 6 month financing of lighting retrofit costs of custom measures beyond the cost per kWh incentive.

A “Turnkey” program consisting of audits, 100% incentivized lighting measures, installation by participating Hawaii Energy Participating contractors.

The following lighting technology changes will be 100% incentivized under this measure:

	Measure Description
28W Retrofits	Two 8 ft. T12HO 110W to Four 4 ft. T8 28W Normal BF / Reflector
	One 8 ft. T12HO 110W to Two 4 ft. T8 28W High BF
	Two 8 ft. T12HO 110W to Two 4 ft. T8 28W High BF / Reflector
	Two 8 ft. T12 75W to Two 4 ft. T8 28W Normal BF
	One 8 ft. T12 75W to Two 4 ft. T8 28W Normal BF
	Four 4 ft. T12 40W to Four 4 ft. T8 28W Normal BF
	Four 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF / Reflector
	Three 4 ft. T12 40W to Three 4 ft. T8 28W Normal BF
	Three 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF / Reflector
	Two 4 ft. T12 40W to Two 4 ft. T8 28W Normal BF
	One 4 ft. T12 40W to One 4 ft. T8 28W Normal BF
	Four 4 ft. T12 34W to Four 4 ft. T8 28W Normal BF
	Four 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF / Reflector
	Three 4 ft. T12 34W to Three 4 ft. T8 28W Normal BF
	Three 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF / Reflector
	Two 4 ft. T12 34W to Two 4 ft. T8 28W Normal BF
	One 4 ft. T12 34W to One 4 ft. T8 28W Normal BF
	Four 4 ft. T8 32W to Four 4 ft. T8 28W Normal BF
	Four 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF / Reflector
	Three 4 ft. T8 32W to Three 4 ft. T8 28W Normal BF
	Three 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF / Reflector
	Two 4 ft. T8 32W to Two 4 ft. T8 28W Normal BF
	One 4 ft. T8 32W to One 4 ft. T8 28W Normal BF
	Two 4ft. FB40 T8 to Three 2 ft. F17
LED Retrofit	PAR20 Halogen 50W to LED
	PAR30 Halogen 75W to LED
	PAR38 Halogen 75W to LED
	PAR38 Halogen 90W to LED
	MR16 Halogen 20W to LED
	MR16 Halogen 50W to LED
	Par20 CFL to LED
	Par30 CFL to LED
	Par38 CFL to LED
CFL	A19 Incandescent 100W to CFL 26W
	A19 Incandescent 60W to CFL 13W
	A19 Incandescent 75W to CFL 19W
Exit	Incandescent Exit Sign Retrofit with LED Kit
	Incandescent Exit Sign to New LED Fixture

	Measure Description
25W Retrofits	Two 8 ft. T12HO 110W to Four 4 ft. T8 25W Normal BF / Reflector
	One 8 ft. T12HO 110W to Two 4 ft. T8 25W High BF
	Two 8 ft. T12HO 110W to Two 4 ft. T8 25W High BF / Reflector
	Two 8 ft. T12 75W to Two 4 ft. T8 25W Normal BF
	One 8 ft. T12 75W to Two 4 ft. T8 25W Normal BF
	Four 4 ft. T12 40W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T12 40W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T12 40W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T12 40W to One 4 ft. T8 25W Normal BF
	Four 4 ft. T12 34W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T12 34W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T12 34W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T12 34W to One 4 ft. T8 25W Normal BF
	Four 4 ft. T8 32W to Four 4 ft. T8 25W Normal BF
	Four 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF / Reflector
	Three 4 ft. T8 32W to Three 4 ft. T8 25W Normal BF
	Three 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF / Reflector
	Two 4 ft. T8 32W to Two 4 ft. T8 25W Normal BF
	One 4 ft. T8 32W to One 4 ft. T8 25W Normal BF
Refrigerated Case Lighting	6 ft. T12HO Refrigerated Case to LED - Center
	6 ft. T12HO Refrigerated Case to LED - Single/Ends
	6 ft. T12 Refrigerated Case to LED - Center
	6 ft. T12 Refrigerated Case to LED - Single/Ends
	6 ft. T8HO Refrigerated Case to LED - Center
	6 ft. T8HO Refrigerated Case to LED - Single/Ends
	5 ft. T12HO Refrigerated Case to LED - Center
	5 ft. T12HO Refrigerated Case to LED - Single/Ends
	5 ft. T12 Refrigerated Case to LED - Center
	5 ft. T12 Refrigerated Case to LED - Single/Ends
	5 ft. T8HO Refrigerated Case to LED - Center
	5 ft. T8HO Refrigerated Case to LED - Single/Ends
	LED Refrigerated Case Light Drivers

Example Savings Algorithms

Small Business Direct Install Lighting Retrofit Pilot Program
Summary Sheet

Business Name:	
Contact Name:	
Address:	
Phone:	
Fax:	
Email:	

Contractor Name:	
Auditor Name:	
Address:	
Phone:	
Fax:	
Email:	

Total Watts Saved	Energy Savings	Energy Cost Savings	Hawaii Energy Participating Contractor NTE Pricing	Hawaii Energy Cash Incentive	Net Customer Cost	Simple Payback	4 Month Monthly Payment	Monthly Savings % of Payment
1,323 W	3,324 kWh/yr.	$ 776 / yr.	$ 2,300	$ 833	1,467	23	367	18%

Step 1	
f2	
Oahu	Island of Project Location
$ 0.234 /kWh	2010 "G" Marginal Cost of Electricity

Measure Code	Existing Technology	New Technology	Step 2 Total Units (each) a	Step 3 M-F Hours per Day b1a	Sat. Hours per Day b1b	Sun. Hours per Day b2a	Annual Hours of Operation (hrs/year) b3 = b1*b2*(365/7)	Step 4 Wkdays Hours on between 5 and 9 p.m. (hrs) c	On-Peak Fraction (%) c2 =c / 4	Total Watts Saved (Watts) d = a x o	Energy Savings (kWh/Year) e = b x (d/1000)	Energy Cost Savings ($/year) f = e x f2	Hawaii Energy Participating Contractor NTE Pricing ($) g = a x p	Hawaii Energy Cash Incentive ($) h = a x q	Net Customer Cost ($) i = a x (p-q)	Simple Payback (Months) j = (i/f) x 12	6 Month Monthly Payment ($/month) k = i /6	Monthly Savings % of Payment (%) l = (f/12)/k
8L1-4L2	8 ft. 1 Lamp F96	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 75	$ 62	$ 13	6	$ 2.24	100%
8L2-4L2	8 ft. 2 Lamp F96	4 ft. 2 lamp F25/28 H	1	8	8	0	2,503	-	0%	57	143	$ 33	$ 84	$ 53	$ 31	11	$ 5.17	54%
8L2HO-4L2R	8 ft. 2 Lamp F96 HO	4 ft. 2 lamp F25/28 N, Reflct.	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 85	$ 27	$ 58	26	$ 9.67	23%
8L2HO-4L4	8 ft. 2 Lamp F96 HO	4 ft. 4 lamp F25/28 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 138	$ 53	$ 85	19	$ 14.17	32%
4L4-4L4	4 ft. 4 Lamp F40	4 ft. 4 lamp F25/28 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 83	$ 51	$ 32	7	$ 5.33	84%
4L4-4L2R	4 ft. 4 lamp F40	4 ft. 2 lamp F25/28 N, Reflct.	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 65	$ 27	$ 38	17	$ 6.33	35%
4L3-4L3	4 ft. 3 lamp F40	4 ft. 3 lamp F25/28 N, Reflct.	1	8	8	0	2,503	-	0%	69	173	$ 40	$ 74	$ 38	$ 36	11	$ 6.00	56%
4L3-4L2R	4 ft. 3 lamp F40	4 ft. 2 lamp F25/28 N, Reflct.	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 65	$ 27	$ 38	17	$ 6.33	35%
4L2-4L2	4 ft. 2 lamp F40	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 35	$ 27	$ 8	4	$ 1.33	168%
4L1-4L1	4 ft. 1 lamp F40	4 ft. 1 lamp F25/28 N	1	8	8	0	2,503	-	0%	23	58	$ 13	$ 30	$ 14	$ 16	14	$ 2.67	42%
4L4-4L4	4 ft. 4 lamp F32	4 ft. 4 lamp F25/28 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 83	$ 34	$ 49	11	$ 8.17	55%
4L4-4L2	4 ft. 4 lamp F32	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 65	$ 53	$ 12	5	$ 2.00	112%
4L3-4L3	4 ft. 3 lamp F32	4 ft. 3 lamp F25/28 N	1	8	8	0	2,503	-	0%	69	173	$ 40	$ 74	$ 26	$ 48	14	$ 8.00	42%
4L3-4L2	4 ft. 3 lamp F32	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 65	$ 25	$ 40	18	$ 6.67	34%
4L2-4L2	4 ft. 2 lamp F32	4 ft. 2 lamp F25/28 N	1	8	8	0	2,503	-	0%	46	115	$ 27	$ 35	$ 27	$ 8	4	$ 1.33	168%
4L1-4L1	4 ft. 1 lamp F32	4 ft. 1 lamp F25/28 N	1	8	8	0	2,503	-	0%	23	58	$ 13	$ 35	$ 9	$ 26	23	$ 4.33	26%
1L400-4L6	HID Pendant 1 lamp 400W	4 foot 6 lamp F25/T8 N	1	8	8	0	2,503	-	0%	138	345	$ 81	$ 360	$ 76	$ 284	42	$ 47.33	14%
1L250-4L4	HID Pendant 1 lamp 250W	4 foot 4 lamp F25/T8 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 330	$ 51	$ 279	62	$ 46.50	10%
1L175-4L4	HID Pendant 1 lamp 175W	4 foot 4 lamp F25/T8 N	1	8	8	0	2,503	-	0%	92	230	$ 54	$ 330	$ 51	$ 279	62	$ 46.50	10%
UBL2-2L2	4 ft. U-Bend 2 lamp FB40	2 ft. 2 lamp F17 N	1	8	8	0	2,503	-	0%	32	80	$ 19	$ 40	$ 22	$ 18	12	$ 3.00	52%
UBL2-2L2R	4 ft. U-Bend 2 lamp FB40	2 ft. 2 lamp F17 L, Reflector	1	8	8	0	2,503	-	0%	27	68	$ 16	$ 50	$ 30	$ 20	15	$ 3.33	39%
100-23	100 Watt Incandescent	23 Watt CFL	1	8	8	0	2,503	-	0%	23	58	$ 13	$ 10	$ 4	$ 6	5	$ 1.00	112%
75-19	75 Watt Incandescent	19 Watt CFL	1	8	8	0	2,503	-	0%	19	48	$ 11	$ 8	$ 4	$ 4	4	$ 0.67	139%
60-13	60 Watt Incandescent	13 Watt CFL	1	8	8	0	2,503	-	0%	13	33	$ 8	$ 6	$ 4	$ 2	3	$ 0.33	190%
Exit	40W Incandecent	2 Watt LED	1	24	24	24	8,760	-	0%	2	18	$ 4	$ 75	$ 38	$ 37	109	$ 6.17	6%
OverHeight	Cost Adder for Fixtures above or out of the reach of a 10' Ladd		0										$ -		$ -			
										1,323 W	3,324 kWh/yr.	$ 776 / yr.	$ 2,300	$ 833	$ 1,467	23	$ 366.86	18%

WORKBOOK INPUTS

Measure Code	Existing per Unit Watts (Watt/unit) m	Unit New Watts (Watt/unit) n	Unit Watts Saved (Watt/unit) o = m-n	Hawaii Energy Participating Contractor Pricing ($/unit) p	Hawaii Energy Cash Incentive ($) q	Public Benefit Fee Investment ($/kWh) r
8L1-4L2	85	46	39	$ 75	$ 62	$ 0.53
8L2-4L2	142	57	85	$ 84	$ 53	$ 0.37
8L2HO-4L2R	170	46	124	$ 85	$ 27	$ 0.23
8L2HO-4L4	170	92	78	$ 138	$ 53	$ 0.23
4L4-4L4	168	92	76	$ 83	$ 51	$ 0.22
4L4-4L2R	168	46	122	$ 65	$ 27	$ 0.23
4L3-4L3	126	69	57	$ 74	$ 38	$ 0.22
4L3-4L2R	126	46	80	$ 65	$ 27	$ 0.23
4L2-4L2	84	46	38	$ 35	$ 27	$ 0.23
4L1-4L1	42	23	19	$ 30	$ 14	$ 0.24
4L4-4L4	112	92	20	$ 83	$ 34	$ 0.15
4L4-4L2	112	46	66	$ 65	$ 53	$ 0.46
4L3-4L3	84	69	15	$ 74	$ 26	$ 0.15
4L3-4L2	84	46	38	$ 65	$ 25	$ 0.22
4L2-4L2	56	46	10	$ 35	$ 27	$ 0.23
4L1-4L1	28	23	5	$ 35	$ 9	$ 0.16
1L400-4L6	475	138	337	$ 360	$ 76	$ 0.22
1L250-4L4	300	92	208	$ 330	$ 51	$ 0.22
1L175-4L4	225	92	133	$ 330	$ 51	$ 0.22
UBL2-2L2	84	32	52	$ 40	$ 22	$ 0.27
UBL2-2L2R	84	27	57	$ 50	$ 30	$ 0.44
100-23	100	23	77	$ 10	$ 4	$ 0.07
75-19	75	19	56	$ 8	$ 4	$ 0.08
60-13	60	13	47	$ 6	$ 4	$ 0.12
Exit	40	2	38	$ 75	$ 38	$ 2.17
OverHeight				$ 8		
						0

15.2 Landlord, Tenant, AOAO Measures

15.2.1 Energy Hero Landlord

Version Date & Revision History
Draft date:
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:

- n/a

TRM Review Actions:

- 10/5/11 – Currently Under Review.

Major Changes:

- n/a

Measure Description:
The landlord/tenant relationship provides challenges to making energy efficiency capital investments in properties and operations such as air conditioning and lighting upgrades.

The tenant energy usage can be accounted for by:

- 1. Paying a flat rate per square foot based on a lease agreement
- 2. Costs Incorporated in CAM
- 3. Third-Party submetered
- 4. Separate Utility submeter

This program will be targeted to provide landlords of small business schedule “G” customers with comprehensive audit, RFP and other support for energy saving projects that will drive down the energy cost of their tenants.

The program will work with local lenders to provide project financing support in conjunction with the program.

Baseline Efficiencies:
TBD

High Efficiency:
TBD

Energy Savings:
Energy savings project may:

- • not have a direct financial incentive for either party
- • have simple payback beyond lease term

<u>Savings Algorithms</u>

Incentive = $0.30/kWh
Target goal = 50,000 kWh

16 Addendum

16.1 Residential

16.2 Commercial

16.2.1 LED Product Customized Process

Measure ID: See Table 7.3 (TBD)
Measure Code: LED - Custom

Version Date & Revision History
Draft date: February 24, 2011
Effective date: July 1, 2012
End date: June 30, 2013

Referenced Documents:
- Illuminating Engineers Society (IES) LM79 /LM80
- ENERGY STAR LED Website http://www.energystar.gov/index.cfm?c=ssl.pr_why_es_com

TRM Review Actions:
- 10/5/11 – Currently Under Review.

Major Changes:
- n/a

Description: Light Emitting Diodes (LED) are a lighting technology that utilizes solid-state technology to produce light, opposed to fluorescent or incandescent lighting sources. In general, LED technology will provide energy levels 15% of a comparable incandescent lamp (15W to a 100W equivalent).
LED lighting projects (Fixtures and Lamps) are handled under a customized incentive basis.

Equipment Qualifications: The program has developed minimum qualifications as a measure to protect the
consumers who are purchasing LED products and insure energy savings potential and persistence.

- *Power and Photometric Measurements:* IES LM79 testing performed and results submitted and understood by the customer. Provides color temperature and power input vs. light output data.
- *Lumen Maintenance:* IES LM80 testing performed and results submitted and understood by the customer. Provides % lumen maintenance over operating hours. (If not available at time of project than product requires a 5 year warranty)
- *Safety:* UL listed products. UL number provided with application.
- *Warranty Protection:* Minimum 3 year warranty with clear description of how warranty is executed.

or

- Energy Star Listing
  (http://www.energystar.gov/index.cfm?fuseaction=iledl.display_products_html)
  and for all projects
- *Program Persistence Requirement:* Acknowledge that the lamps must be in place for a period of 5
  years. If replaced with higher usage technologies the rebate will be required to be refunded.

- *Purchaser Due Diligence:* Customers are informed to utilize third-party education such as the US DOE
  Calipers reports (http://www1.eere.energy.gov/buildings/ssl/caliper.html)

Payback Qualifications: For LED products the payback requirements are allowed to be six months or greater.
This is 6 months lower than the standard customized payback requirement of 1 year or greater. The TRB/TRC must be greater than 1.

Energy and Demand Savings: A simple worksheet is utilized to compare pre and post lighting configurations. The existing lamp counts, wattage (with ballasts as appropriate) and operating hours are used to determine the existing "base case" energy usage. The "enhanced case" is then determined using the same information for the proposed LED technology.

A review is performed to insure LED wattages are in the expected range for the equivalent light output of the existing technology.

Project: Customer Name
Application Number: 2CBEEM111111
Date: 12/16/2010
Techology Type: F32 T8 to LED
Input by: Kimo Kilowatt

Existing / Base

Location	Fixture Type	Fixture Qty	Lamps Per Fixture	Lamp Wattage	Total Wattage	M - F Hours of Operation	Sat. Hours of Operation	Sun. Hours of Operation	Annual Hours of Operation	Peak Demand Hours	Peak Demand kW	Total Demand Max kW	Annual Energy kWh/Year
Campus Upper Building	T8 F32	1	190	29	5,510	12	4	-	3,337	2.0	2.8	5.5	18,388
					-				-		-	-	-
					-				-		-	-	-
					-				-		-	-	-
								Total	834	2.0	2.8	5.5	18,388

Notes:

Retrofit / Enhanced

Location	Fixture Type	Fixture Qty	Lamps Per Fixture	Lamp Wattage	Total Wattage	M - F Hours of Operation	Sat. Hours of Operation	Sun. Hours of Operation	Annual Hours of Operation	Peak Demand Hours	Peak Demand kW	Total Demand Max kW	Annual Energy kWh/Year
Campus Upper Building	LED	1	190	14	2,660	12	4	0	3,337	2	1	2.7	8,877
									-				
								Total	1,669	2.0	1.3	2.7	8,877
										Reduction Percentage		-52%	-52%

Notes:

Project Summary

Average Energy Savings Per Year	9510.86 kWh/Year
Demand Savings	1.43 kW

Cost Breakdown

Material Cost	$7,990

Attachment G

PY2012 Media Coverage Report

Honolulu Star-Advertiser

Thursday, July 12, 2012 80.0°F

OUR VIEW

Help compare energy usage

POSTED: 01:30 a.m. HST, Jul 12, 2012 retweet

Share

Most of the attention given to the Hawaii Clean Energy Initiative — defined on its website as the drive to "achieve 70 percent clean energy by 2030" — has focused on ways to migrate toward renewable sources. A full 30 percent of that "clean" achievement, however, comes from sheer reduction in usage of fossil-fuel-produced energy, however that's managed.

Besides the institutional changes aimed at energy efficiency, such as adopting green standards in construction so that government and businesses waste less, the big challenge lies in converting the consumers themselves. That part of the enterprise can seem a bit like herding cats, since most of us like to do our own thing, especially within the privacy of our homes.

It's good to see that Hawaii Energy, a contractor for the state Public Utilities Commission, is pulling out all the stops. Among its various approaches is one that's based on a human trait as old as the hills: competition.

Home Energy Reports is a "peer comparison" program conducted by Opower (haw.opower.com), a Virginia-based company. It was launched about a year ago for Oahu customers and enables rate-payers to see how they rank on a 1-to-100 scale based on energy use. A high score here signifies something of an energy hog, folks who could maybe learn a thing or two from their more-efficient neighbors.

It makes sense, as a strategy, judging by the number of people enthralled with competition in everything from social media to video gaming, in which there's no reward other than satisfaction.

In this case, of course, there can be a financial lure in achieving savings on a utility bill that can be more enjoyably spent elsewhere. And Oahu ratepayers are shelling out quite a bit. Both Hawaiian Electric Co. and Maui Electric Co. reported modest declines since June, but that didn't change Hawaii's dubious distinction as having the highest rates in the nation. The statewide average residential rate in April was 37.5 cents per kilowatt-hour, compared to the national average of 12 cents per kilowatt-hour.

The program is being expanded to neighbor islands, and the results on Oahu have been encouraging. Already energy use is down 1.5 percent, a cut in $500,000 from energy bills paid by 15,000 HECO's residential customers.

It's doubtful that peer comparison could supplant Hawaii Energy's cash rebate program, which has shown impressive success. The most recent data available show that the rebates, which lower the cost of purchasing more energy-efficient equipment, in 2010 cut electricity usage by 142 million kilowatt-hours.

This program remains worthwhile, as Hawaii continues to strive for more energy self-reliance. Recent fluctuations in oil prices show the repercussions of an almost complete dependence on fossil fuels, both in terms of energy security and the boost that comes from keeping more of the state's energy dollars circulating in the Hawaii economy.

But it's clearly going to take a constellation of approaches to reach the ambitious clean-energy goal, and Home Energy Reports should have a spot among them. It's undeniable: Peer pressure works.

Latest News/Updates

Rolling Stones celebrate 50 years on stage - 08:58 a.m.

Rain causes flooding, mudslides in Japan; 15 dead - 08:46 a.m.

Hawaii and Maui counties part of large drought disaster declaration - 08:41 a.m.

Hawaii consumers could get partial refunds for TV and computer purchases - 08:21 a.m.

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Columns

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Around Town - Pineapple Festival

Saturday, June 30, 2012

All photos by Alberta de Jetley

How many goodies can you make with pineapple? Four Seasons Resorts team Having fun at their booth are: Pamela Haban, Philip Clough, Jeremy Choo, and Junior Ulep. Behind them are: Stella Lopresto, Tangley De Madeina, Mark Whitley, Rabi Saber, Annette Whitley and Mali Etrata.

The Class of 2013 was getting a head start on their fundraising for next year! Having fun selling candied popcorn were, clockwise: Janelle Costales, Michael Domquiel, Melissa Agcaoili, Dallas Del Rosario, Debbie Badillo,holding her niece Mia, Drewan Banfield, Kristen Cox, Edward Giles, and China Woolsey Lopez.

Happy! That was the mood at the Pineapple Festival! At the Lanai King's Chapel tent, Mindy Bolo, and Micah and Jay Callao were working with Baba Sandi, Julio Russi and Garrett Hera selling shaved ice and Polish hot dogs.

Dorey and her dad, Scott Stein were enjoying their first Pineapple Festival at their table where they were selling fudge, cucumber pickles and limeade.

Originally made in Nahiku, Maui, by his mom, Lin, Carl Polk is now using her recipe to make the most delicious coconut candy ever. He hope to be selling it in Lanai stores soon!

John Harrison and Willow Krause display a Focus Maui Nui article about one of Lanai's most cherished residents, Phyllis McOmber. The article appeared in the Maui News several weeks ago. At their booth, Willow had information about the Women in Technology Project. For information, check out info@womenintech.com or call her at 875-2300. John can be reached at the Maui Economic Development Board, ph. 875-2300.

Carin Ihe and Helen Wai from Hawaii Energy showed residents how to save energy with CFLs and passed out free energy efficient outlets for small electronic equipment like cell phones.

Keeping us all healthy is high on the Lanai Community Health Center's goals. Cindy Santiago, Chelsea Tadena and Serenity Chambers passed out brochures on the center's services.

Let them eat cake, especially if it's cake from 808 cakery.com. Zena Ann Ige Kageno, her sister, Nida Ige, and husband Albert Kageno, had a huge variety of all kinds of cakes including cake lollipops! You don't have to wait for festivals to try Zena's baked delights. The next time you're having a special occasion, visit her online!

"*Around Town*" is proudly sponsored by Castle & Cooke Resorts, LLC

Wednesday, July 25th, 2012 | Posted by Hawaii Reporter | Print This Article

Hawaii Residents Consume the 3rd-Lowest Amount of Energy

Hawaii residents consume the 3rd-lowest amount of energy per person nationwide, according to a newly launched nonprofit website EnergyTrends.org

According to the Institute, "The website tracks vital indicators for energy and electricity use, as well as which fuels (like coal, natural gas or renewables) are used to generate electricity, and ranks states in each category. It also analyzes data from recent years, providing easy-to-read indicators to show overall trends."

EnergyTrends, a project of the Arlington-based Lexington Institute, notes in its recent report:

- "Hawaii's Honolulu Museum of Art received an energy rebate after completing an energy efficiency retrofit project. The $346,026 incentive is the largest rebate from Hawaii Energy given to a charitable organization to date.
- "Due to Hawaii's isolation from the continental U.S., close to 90 percent of Hawaii's energy comes from petroleum.
- "Hawaii is one of the lowest users of energy per capita in the America.
- "Hawaii is one of three states in America to produce synthetic natural gas and has the third largest geothermal generation capacity in the U.S.
- "Hawaii recently changed its renewable portfolio standards to require that 40 percent of its electricity will be generated from renewable sources by 2030."

Earlier this year, EnergyTrends assigned Hawaii a letter grade of D+ for what the institute said is "based on renewable energy patterns." (For Renewable Energy Scoring Methodology click here)

The grade is based on 2010 energy data recently released by the U.S. Department of Energy, the Institute said.

"It is our hope that the information on EnergyTrends.org will be useful for everyone from schools to elected officials to keep track of their state's critical energy consumption and generation patterns," said Don Soifer, Executive Vice President of the Lexington Institute.

Author: Hawaii Reporter

Hawaii Reporter is an award-winning, independent Hawaii-based news and opinion journal founded in 2001 and launched in February 2002. The journal's staff have won a number of top awards from the Society of Professional Journalists, including the top investigative news reporting awards, business reporting awards, government reporting awards, and online news reporting awards. Hawaii Reporter has a weekly television news show, News Behind the News, which airs on Mondays at 1:30 p.m. and Wednesdays at 6:30 p.m.
Hawaii Reporter has written 7687 articles for us.

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Westin Ka`anapali Receives $200K Energy Efficiency Incentive

July 26th, 2012 · No Comments · Business

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Maui Mayor Alan Arakawa, State Senator J. Kalani English, and several county council members joined Hawaii Energy to present The Westin Ka'anapali Ocean Resort Villas with a check for $215,657. Photo courtesy of Brian Fitzgerald.

By Sonia Isotov

Maui Mayor Alan Arakawa joined public and private sector leaders today as Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, presented The Westin Ka'anapali Ocean Resort Villas with a check for $215,657.

"Our dependence on foreign oil is one of our greatest liabilities, and it is going to take all of us working together to mitigate this. I applaud the team at The Westin Ka'anapali Ocean Resort Villas for leading by example, and doing their part to help us become more energy independent," said Arakawa, in a written statement.

This incentive is the largest received to date by a Maui business from Hawaii Energy, a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission.

Hawaii Energy offers cash rebates and other incentives to residents and businesses to help offset the cost of installing energy-efficient equipment.

Today's ceremony was held in recognition of extensive energy efficiency measures that The Westin Ka'anapali Ocean Resort Villas recently completed. The four diamond resort's energy efficiency retrofit included the replacement of over 9,500 incandescent lamps with energy-efficient, ENERGY STAR qualified LEDs, which reduces electricity use related to lighting by over 80%.

Walter Enemoto his Hawaii Energy t-shirt. Photo courtesy of Brian Fitzgerald.

The property also added a control system that monitors the carbon monoxide levels in the garage, operating the ventilation exhaust fans only when needed. This reduces fan operating times and energy consumption related to garage ventilation by over 99%.

The $385,353 project will save The Westin Ka'anapali Ocean Resort Villas an estimated 1,914,958 kilowatt hours (kWh) of energy annually, a third of the electricity the property purchases from the utility each year. This is equal to $608,956

Event Calendar

FRIDAY7/27/2012

Happy Hour Monkeypod
Open from 11:30AM-11PM daily with 2 happy hours; 3PM-5:30PM & 9PM-11PM daily. Food specials included too

Happy Hour Betty's Beach Cafe
2 happy hours; 2-5PM & 9-11PM includes $4 Maui Bre Co & kona Brew beers, $2 margaritas & $3 MaiTais.

Kama'aina Nights
Sista Val from KPOA presents entertainer Mikey Mina. Dine, socialize, and win prizes at the Center Court.

Ocean's Friday Night
Starts at 10 p.m. No cover charge, $2 drink specials and performance from The Sexy Nile Dollz.

Tiki Fridays
Fridays 10 p.m. hip hop, top 40s, electro, dirty dutch.

View All Events

Public and private sector leaders gathered to see the largest energy incentive in Maui be given to the Westin. Photo by Brian Fitzgerald.

in savings, based on $0.318 per kWh.

Estimated payback for the project is less than six months, after the incentive.

"We are excited that The Westin Ka'anapali Ocean Resort Villas took advantage of one of our many existing offers to help bring such a large project to fruition," said Ray Starling, Hawaii Energy Program Manager.

For more information, visit www.HawaiiEnergy.com.

Related Stories:

- Maui Westin Hotels First With OSHA Certification
- Westin Ocean Resort Villas Names New General Manager
- Hawaii Energy Offers $35 Cash For Inefficient Appliances
- Limited $250 Rebate for ENERGY STAR Purchase on Maui
- Curb Your Business' Energy Diet at Efficiency Workshop

Tags: alternative energy · business incentives · energy conservation · energy efficiency · Hawaii Energy · renewable energy · Westin Kaanapali Ocean Beach Villas

Honolulu Star★Advertiser

Monday, August 06, 2012 84.0°F

Westin Kaanapali cuts electric bill with energy improvements

By Star-Advertiser Staff

POSTED: 01:00 p.m. HST, Jul 26, 2012
LAST UPDATED: 01:00 p.m. HST, Jul 26, 2012

The Westin Kaanapali Ocean Resort Villas is expected to cut its electricity bill by about one-third as a result of energy efficiency improvements made at the Maui hotel.

The project included the replacement of more than 9,500 incandescent light bulbs with light emitting diodes, which cut energy used for lighting by 80 percent. The hotel also added a control system that monitors carbon monoxide levels in the garage and operates exhaust fans only when needed.

Officials from the state's main energy conservation and efficiency program, Hawaii Energy, today presented the hotel management with a rebate check for $215,657 that covered more than half the cost of the $385,353 project. The incentive is the largest to date presented by Hawaii Energy to a Maui business.

The Westin is projected to save 1.9 million kilowatt hours of electricity a year, cutting its electricity bill by about one-third. With the price of electricity on Maui running about 32

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BREAKING NEWS
• Olympics: Monday's U.S. men's basketball result - 03:19 p.m.
• Cayetano admitted to hospital with bleeding ulcer - 02:31 p.m.
• Saint Louis' Mariota battling for starting QB spot at Oregon - 12:55 p.m.
• Olympics: Monday's wrestling result for Hawaii

cents a kilowatt hour the project is expected to pay for itself in less than six month after the rebate is factored in.

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native Keitani Graham - 12:13 p.m.

- Olympics: Monday's men's volleyball results - 11:35 a.m.
- Olympics: Monday's U.S.-Canada soccer semifinal - 11:27 a.m.
- Man accused in fatal accident will also go on trial for criminal property damage - 09:58 a.m.
- Trial date set for October in slaying of man found at Kawainui park - 09:51 a.m.
- Gunman in Sikh temple shooting was a known white supremacist - 06:56 a.m.
- Medical Examiner identifies man killed in weekend crash - 04:59 a.m.

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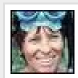
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Yosemite trout a reminder of ocean's stirring of life


Further Review
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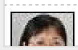
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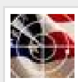
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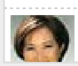
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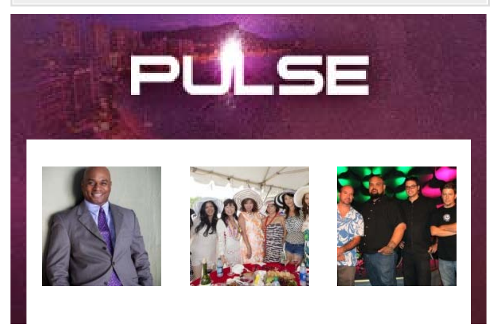

Rebate sheds light on effort by resort to conserve energy

The Westin Ka'anapali Ocean Resort Villas received a $215,657 rebate from Hawaii Energy on Thursday, the largest check cut for a Maui business installing energy-saving equipment.

A ceremony was held at the resort to mark the rebate given for $385,353 in energy-saving improvements made by the resort.

Brian Fitzgerald, spokesman for Hawaii Energy, said this is the largest rebate presented to a Maui business since Hawaii Energy formed in 2009. Hawaii Energy is a statewide ratepayer-funded conservation and efficiency program administered by the company SAIC under a contract with the Hawaii Public Utilities Commission. Hawaii Energy offers cash rebates and other incentives to residents and businesses to help offset the cost of installing energy-efficient equipment.

The resort's energy-efficiency retrofit included replacement of more than 9,500 incandescent lamps with energy-efficient LEDs, which reduce electricity use for lighting by more than 80 percent.

The property also added a control system that monitors the carbon monoxide levels in the garage and operates the ventilation exhaust fans only when needed. This reduces fan operating times and energy consumption related to garage ventilation by more than 99 percent.

The project will save the resort an estimated 1,914,958 kilowatt-hours of energy annually, a third of the electricity the property purchases from Maui Electric Co. each year. This is equal to $608,956 in savings, based on $0.318 per kwh.

Estimated payback for the project is less than six months, after the incentive, the news release about the rebate said.

"We will continue our powerful commitment to transform the resort and its services into a greener operation that will help reduce the impact of business activities within the environment and move toward a long-term goal of carbon reduction," said Angela Nolan, general manager of The Westin Ka'anapali Ocean Resort Villas.

In addition to rebates, Hawaii Energy conducts education and training for residents, businesses and trade allies to encourage the adoption of energy conservation behaviors and efficiency measures.

For more information, go to the website www.HawaiiEnergy.com.

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Allen Evans Receives Inaugural Hawaii Energy Conservation Aw

Title (Max 100 Charaters)

Allen Evans Receives Inaugural Hawaii Energy Conservation Award

Submitted by Caitlin Kogachi
Thursday, August 2nd, 2012, 11:17am

Topics: Community Spirit (/news/community-spirit) , Environment (/news/environment) , Shopping & Services (/news/shopping-services)

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The following information is provided by Brian Fitzgerald:

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, prese Recycling, Inc. on August 1, 2012 during the 20th Annual Hawaii Conservation Conference. The Hawa or organization whose outstanding leadership and innovation in the area of energy conservation has m of Hawaii.

"Our inaugural Hawaii Energy Conservation Award has gone to a true hero, Allen Evans," stated Ray S developed a recycling service, the first of its kind in Hawaii, which breaks refrigeration devices down to refrigerant and other containments. Prior to Allen's service, older refrigerators and freezers in Hawaii w garage or lanai to continue draining electricity."

Spurred by American Recovery and Reinvestment Act ("ARRA") funds received in 2010 by the State o Development and Tourism, Hawaii Energy was able to reconnect with Allen, who had been working ind recycling service. Allen helped Hawaii Energy create and fine-tune recycling channels for the "Trade-u the "Trade-up" offer, Hawaii Energy developed and launched the residential "Bounty" offer in mid-2011

The "Trade-up" offer continues to be available to electric utility customers who receive a $125 rebate w refrigerator and recycle their old, working refrigerator. The goal is to reduce the number of inefficient re recycling. Refrigerant Recycling, Inc. handles the recycling on Oahu on behalf of Hawaii Energy. Recy manner by other vendors, as all liquids, plastics, and metals are completely removed and recycled. Mo enhanced with assistance from Allen and other neighbor island recycling vendors.

As for Hawaii Energy's "Bounty" offer, the goal is to eliminate a household's secondary old, inefficient b the extra units off the grid and disposes them in an environmentally accountable manner. Electric utility Hawaii Energy and make the request for pick-up. Then, Refrigerant Recycling, Inc. picks up and recyc Energy sends a cash award to customers for eliminating those old energy-wasting units. Oahu househ households get $65. The offer is coming soon to Molokai and Lani.

Since spring of 2010, Refrigerant Recycling, Inc., on behalf of Hawaii Energy's "Trade-up" and "Bounty refrigerators and freezers. This has nettled 300 tons of metals, 8,300 pounds of refrigerant and 9,500 c kilowatt hours (kWh) of electricity and approximately $2,504,960 in electricity costs have been saved a savings of 824 kWh per recycled unit and electricity at 32 cents per kWh).

As part of the Hawaii Energy Conservation Award ceremony, in partnership with the Hawaii Conservat joined the conservation conference and keynote speakers to take an active role in the comprehensive the need for imported oil, energy conservation reduces the impact on Hawaii's fragile environment and economy.

For more information about "Trade-up," visit HawaiiEnergy.com. To learn about "Bounty," visit HawaiiE Energy Conservation Award, visit HawaiiEnergy.com/award.

About Hawaii Energy

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under Commission, serving the islands of Hawaii, Lani, Maui, Molokai, and Oahu. Hawaii Energy offers cash businesses to help offset the cost of installing energy-efficient equipment. In addition to rebates, the pr residents, businesses and trade allies to encourage the adoption of energy conservation behaviors and *important role in helping to achieve Hawaii's goal of reducing total electric energy usage by 30 percent visit HawaiiEnergy.com.*

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UH Matters with M.R.C. Greenwood

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Recent photos




Hawaii Conservation Conference

August 2, 2012

Pictured with me, from left, is Markus Staib, president of Milici Valenti Ng Pack; Sharon Ziegler-Chong, UH Hilo Office of Research; Michael Chang, deputy program manager of Hawai'i Energy and James Hardway, executive director of the Workforce Development Council, Department of Labor and Industrial Relations.

I was invited to speak at the 20th Annual Hawaiʻi Conservation Conference at the Hawaiʻi Convention Center on Tuesday, July 31. The focus of the conference was growing green jobs in Hawaiʻi.

The Hawaiʻi Green Jobs initiative and the Hawaiʻi Clean Energy Initiative attract investments from companies around the world, which benefit local workers, companies and entrepreneurs across the state. Of course, this also provides a critical boost to Hawaiʻi's economy.

In 2011, clean energy investments doubled to about $1.2 billion, and right now it looks like 2012 will be another year of growth. Currently, Hawaiʻi ranks third in the nation in clean energy job growth.

My speech focused on institutional preparation for a future economy consisting of green jobs and how we are preparing future generations to compete in a green job market.

Academic programs currently in place at UH include the agriculture programs at UH Mānoa, Hilo and the community colleges that are examining biofuels and food sustainability and Mānoa's architecture program with its emphasis in green design.

We had an excellent discussion. The opportunity is here and we are educating and researching around this vision.

Filed under: Speeches — Tags: UH Community Colleges, UH Hilo, UH Manoa, UH System — 1 Comment »

Westin Ka'anapali Ocean Resort Villas earns huge energy efficiency rebate

August 16, 2012

The Maui Weekly

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Honolulu Star-Advertiser - The Westin Ka'anapali Ocean Resort Villas is projected to save 1.9 million kilowatt-hours of electricity a year and cut its electric bill by about one-third as a result of energy efficiency improvements made at the Maui hotel.

The project included the replacement of more than 9,500 incandescent light bulbs with light emitting diodes (LEDs), which cut energy used for lighting by 80 percent. The hotel also added a control system that monitors carbon monoxide levels in the garage and operates exhaust fans only when needed.

Officials from the state's main energy conservation and efficiency program, Hawai'i Energy, presented the hotel management with a rebate check for $215,657 on July 26, which covered more than half the cost of the $385,353 project. The incentive is the largest to date presented by Hawai'i Energy to a Maui business.

With the price of electricity on Maui running about 32 cents per kilowatt-hour, the project is expected to pay for itself in less than six month after the rebate is factored in.

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Page 15 of 155

CENTRAL // CENTRAL OAHU COVERSTORY

Mililani Man Wins Conservation Award

Posted on August 29, 2012 by MidWeek Staff | Central • Central Oahu Coverstory | Email the author

Sometimes innovation is simply a matter of finding new ways to tackle old problems.

Allen Evans did just that, and for his efforts the Mililani resident became the first recipient of the Hawaii Energ Conservation Award. The award is given to individuals or organizations that have shown leadership and innovation energy conservation that make a positive impact on the state.

"Our inaugural Hawaii Energy Conservation Award has gone to a true hero," stated Ray Starling, Hawaii Energ program manager. "Allen developed a recycling service, the first of its kind in Hawaii, which breaks refrigeratic devices down to the bare components including oil, scrap metals, refrigerant and other containments. Prior to Allen service, older refrigerators and freezers in Hawaii were either disposed of improperly or sent to the garage or lanai continue draining electricity."

Evans, the president of Refrigerant Recycling Inc., a Kapolei-based company, helped Hawaii Energy create and fin tune its recycling channels for the "Trade-up for Cool Cash" offer. The success of the program led to the residenti "Bounty" offer last year.

The Trade-Up offer is available to electric utility customers who receive a $125 rebate when they purchase a ne ENERGY STAR refrigerator and recycle their old, working one.The goal of the Bounty program is to eliminate homeowner's secondary old, inefficient-but-working appliance.

Oahu households that participate in the program get $25 for turning in their old refrigerators and freezers. Refrigera
Recycling will pick up and recycle the old appliances at no cost to the owner.

To date, the Bounty and Trade-Up programs have recycled approximately 9,500 refrigerators and freezers whi
netting 300 tons of metals, 8,300 pounds of refrigerant and 9,500 quarts of oil.

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Honolulu Weekly

FEATURES

Chill Savings

BY MINDY PENNYBACKER | AUG 29, 2012

1

Reefer madness: Got an old, energy hog refrigerator sucking money out of your budget? If you replace it with an efficient, Energy Star model (bought between July 1 and Sept. 30), and have the old fridge taken away for recycling, you can get a $125 rebate check from Hawaii Energy's "Trade Up for Cool Cash" program.

There's also a secondary "Bounty" program in which you can get an extra old fridge hauled away for free and get paid $25 in cash.

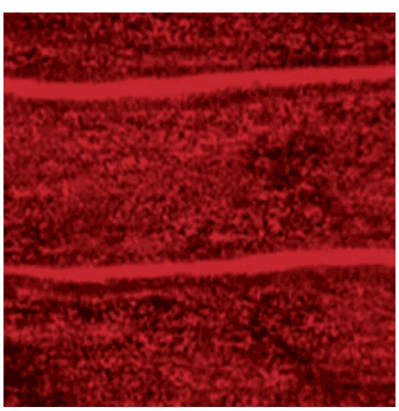
Old fridges are recycled, on Oahu, by Refrigerant Recycling, Inc.Since spring of 2010, it has recycled "approximately 9,500 refrigerators and freezers. This has netted 300 tons of metals, 8,300 pounds of refrigerant and 9,500 quarts of oil.

It is estimated that over 7,828,000 kilowatt hours (kWh) of electricity and approximately $2,504,960 in electricity costs have been saved," Hawaii Energy reports.

Timing is of the essence. It's first come, first serve until the money runs out. Remember, to qualify, you must have bought an Energy Star fridge before Sept. 30, and had the old one carted off by a participating hauler. The person whose name is on the electric bill gets the check.

They say to wait six to eight weeks for the rebate. You ought to start seeing a lower energy bill before then.

| For more info, go to [HawaiiEnergy.com]



This week

Fence Me In

Ka'ena Point, Oahu's wild and windswept northwestern tip, is the ancestral gathering place for souls of the dead, from where they jump off into the next world. Now it has new resonance as the first piece of land in Hawaii that is being allowed to revert to the way our islands were thousands of years ago, when there were no people, the only mammals were seals and bats, and tens of millions of seabirds flocked in from all over the world to nest.

Rail Broke Burial Rules

Let's not forget history. Last Friday's Hawaii Supreme Court ruling (*Kaleikini v.*

Chill Savings

Reefer madness: Got an old, energy hog refrigerator sucking money out of your budget? If you replace it with an efficient, Energy Star model (bought between July 1 and Sept.

Consequence of Sound

As the former frontman of hardcore punk bands Black Flag and Rollins Band, Henry Rollins is best-known for his caustic lyrics and an intense, raw delivery of opinions. The outspoken activist hosts a weekly program on the public radio station KCRW and performs spoken word events, or "talking shows," all over the world, averaging more than 100

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The choice for Mayor is very clear. Ben Cayetano or Kirk Caldwell-Hannemann. Who u like?...

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Great shot of Kalanianaole.

Boots Are Made for Walking, Remember? · 17 hours ago

honoluluweekly

Your kneeslappingly funny comment was jettisoned because of the (supposedly phony) affiliate link you had to GEICO....

Mudslingers · 22 hours ago

Ace Lee

Dela Cruz so ignorant he doesn't know it's DLNR -- Dept. of Land & Nat 'l Resources.

From Sen. Dela Cruz · 22 hours ago

boomshankah

The Ghost in the Machine appears to have devoured another of my kneeslappingly funny comments and jettisoned it into...

Mudslingers · 1 day ago

Certified Energy Manager Training Program Coming to Maui

August 29th, 2012 · No Comments · Comments Via Facebook (0) · Business

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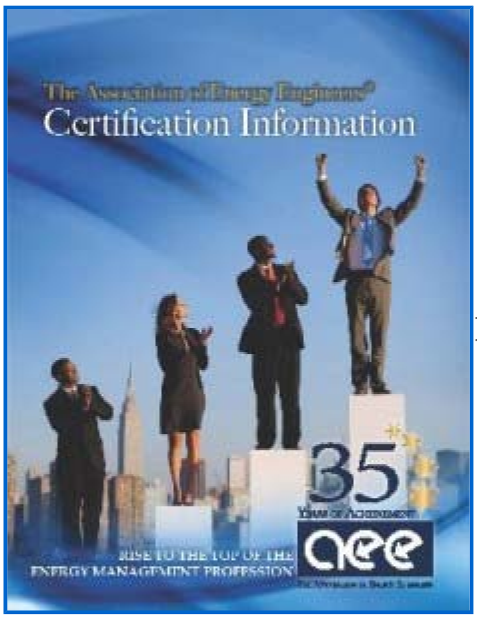

Certification brochure cover. Photo courtesy of AEE.

By Sonia Isotov

Energy professionals from all types of businesses will benefit from the opportunity to attend a five-day certified energy manager (CEM) certification program being given by the Association of Energy Engineers on Maui from October 1-5.

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, is bringing the AEE to Maui to present a five-day Comprehensive Training Program for Energy Managers and CEM exam.

CEM certifications are needed in various aspects of the energy industry to help reduce electricity use in these areas: major multi-national corporations, hotels, resorts, controls and performance contractors, federal, state and local governments, universities, industrial facilities, commercial buildings, big box retail chains, hospitals, school districts and local entrepreneurs, as well as consultants in the energy field.

To encourage our local professionals, Hawaii Energy is providing grants, on a first-come first-served basis subject to funding and approval, to cover the majority of the cost of $2,195. The first 40 qualified grant recipients will just need to contribute $300 each to register for five days of training.

Attendees from counties other than Hawaii, Honolulu and Maui will need to pay the unsubsidized fee of $2,195.

Since its inception in 1981, the CEM credential has become widely accepted and used as a measure of professional accomplishment within the energy management field. It has gained industry-wide use as the standard for qualifying energy professionals both in the United States and abroad.

The CEM credentials are recognized by the US Department of Energy, the Office of Federal Energy Management Programs and the US Agency for International Development, as well as by numerous state energy offices, major utilities, corporations and energy service companies.

The training and exam will be administered at the Donald Malcolm Center in the Maui Research & Technology Park at 1305 N. Holopono St., Suite #1 in Kihei.

To register, go to www.aeeprograms.com/HawaiiEnergy or email Jenn@aeecenter.org or call (770) 279-4391 (10 a.m. – 5 p.m. EST)

Related Stories:

- Hawaii's Largest Energy Conference Coming Sept 13-15
- Limited $250 Rebate for ENERGY STAR Purchase on Maui
- Maui Westin Hotels First With OSHA Certification
- Four Seasons Randy Clark Earns Industry's Highest Credential
- President Declares Hawaii Disaster Following March Tsunami

Tags: Association of Energy Engineers·business development·CEM training·certified energy manager·conservation·educational trainings·energy·Hawaii Energy

Editor's Note: *Maui Now is an open forum and we welcome any views. However, please apply your sense of aloha when posting comments - remarks that are unnecessarily offensive will be blocked.*

By publishing a comment, you are acknowledging that you are personally responsible for its contents.

CENTRAL // CENTRAL OAHU COVERSTORY

Mililani Man Wins Conservation Award

Posted on August 29, 2012 by MidWeek Staff | Central • Central Oahu Coverstory | Email the author

Sometimes innovation is simply a matter of finding new ways to tackle old problems.

Allen Evans did just that, and for his efforts the Mililani resident became the first recipient of the Hawaii Energy Conservation Award. The award is given to individuals or organizations that have shown leadership and innovation in energy conservation that make a positive impact on the state.

"Our inaugural Hawaii Energy Conservation Award has gone to a true hero," stated Ray Starling, Hawaii Energy program manager. "Allen developed a recycling service, the first of its kind in Hawaii, which breaks refrigeration devices down to the bare components including oil, scrap metals, refrigerant and other containments. Prior to Allen's service, older refrigerators and freezers in Hawaii were either disposed of improperly or sent to the garage or lanai to continue draining electricity."

Evans, the president of Refrigerant Recycling Inc., a Kapolei-based company, helped Hawaii Energy create and fine-tune its recycling channels for the "Trade-up for Cool Cash" offer. The success of the program led to the residential "Bounty" offer last year.

The Trade-Up offer is available to electric utility customers who receive a $125 rebate when they purchase a new ENERGY STAR refrigerator and recycle their old, working one.The goal of the Bounty program is to eliminate a homeowner's secondary old, inefficient-but-working appliance.

Oahu households that participate in the program get $25 for turning in their old refrigerators and freezers. Refrigerant Recycling will pick up and recycle the old appliances at no cost to the owner.

To date, the Bounty and Trade-Up programs have recycled approximately 9,500 refrigerators and freezers while netting 300 tons of metals, 8,300 pounds of refrigerant and 9,500 quarts of oil.

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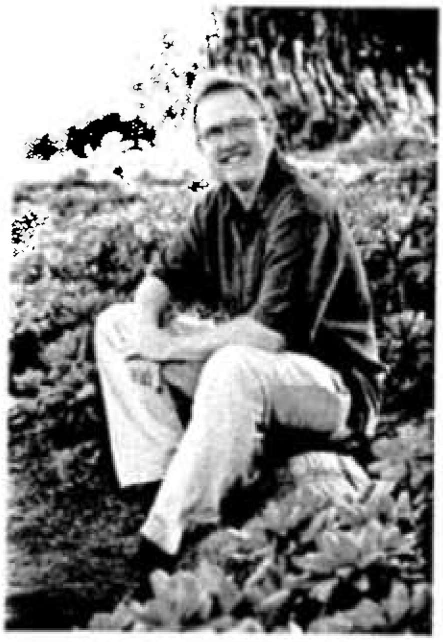
ROY CHANG

editor's NOTES



"You're a jerk!" It was the last thing I heard before a miniature metal terrier hit me in the forehead.

My friend now refuses to play Monopoly with me — under any circumstances. If there's one thing I love more than playing games, it's winning them. I'm not a poor sport, just ruthless. Ever since I was a little boy, I've been in love with board games: Risk, Battleship, Clue, Cranium, I play them all. (My favorite is Catan. Try it, you'll love it.)

This month on page 47, we turn the confusing world of financing home solar into an easy-to-understand board game with one key difference — there's REAL money on the line. In Hawaii, people who install photovoltaic (PV) panels save an average of $270 per month on their electric bill. That's more than three times the national average.*

From solar water heaters to PV and even electric vehicles, *Hawaii Home + Remodeling* helps you navigate the perilous road to a solar paradise. The good news is it's within reach of almost everyone and, unlike Monopoly, there are only winners in the game of S-O-L-A-R.

Take it easy,

Tom

Tom Kunz EDITOR
tomk@hawaiihomemag.com

*Source: U.S. Homeowner Solar Estimate Tool Results, 2011, Clean Power Research

Editor's Pick: Look for this symbol throughout each issue for our monthly picks. Then go online to hawaiihomemag.com to find out what made these items stand out.

The Game of SOLAR

From charging electric vehicles to powering your home, financing solar can be easy when you make the right moves.

by JAIMIE KIM // *illustrations by* RYAN O' ROURKE

YOU'VE SEEN YOUR NEIGHBOR'S ROOF TRANSFORM into a solar hotspot with the installation of photovoltaic (PV) panels and all he talks about is his shrinking electric bill. You're envious, but the idea of spending money in this economy makes you nervous. So how do you make it happen? Follow homeowners Jay and Cindy, along with their kids Lance and Malia, as they embark on the game of S-O-L-A-R and show you just how easy it is to finance. Along the way, encounter experts who provide their tips to ensure everyone wins — even planet Earth.

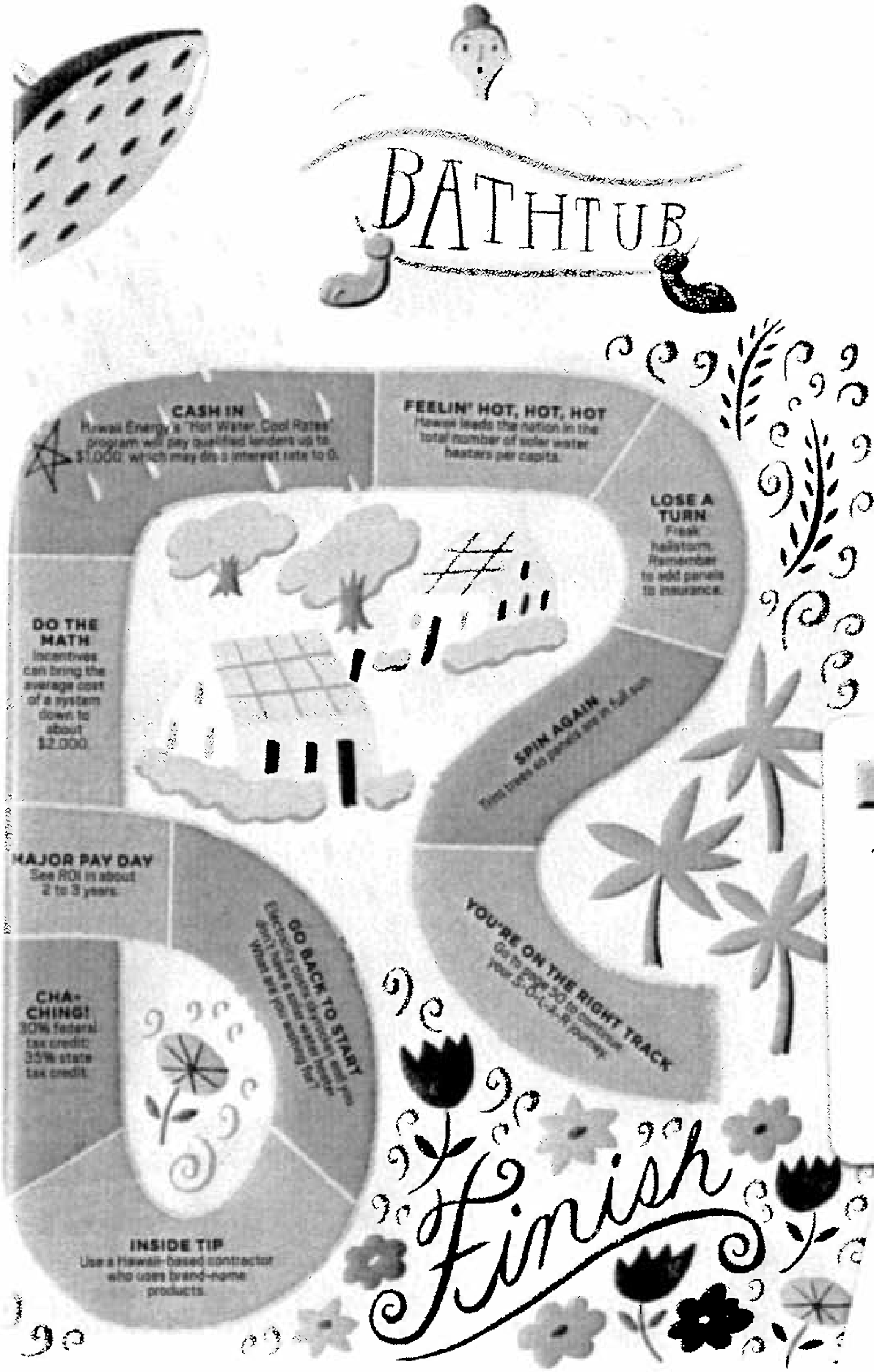
Solar Water Heater

▸ Installing a solar water heater is the first step to turning your home into its own energy source and winning the game.

$1,200	$6,000	2-3 yrs.	$23,800
ANNUAL SAVINGS	5-YEAR SAVINGS	PAYBACK TIME	20-YEAR SAVINGS

*PROJECTED SAVINGS DOES NOT INCLUDE POSSIBLE RATE INCREASES FOR ELECTRICITY DURING THESE TIME PERIODS. RESULTS MAY VARY DUE TO OTHER FACTORS INCLUDING COST OF SYSTEM, MAINTENANCE COSTS, SYSTEM SIZE, ENERGY USAGE

Attachment G
Page 24 of 155



CHEAT SHEET

1. DO YOUR HOMEWORK. Researching solar companies will lead you to a reputable company.

2. THINK LONG TERM. Remember, a warranty is only as good as the company offering it.

3. LOOK UP. Get your roof inspected by a professional to guarantee it s ready for a PV system that lasts 20 to 25 years.

4. READ THE FINE PRINT. When reviewing proposals and making a decision, know what is included (or excluded).

5. BE PATIENT. Get proposals from multiple contractors to ensure you choose a solar company that best fits your needs. Ask for references.

EXPERT TIP

"All homeowners should first install a solar hot water system. It's the most logical way to start taking advantage of solar energy."

– AARON LANGHOFF, **R&R SOLAR SUPPLY**

EXPERT TIP

"Research the company, and read your contract carefully. So many people don't read what they sign ... It tells you what's excluded, what's included and what the terms are."

– GINDI FRENCH, **KM ELECTRICAL SERVICES**

▶ "As a banker, I always look at the return on investment. When you factor in the tax credits that both solar hot water heaters and photovoltaic give you, the ROI is very high."

—*Derek Wong*, **First Hawaiian Bank**

PV Panels

▸ You've already seen a drop in your bill due to the solar water heating system curbing those costs, so why not move on to the next step: cracking down on your electricity costs.

EXPERT TIP

"You will be surprised to see how affordable it is to purchase your own system using local bank loans. People are paying off systems in less than five years using these programs with the benefit of huge savings in the future."

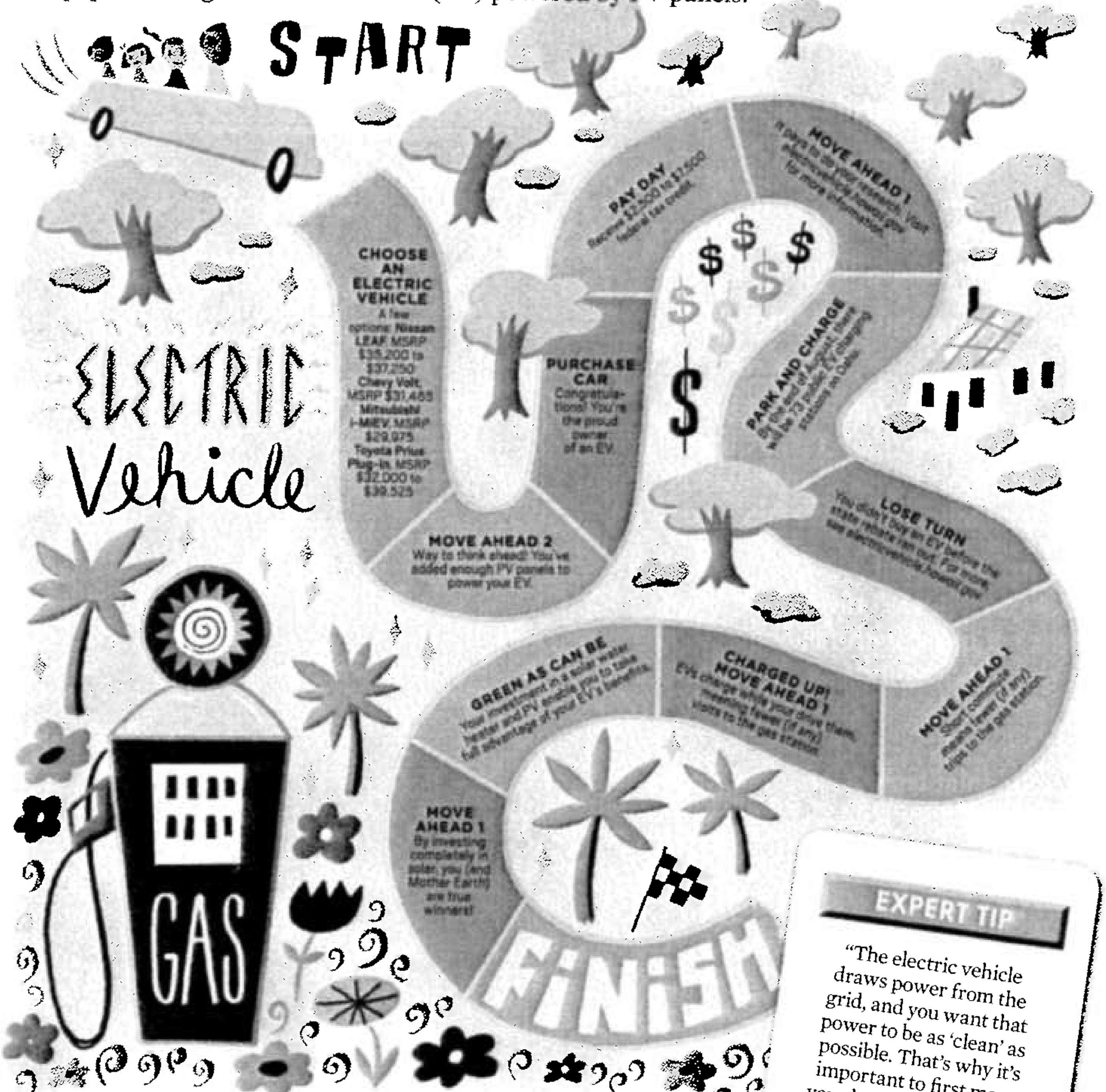
– CHRIS DEBONE, ***HAWAII ENERGY CONNECTION, MAKER OF KUMUKIT™***

\$2,450	\$49,000	5-8 yrs.
ANNUAL SAVINGS	20-YEAR SAVINGS	PAYBACK TIME

*PROJECTED SAVINGS DOES NOT INCLUDE POSSIBLE RATE INCREASES FOR ELECTRICITY DURING THESE TIME PERIODS. RESULTS MAY VARY DUE TO OTHER FACTORS INCLUDING COST OF SYSTEM, MAINTENANCE COSTS, SYSTEM SIZE, ENERGY USAGE, ETC.

Electric Vehicles

▸ You have successfully surpassed your neighbor by creating a home completely reliant on solar energy, and you want to take the next step: purchasing an electric vehicle (EV) powered by PV panels.



EXPERT TIP

"The electric vehicle draws power from the grid, and you want that power to be as 'clean' as possible. That's why it's important to first move your home completely to PV before buying an EV."

– DAVID JENKINS, **ALLIED BUILDING PRODUCTS, SOLAR DIVISION**

100	80	40*
AVG. MILES PER CHARGE NISSAN LEAF	AVG. MILES PER CHARGE MITSUBISHI I-MIEV	AVG. MILES PER CHARGE CHEVY VOLT

*NOTE: BEFORE SHIFTING TO GAS ENGINE. MILEAGE FOR ALL EVS MAY VARY BASED ON DRIVING CONDITIONS

↘ *EXPERT TIPS TO WIN*

It's always helpful to get the inside scoop from the insiders themselves. Here are additional tips from our experts to make you a winner:

Think long term. "There may be a time when you have two electric vehicles. Now you don't have enough room on your roof to power them because you have gone with a system you thought was going to cover your needs, when it really hasn't."

—Eric Carlson, RevoluSun

"Ask about the brand names of the solar panels, inverters and mounting hardware being used on your house. It helps to use a Hawaii-based installation contractor that uses brand name products."

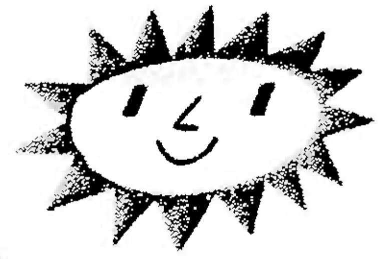
—David Jenkins, Allied Building Products, Solar Division

"If you're struggling with the idea to do it, if you don't really feel like you can afford it, I would say you should really look at how the finances work out ... you are going to have a very short period before the whole thing is paid off. After that, there are many years of savings."

—Dennis Swart, Pacific Islands Construction

▶"What you can do is turn your roof into a piggy bank. Take the 15-year term and when you get the tax credits back, just put them as cash into your account."

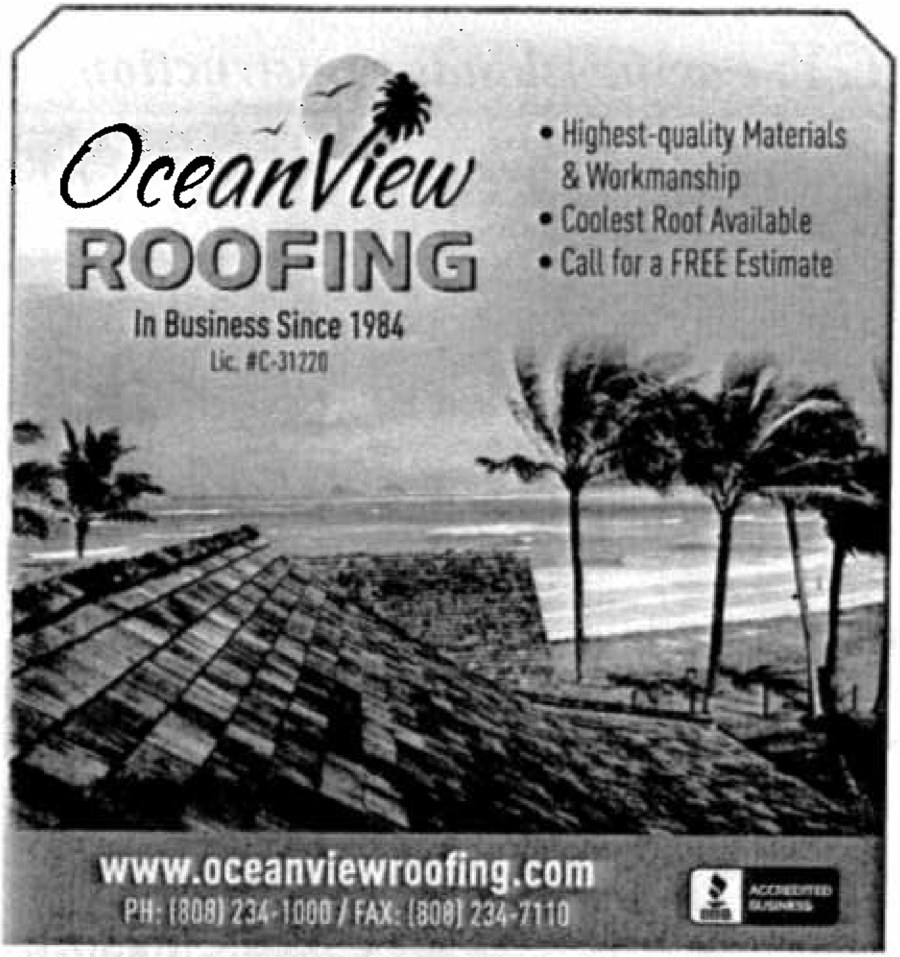
—Jim Whitcomb, **Haleakala Solar**



EXPERT TIP

"When comparing proposals, it's important to stress what the production is going to be. Anyone can promise a certain-sized system, but at the end of the day, it's how much power your panels are going to produce."

– ERIC CARLSON, REVOLUSUN



EXPERT TIP

"It's extremely important to get a roof inspection and estimate for any repairs prior to considering PV. What sort of shape is your roof in? What kind of longevity does it have left?"

– PETE MICHELMORE, OCEANVIEW ROOFING COMPANY

WHERE TO GET IT

ALLIED BUILDING PRODUCTS, SOLAR DIVISION
1081 MAKEPONO ST.
630-3360
SOLAR.ALLIEDBUILDING.COM

FIRST HAWAIIAN BANK
844-4444
FHB.COM

HALEAKALA SOLAR
HONOLULU
2700 SOUTH KING ST.
955-0050

KAHULUI
70 E. KAAHUMANU AVE.
808-871-4059
HALEAKALASOLAR.COM

HAWAII ENERGY CONNECTION
524-7336
HAWAIIENERGYCONNECTION.COM

KM ELECTRICAL SERVICES
595-4503
KEITHMORRILL@HAWAII.RR.COM
KMELECTRICHAWAII.COM

OCEANVIEW ROOFING COMPANY
234-1000
PETE@OCEANVIEWROOFING.COM
OCEANVIEWROOFING.COM

PACIFIC ISLANDS CONSTRUCTION
1732 KALANI ST., UNIT 4
841-7756
PACIFICISLANDSCONSTRUCTION.NET

R&R SOLAR SUPPLY
922 AUSTIN LANE, BLDG. D
842-0011
RANDRSOLAR.COM

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1600 KAPIOLANI BLVD., #1700
748-8888
REVOLUSUN.COM

Senator Michelle Kidani

(D) Senate District 17– Serving Mililani Mauka, Mililani Town, Waipio Acres and Waipio Gentry

Aloha, friends and neighbors:

Two issues have attracted a good deal of public and media attention this summer. In each case, the Legislature is doing its due diligence and conducting reviews to assure that the expenditure of taxpayer dollars is not only legal, but appropriate and not wasteful.

First – and without repeating *all* of the details of this mis-adventure – someone at the University of Hawaii authorized the expenditure of $200,000 to secure an on-campus concert to benefit UH Manoa Athletics. The money disappeared in what was apparently a scam. Athletic Director Jim Donovan was suspended then cleared of all wrong doing and brought back but assigned to another position in the Manoa Chancellor's office. At a cost of tens of thousands of dollars, an outside investigator reviewed the process by which the concert funds were expended and lost; the University asserted that the Donovan personnel action was not related to the concert fiasco; and the community remains in the dark about precisely how this all could have happened.

A Special Senate Committee on Accountability will conduct an inquiry on September 24 at 1:00 pm in Room 211 at the State Capitol. While the University enjoys a measure of autonomy, and operates under the direction of the Board of Regents, I believe taxpayers deserve answers and lawmakers should insist that these answers are given.

Second, the State Department of Education has been under fire for losing control of its student transportation program. As confirmed by the Legislative Auditor last month, not only does it appear that no one was paying attention to runaway costs for school bus services, but there was insufficient thought devoted to reviewing bus routes to make sure they were best serving the needs of our public school students. We directed that the audit be conducted when it became clear last session that we weren't getting the answers we sought about these matters in hearings before the Senate Ways & Means and Education Committees – two of the Committees on which I serve as Vice Chair.

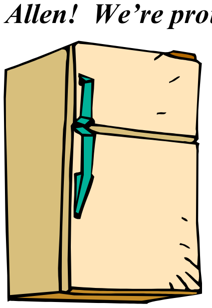
In each of these cases, money has been spent without clear accountability from both the University and the Department of Education for the taxpayers' investments in our public institutions.

Me ke aloha,

Michelle

Hawaii Energy recognizes Mililani's Allen Evans

Hawaii Energy, the conservation and efficiency program for Oahu, Maui and the Big Island, has presented its first-ever Hawaii Energy Conservation Award to **Allen Evans of Mililani.** Allen's company developed Hawaii's first recycling service that dismantles old refrigerators into bare components – including oil, scrap metals, refrigerants, etc.—and recycles them appropriately. No such program existed in Hawaii before Allen took the initiative. The program was funded in part by President Obama's economic stimulus program – the American Recovery and Reinvestment Act of 2010. ***Congratulations, Allen! We're proud to acknowledge you as one of our outstanding Mililani neighbors.***



Did you know . . .

that if you purchase a new ENERGY STAR rated refrigerator to replace an older unit, you may be eligible for a $125 rebate from Energy Hawaii? And if you have a working refrigerator or freezer that you simply want to dispose of, you may be eligible for a $25 "bounty." Other incentives are available; details are on the Web at http://hawaiienergy.com .

Allen Evans**, president of Refrigerant Recycling, Inc., and Hawaii Energy Program Manager **Ray Starling

Mililani High School projects underway

If you have visited or driven past the Mililani High School campus in the last few weeks, you know that there is lots of construction activity underway. It's always satisfying to see the Legislature's commitments for improving our campuses become a reality. Here's a relatively current rundown:

- Repaving of one parking lot and driveway (near the intersection) now complete; **contract awarded for paving the second parking lot beginning in October**, to be completed in early 2013.
- Contract awarded for **construction of the MHS Multipurpose Building** – a much-anticipated major addition for MHS.
- **Coming soon: improvements to the MHS tennis courts**, now in the design phase. ***Note:*** *Some MHS tennis team supporters have expressed concern that money for this project was diverted to the parking lot projects.* ***That's not the case****; funds are in place for this job, and the work will proceed soon as other projects near completion in a very busy year for campus improvements.*

We ♥ our Mililani Schools . . .

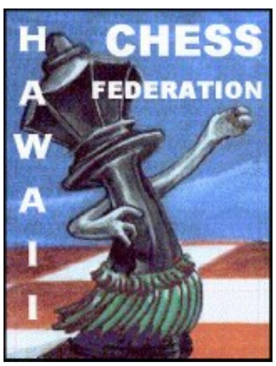
Now that school is back in session, I am enjoying my visits to campuses. This month there was a chance to meet with **Mililani Ike** 2nd graders who have been learning about our government.

We talked about what I do as a State Senator, and how I can help Mililani. ***I'm always impressed with our youngsters' eagerness to learn, and their many really terrific questions!***

Speaking of Mililani Ike . . . Above are the school's cafeteria staff, Department of Education 2012 Team of the Year. Front: ***Debbie Pa, Thelma Wilcher, Valerie Watanabe, Devie Nakamura;*** back: ***Hener Sison, Sharon Kim, Derek Kajihiro and Sherrie Balasbas. Congratulations!***

Roslyn Fujimoto

Honors also go to . . .
Mililani Mauka Elementary School Administrative Services Assistant (SASA), who received a DOE 2012 Sustained Superior Performance Award! ***Thanks, Roslyn, for your commitment!***



The 2012 Hawaii Chess Federation Blitz Champion is teen chess star Stephen Mau, captain of the State High School Champion Mililani Trojans. ***Well done, Stephen!***

For Older Americans Month, the Honolulu Committee on Aging and the State Office on Aging honored **Myrtle Nanbara of Mililani** for her more than 10,000 hours of volunteer work over the past decade at Moiliili Community Center. ***With her at right: Wesley Lum of the Office on Aging and the Governor's Chief of Staff Blake Oshiro.***

Check out these events happening on Oahu in the next few weeks

Friday, September 21 – Mililani High School Homecoming! Join the community for a Homecoming Parade on Friday afternoon beginning at Mililani Town Center at 1:00 p.m. Celebrate our school's 40th anniversary year under the theme of **Trojan Legacy!** Friday night kickoff times for the 2012 homecoming football games versus the Kapolei Hurricanes: **JV at 5:00 p.m., Varsity at 7:30 p.m. at John Kauinana Field.**

Saturday, September 29 – Jump Into Health Mililani! Head over to the Mililani High School Gym from 10am-2pm for a community health and wellness fair in cooperation with the American Heart Association. Includes a Jump Rope for Heart event, and a chance to meet community partners and vendors that promote all aspects of physical, mental, emotional, and social health in Mililani. More information on the Web at http://jumpintohealth.tk/ .

Sunday, October 7 – Children and Youth Day at the State Capitol and civic center grounds– sponsored by the Hawaii State Legislature's Keiki Caucus and other organizations. Non-stop entertainment on six stages, along with games and rides, demonstrations and tours, lots of food and refreshments. More information at www.HawaiiCYD.org .

Tuesday, September 4, 2012

12:05 am - September 02, 2012 — Updated: 12:06 am - September 02, 2012

Grants provide families with solar water heaters

By COLIN M. STEWART

Tribune-Herald Staff Writer

A select number of Hawaii Island low-income families found themselves in hot water this past year, and loving it.

Wrapped up on Friday, the more than $1 million federal Rural Utilities High Energy Costs Assistance Program helped to install free solar water heaters in the homes of rural Big Isle families who have found it difficult making ends meet while wrestling with large power bills.

The Hawaii County Economic Opportunity Council (HCEOC) accepted applications from needy area residents, and the units were paid for by the U.S. Department of Agriculture, in a partnership with Hawaii Energy, said HCEOC Director of Community Resources Bettie Wagstaff.

The solar water heater program is one that helps to make dramatic cuts in power bills for low-income families, and it keeps paying dividends for years, Wagstaff said.

“You really get a big bang for your buck with solar water heaters, because they last 20 years, at least,” she said.

One woman, who asked that her name not be used, was the recipient of three of the water heater units. A single resident of Kurtistown, she has 17 people under one roof, including her mother, 12 foster teens, and several adopted children. The crowded arrangement made for difficult mornings trying to get everyone showered and ready for school.

“We just didn’t have enough hot water,” she said with a laugh. “I was having to stagger the showers in shifts and keep track of how long they spent in them and all that.”

The situation may have been funny sounding, but the resulting power bills certainly weren’t, she added.

“We were getting power bills of like $1,150 a month, or $1,200 a month,” she said.

On Aug. 15, she received her first power bill since having the units installed, and she was surprised to find she’d saved about $300.

“It’s amazing,” she said excitedly on Thursday afternoon. “I thought my bill would go down by $100. But it’s made a huge impact. I was thrilled. Woohoo! … And I didn’t even have them (the heaters) for a full month.”

The grant is only available to residents living within one of 14 specific Census Designated Places with a population of less than 2,500 residents and a median income of 69 percent of the state median. Those locations include Ocean View, Pahoa, Fern Acres, Eden Roc, Fern Forest, Orchidland, Pepeekeo, Kurtistown, Laupahoehoe, Hawaiian Acres, Honokaa, Leilani Estates, Naalehu and Paauilo.

Announced at the end of 2011, the grant ultimately paid to install 214 solar water heater systems in 172 households on the Big Island, said Brian Fitzgerald, a spokesman for Hawaii Energy, a conservation and efficiency program serving Hawaii, Honolulu and Maui counties.

Fitzgerald explained that each system has been estimated to conserve an average of 2,066 kilowatt hours (kWh) of electricity usage a year. At HELCO's August rate of 38.37 cents per kWh, that amounts to $793 a year per unit. Island wide, beneficiaries of the grant will save a combined estimate of $169,642.97 a year, he said.

"When it comes to overall energy efficiency, I think one of the most underserved categories is that of lower income families," he said. "They might be able to afford some CFL bulbs instead of incandescents, but they just can't afford a solar water heater or an updated refrigerator. By providing them with solar water heaters, it helps to reduce their cost of living, and it helps to contribute to the state's overall goal of using 70 percent clean energy by 2030."

According to Wagstaff, the Rural Utilities High Energy Costs Assistance Program has helped to augment another program available to Hawaii Island residents that also helps to install solar water heaters — the U.S. Energy Department's Weatherization Assistance Program (WAP), which installed 106 of the units in area households last year. In addition to the heaters, the WAP also pays for families to replace energy-hogging refrigerators with more efficient models.

Email Colin M. Stewart at cstewart@hawaiitribune-herald.com.

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Tuesday, September 4th, 2012 | Posted by Guest Contributor | Print This Article

Hawaii's Energy Smart Initiative Already Generating Energy Savings for Forest City Residents

REPORT FROM Hawaii's Energy Smart Initiative — On May 29, 2012, Hawaii residents joined Lieutenant Governor Brian Schatz, Marine Colonel Brian P. Annichiarico, Navy Captain Jeffrey W. James, Forest City Military Communities and Hawaii Energy**,** the energy efficiency and conservation program for Hawaii, Honolulu and Maui counties**,** as they launched Hawaii's Energy Smart Initiative. Through the Energy Smart Initiative, Hawaii Energy and Forest City expect to achieve a 1.3 million kilowatt hour (kWh) energy reduction per year.

The Energy Smart Initiative has already played a significant role in helping Forest City's

Select Language ▲ 32 Online Videos

reduced its electricity use, on average, by 58 kWh per occupied housing unit each month in June and July. The 674,956 kWh reduction is equal to approximately $147,125 in savings.

“The Energy Smart Initiative represents one of the first large-scale efforts on Oahu to transform an entire residential community to achieve an energy-efficient lifestyle,” said Hawaii Energy Program Manager Ray Starling. “I applaud each and every Forest City employee and resident for helping to make this initiative a success from the very start. In addition, I encourage all electric utility customers in the three counties – whether a part of this initiative or not – to actively battle high electricity bills by taking advantage of numerous rebates and low-cost conservation ideas that Hawaii Energy offers.”

With Hawaii families paying the highest electricity rates in the nation, Forest City residents are contributing to significant energy and financial savings and are helping the State of Hawaii to achieve its clean energy goals. The Energy Smart Initiative is also in alignment with the Department of Defense and Department of the Navy's energy conservation initiatives to reduce dependence on imported oil and other fossil fuels.

"I encourage every Forest City household to participate in the Energy Smart Initiative,” added Forest City Vice President Will Boudra. “By helping to build energy smart communities, Forest City residents can save money and aid in the energy security of our state and our nation."

Forest City Military Communities, in partnership with the Department of the Navy, manages, maintains and revitalizes neighborhoods on and around military bases in Hawaii, including Pearl Harbor, Marine Corps Base Kaneohe and neighboring installations. With over 36 neighborhoods, and 6,700 homes under management, Forest City is dedicated to the singular vision of enhancing the quality of life for military families through superior homes and welcoming neighborhoods.

For more information about the Energy Smart Initiative, Forest City or Hawaii Energy, please visit HawaiiEnergy.com/ForestCity.

About Hawaii Energy

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission, serving the islands of Hawaii, Lanai, Maui, Molokai and Oahu. Hawaii Energy offers cash rebates and other incentives to residents and businesses to help offset the cost of installing energy-efficient equipment. In addition to rebates, the program conducts education and training for residents, businesses and trade allies to encourage the adoption of energy conservation behaviors and efficiency measures. The program plays an important role in helping to achieve Hawaii’s goal of reducing total electric energy usage by 30 percent or 4.3 billion kWh by 2030. For more information, visit www.HawaiiEnergy.com.

About Forest City Hawaii

Forest City Military Communities in Hawaii is now managing over 6,700 homes for Navy and Marine families. A majority of the homes will be demolished and built anew or fully renovated resulting in a development budget exceeding $1.7 billion, excluding reserves. As part of its Public-Private Venture (PPV) partnership with the Department of the Navy, FCMC Hawaii is rebuilding approximately half of the total inventory of 6,788 military family housing units across 36 neighborhoods on Oahu and Kauai. In addition to all planning, financing, construction and renovations, Forest City also provides ongoing leasing, operations and maintenance for the properties and residential communities.

Forest City Enterprises, Inc. is a $10.5 billion NYSE-listed national real estate company. The company is principally engaged in the ownership, development, management and acquisition of commercial and residential real estate and land throughout the United States. For more information, visit www.ForestCity.net.

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LIFESTYLE // GOOD NEIGHBORS

Allen Evans

Posted on September 5, 2012 by Christina O'Connor | Good Neighbors • Lifestyle | Email the author

It's a common scene: When a household gets a new refrigerato the old one often is sent to the curb for disposal, or banished to tl garage to act as a backup device.

"They think that when they just put it on the curb, it ju disappears," says Allen Evans of Kapolei-based compa Refrigerant Recycling Inc. "The solution isn't just simply to toss in a landfill. One, because there are very toxic materials in maj appliances. And second, there is a use for them."

Realizing the need for the proper disposal of appliance Refrigerant Recycling worked to develop a system that would bre down appliances to separate oil, scrap metals and chemicals order to recycle some of the items while safely disposing of tox materials.

In 2010, the company partnered with Hawaii Energy, and togeth they launched the Trade-up for Cool Cash and Bounty program

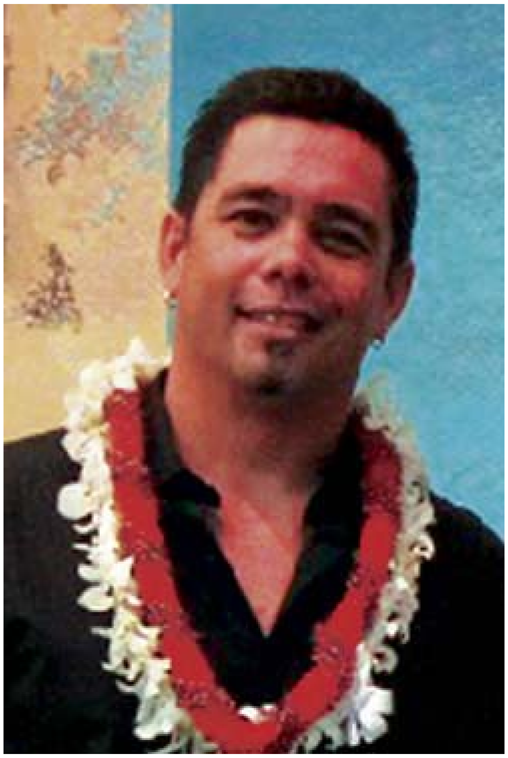

Photo courtesy Hawaii Energy

which provide cash incentives to reduce the number of energ inefficient appliances. Trade-up offers a $125 rebate for those wh recycle a working refrigerator and purchase an Energy St refrigerator. Bounty provides $25 to people who turn in the secondary, old refrigerators or freezers to be recycled.

For his work, Evans was the first recipient of the Hawaii Energ Conservation Award during the annual Hawaii Conservatic Conference last month. The award honors an individual o organization for leadership and innovation in energy conservatic that has made a positive impact.

"If released into the atmosphere, (refrigerant) destroys our ozon layer," Evans explains about one of the main chemicals used i refrigerators and air conditioners. "And without ozone, we hav increased cases of skin cancer, crop loss, cataracts. It goes on ar on and on." He adds that other materials, including mercury ar various oils, in refrigerators could be damaging to human ar environmental health if they are not properly handled.

In addition to properly disposing of the chemicals, Refrigera Recycling makes use of other items found in appliances by recycling the scrap metal.

Currently, the company processes about 500 appliances a day. Through the Trade Up and Bounty program Refrigerant Recycling has recycled about 9,500 refrigerators and freezers. According to Hawaii Energy, this equals 3C tons of metals, 8,300 pounds of refrigerant and 9,500 quarts of oil; and 7,828,000 kilowatt hours of electricity ar approximately $2,504,960 in electricity costs have been saved. "It is reducing the amount of energy we are consuming Evans says. "And these materials are getting recycled. It's not getting dumped on the side of the road. We a processing the chemicals, processing the scrap metals and processing the oils – all properly.

"We saw that we could really make a difference doing something," Evans adds. "And we felt good about making a impact globally."

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Honolulu Star-Advertiser

Friday, September 07, 2012 77.0°F

Hawaii military households cut electricity bills by $150,000

By Star-Advertiser Staff

POSTED: 01:33 p.m. HST, Sep 07, 2012

Hawaii military families living in housing managed by Forest City cut their electricity bills by nearly $150,000 in June and July as part of a program to reduce energy consumption.

The roughly 6,000 homes participating in the Energy Smart Initiative reduced their electricity usage by 58 kilowatt hours per month for a total reduction of 674,965 kilowatt hours during the two-month stretch compared the same period a year earlier

“The Energy Smart Initiative represents one of the first large-scale efforts on Oahu to transform an entire residential community to achieve an energy-efficient lifestyle,” said Hawaii Energy Program Manager Ray Starling.

“I applaud each and every Forest City employee and resident for helping to make this initiative a success from the very start.”

Certified Energy Manager training to be offered on Maui

September 20, 2012

Lahaina News

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KIHEI - Hawaii Energy is bringing the Association of Energy Engineers to Maui to present a five-day comprehensive training program and Certified Energy Manager (CEM) exam from Oct. 1-5 at the Douglas C. Malcolm Center in Kihei.

CEM certification is needed in various aspects of the energy industry to help reduce electricity use in hotels, government facilities, commercial buildings, school districts and other uses.

To support local professionals, Hawaii Energy is providing grants - on a first-come, first-served basis subject to funding and approval - to cover the majority of the program cost of $2,195. The first 40 qualified grant recipients will just need to contribute $300 each to register for the five days of training.

Attendees from counties other than Hawaii, Honolulu and Maui will need to pay the unsubsidized fee of $2,195.

Register at www.aeeprograms.com/ HawaiiEnergy, e-mail Jenn@aeecenter.org or call (770) 279-4391. The Douglas C. Malcolm Center is located at 1305 N. Holopono St., Suite 1.

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Lahaina, HI

77°F

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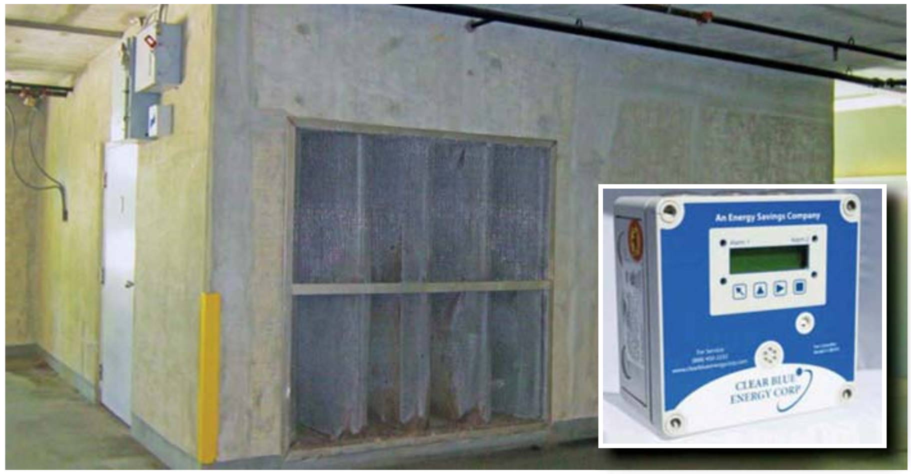
AIR IT OUT

Don't let exhaust fans blow your money.

By Michael Chang

Stop, hey, what's that sound …
Everybody look what's going down.
~ Buffalo Springfield



The parking garage ventilation system will save Nauru Tower close to $300,000 in energy costs per year," according to Nauru resident manager Don Higgins. Photo courtesy of Nauru Tower and Hawaii Energy. Inset: Sample carbon monoxide gas detection system from Clear Blue Energy Corp.

If you manage a large parking garage, "that sound" is your garage exhaust fan and "what's going down" is up to $200,000 per year. Depending on your business model, this money is being drained from your owners or tenants whose businesses and families have to earn $277,000 to $2,000,000 per year just to move air in and out of the parking garage.

Now, don't get me wrong. Fans and mechanical ventilation are necessary in parking garages. In fact, they are required by law to ensure healthy air quality conditions and prevent the buildup of carbon monoxide (CO). All facilities must exercise due diligence to assure a safe breathing environment for staff and tenants.

Factoid 1

CO threshold level is governed by the Hawaii Occupational Safety and Health Division. The permissible exposure level is 50 parts per million.

CO, in particular, presents a special threat because it is poisonous, lighter than air, colorless, odorless, tasteless, non-irritating. In parking structures, CO is one of the most abundant airborne contaminants and poses significant safety concerns. The CO levels must be controlled or else concentrations approach unsafe levels.

To be up to code, many facilities operate constantly—24 hours a day 7 days a week.

There are no shortcuts in keeping your building up to code, but there are better, smarter systems. Let's take for example, a carbon monoxide monitoring system with sensors. The system can determine the concentration of carbon monoxide levels and activate exhaust fans only when they are needed to keep the air safe to breathe.

The system can dramatically minimize the amount of time exhaust fans run. On average, the runtimes of exhaust fans can be reduced by 83 percent or more.

Factoid 2

Mechanical ventilation for parking garages shall require a minimum of one and five tenths cfm per square foot … over the entire floor area requiring ventilation ... ~ Hawaii Administrative Rules § 11-39-13(2)

Energy Savings: Meeting the required amount of fresh air in parking structures can become very expensive. Installing a carbon monoxide monitoring system can result in the following benefits:

- **Minimized utility bills:** The electrical energy required to run the exhaust fans 24 hours a day is exceptionally high, causing large utility bills.
- **Lower fan usage:** Fans run continuously, causing significant wear, frequent equipment replacement and shortening fan motor life.
- **Reducedm aintenance:** Without a carbon monoxide monitoring system, the frequency of maintenance is higher for fan belt and lubrication services.

Exhaust fans are sneaky as they hide out in the dark corners of the garage and they use their 3 to 10 horsepower motors every moment of everyday running up to 8,760 hours per year and costing just shy of $2,000 per horsepower per year.

Energy-efficient systems such as carbon monoxide monitoring reduce

Factoid 3

The effects of carbon monoxide on people can vary significantly based on overall state of health, sex, age and weight.

Case Studies:

Examples of local buildings with 80 percent or higher energy savings.

Nauru Tower AOAO
Annual savings: $283,848
10-year savings: $2,338,030
Payback period with Hawaii Energy incentives: Approximately 3 months

Hawaii Prince Hotel
Annual savings: $182,901
Payback period with Hawaii Energy incentives: 0 months (Hawaii Energy's incentive paid 100% of the total project costs)

Queen Emma Gardens AOAO
Annual savings: $134,948
Payback period with Hawaii Energy incentives: Less than 4 months

Ward Entertainment Parking Garage
Annual savings: $71,980
Payback period with Hawaii Energy incentives: Approximately 5.5 months

Wailana AOAO
Annual savings: $26,324
Payback period with Hawaii Energy incentives: Approximately 4.5 months

Attachment G
Page 41 of 155

our dependence on fossil fuels, increase our energy security, decrease the risk of price spikes to Hawaii's economy and stimulate our economy by putting money back in your pocket to spend as you see fit.

BMH Resource:

Hawaii Energy offers cash rebates and other incentives to local residents and businesses to help offset the cost of installing energy-efficient equipment. In addition to rebates, the program conducts education and training for residents, businesses and trade allies to encourage the adoption of energy conservation behaviors and efficiency measures. The program plays an important role in helping to achieve Hawaii's goal of reducing total electric energy usage by 30 percent, or 4.3 billion kWh, by 2030.

Hawaii Energy Incentives

In August 2010, Hawaii Energy engaged in discussions with energy service companies about carbon monoxide monitoring systems. By June 2011, it provided a special offering of 18 cents per annual kWh savings (up to 100 percent of total project cost). Depending on the project, Hawaii Energy can offer 14 cents per kWh of electricity saved per year for up to 85 percent of the total project cost. Hawaii Energy can also help you find a contractor to reduce the project payback time.

HawaiiEnergy.com
Oahu: 839-8880
Toll-free: 1-877-231-8222
(Neighbor Islands)

Michael Chang, deputy program manager of Hawaii Energy, is responsible for leading the operations team of Hawaii Energy. Michael has developed a broad range of energy experience gained from 18 years in the local energy industry identifying ways to cut energy costs, implement energy-saving actions and achieve energy efficiency goals while working for Hawaiian Electric Company, Johnson Controls and now Hawaii Energy.

wiliki o hawaii
ENGINEER OF HAWAII

VOL. 48 NO. 8 | SERVING 2000 ENGINEERS & LAND SURVEYORS | OCTOBER, 2012

October is Energy Awareness Month:

Hawaii Energy's Incentives Can Help Your Company or Client Battle Rising Electricity Costs

In celebration of Energy Awareness Month, consider and take advantage of Hawaii Energy's incentives to help reduce your company or client's electricity costs and increase the bottom line.

As some of you may be familiar, Hawaii Energy's core mission is to educate, motivate and incentivize the adoption of energy conservation and efficiency measures to save electricity and reduce Hawaii's dependence on imported fuels. We serve all electric utility customers (both residential and business) in Hawaii, Honolulu and Maui counties. We are always interested in new opportunities to better assist electric utility customers. Please contact us with ideas and feedback.

Consider Garage Ventilation Control Systems to Save You Money

For those who own or manage a property with a garage, Hawaii Energy offers an incentive for carbon monoxide monitoring systems with sensors. Meeting the required amount of fresh air in parking structures can be very expensive. Exhaust fans use their 3 to 10 horsepower motors every moment of everyday running up to 8,760 hours per year and costing about $2,000 per horsepower per year.

Monitoring systems can determine the concentration of carbon monoxide levels and activate exhaust fans only when they are needed to keep the air safe to breathe. They can dramatically minimize the amount of time exhaust fans run. On average, the runtimes of exhaust fans can be reduced by 83 percent or more.

Hawaii Energy Incentive

Depending on the project, Hawaii Energy may be able to offer 14 cents per kilowatt hour (kWh) saved per year for up to 85 percent of the total project cost, as well as help you find a contractor to reduce the project payback time.

Benefits of Installing a System

- **Minimized utility bills:** The electricity required to run the exhaust fans 24 hours a day is exceptionally high, causing large utility bills.
- **Lower fan usage:** Fans run continuously, causing significant wear, frequent equipment replacement and shortening fan motor life.
- **Reduced maintenance:** Without a carbon monoxide monitoring system, the frequency of maintenance is higher for fan belt and lubrication services.

Recent Case Studies

The Westin Ka'anapali Ocean Resort Villas

In July, Hawaii Energy presented The Westin Ka'anapali Ocean Resort Villas with an incentive check for $215,657, which is the largest received to date by a Maui business. The check was issued for the property's extensive energy efficiency retrofit, which included a carbon monoxide control system for its garage and the replacement of over 9,500 incandescent lamps with energy-efficient, ENERGY STAR® qualified LEDs. The garage system reduces fan operating times and energy consumption related to garage ventilation by over 99 percent. The lighting retrofit reduces electricity use related to lighting by over 80 percent.

In total, the $385,353 project will save The Westin Ka'anapali Ocean Resort Villas an estimated 1,914,958 kWh of energy annually, a third of the electricity the property purchases from the utility each year. This is equal to $608,956 in savings, based on $0.318 per kWh. Estimated payback for the project is less than 6 months, after the incentive. The property utilized in-house engineering team personnel, as well as contractors 21st Century Lighting and Clear Blue Energy to implement the work.

Other Local Properties

A number of other properties have also participated in Hawaii Energy's garage ventilation incentive. These properties have achieved energy savings of 80 percent or higher:

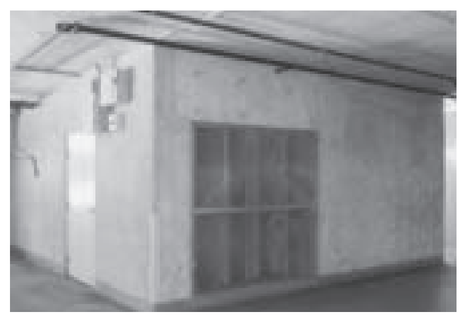
- Nauru Tower AOAO, Annual savings: $283,848. Payback period with Hawaii Energy incentives: Approximately 3 months.
- Hawaii Prince Hotel, Annual savings: $182,901. Payback period with Hawaii Energy incentives: 0 months (Hawaii Energy's incentive paid 100% of the total project costs).
- Queen Emma Gardens AOAO, Annual savings: $134,948. Payback period with Hawaii Energy incentives: Less than 4 months.
- Ward Entertainment Parking Garage, Annual savings: $71,980. Payback period with Hawaii Energy incentives: Approximately 5.5 months.
- Wailana AOAO, Annual savings: $26,324. Payback period with Hawaii Energy incentives: Approximately 4.5 months.

Consider whether a carbon monoxide monitoring system – or any of Hawaii Energy's many other incentives - can provide some relief to your property's electricity costs. Incentives are subject to restrictions, funding availability and change without notice. Contact Hawaii Energy today to learn more.

About Hawaii Energy

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission, serving the islands of Hawaii, Lanai, Maui, Molokai and Oahu. Hawaii Energy offers cash rebates and other incentives to residents and businesses to help offset the cost of installing energy-efficient equipment. In addition to rebates, the program conducts education and training for residents, businesses and trade allies to encourage the adoption of energy conservation behaviors and efficiency measures. The program plays an important role in helping to achieve Hawaii's goal of reducing total electric energy usage by 30 percent or 4.3 billion kWh by 2030.

HawaiiEnergy.com
Oahu: 839-8880
Toll-free: 1-877-231-8222 (Neighbor Islands)



Nauru Tower in Honolulu was one of the first participants of the Hawaii Energy parking garage ventilation system incentive. Photo courtesy of Nauru Tower and Hawaii Energy.

Hawaii Energy awarded The Westin Ka'anapali Ocean Resort Villas an incentive check for $215,657 with Maui Mayor Alan Arakawa and community leaders present. Photo courtesy of Hawaii Energy.

Tuesday, October 2, 2012

12:05 am - October 01, 2012 — Updated: **12:06 am** - October 01, 2012

Cut energy costs with a free lighting retrofit

For a limited time, Hawaii Energy is providing small businesses and restaurants with free lighting retrofits.

The 2011 fiscal year program ending June 30 benefited hundreds of businesses who took advantage of this program. The program for 2012 is expected to kick off by the end of September and will continue until June 30, 2013.

All Big Island restaurants and small businesses which meet the critieria qualify for this program. This program will help the business bring down its utility bill, lessening the carbon footprint.

If you are a small business owner, contact any of the participating contractors listed on http://www.hawaiienergy.com/151 for a free audit.

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Hawaii Energy Seeks Energy Success Stories

October 6th, 2012 · No Comments · Business

Share |

Ray Starling is program manager for Hawaii Energy. Photo courtesy of Hawaii Energy.

By Sonia Isotov

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, has announced the launch of its second annual Energy Success Story Contest.

Ten winners will be selected, and each will receive energy efficiency gift bags valued at $200 each. One overall winner will also be awarded a home energy monitor system, installation included, market valued at roughly $500.

"We had an amazing response to this contest last year, and we are hoping to reach even more people this year," said Ray Starling, the program manager of Hawaii Energy, in a written statement.

"People teaching people to conserve energy and live more efficiently is what this contest is really all about, so I encourage everyone with a story to please share it with us. It's going to take us all working together if we are to achieve our clean energy goals."

As part of the contest, Hawaii Energy wants inspiring and motivating stories and photos from Hawaii homeowners and renters showcasing their outcomes and successes in conserving, or more efficiently using electricity.

Solar water heating saves energy. Photo courtesy: Hawaii Energy, Conservation and Efficiency Programs.

"We keep the use of our clothes dryer to a minimum and we started hang-drying our clothes," stated Elisa Lau-Oshiro of Honolulu in her winning submission last year.

"We also make sure our solar water heater is working effectively and efficiently, and we turn off lights in rooms that aren't being used. Everyday changes have lowered our electricity bill by $30-$50 a month; and that adds up!"

Contest submissions will be accepted from Monday, October 8 at 8:00 a.m. through Wednesday, October 31 at 11:59 p.m.

No purchase or payment is required to enter, but entrants must be a residential electric utility account holder on the islands of Hawaii, Lanai, Maui, Molokai or Oahu. There is no limit on the number of entries.

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission, serving the islands of Hawaii, Lanai, Maui, Molokai and Oahu.

For more information on the contest or Hawaii Energy, visit www.HawaiiEnergy.com.

Related Stories:

- Hui Up Program Offers Refrigerator Trade-In on Molokai
- Hawaii Energy Offers $35 Cash For Inefficient Appliances
- Westin Ka`anapali Receives $200K Energy Efficiency Incentive
- Get Free LED Lighting! Lamps Offered to Business, Nonprofits
- Limited $250 Rebate for ENERGY STAR Purchase on Maui

Tags: Hawaii Energy program·maui alternative energy·maui electric utilities·maui electricity·maui energy·maui energy conservation·maui energy efficience·maui energy savings·maui home energy monitoring system·maui home energy savings

Hawaii Energy Contest Launches Monday

Sherry Bracken

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, has announced the launch of its second annual Energy Success Story Contest. Ten winners will be selected, and each will receive energy efficiency gift bags valued at $200 each. One overall winner will also be awarded a home energy monitor system, installation included, market valued at roughly $500.

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“We had an amazing response to this contest last year, and we are hoping to reach even more people this year,” said Hawaii Energy Program Manager Ray Starling. “People teaching people to conserve energy and live more efficiently is what this contest is really all about, so I encourage everyone with a story to please share it with us. It’s going to take us all working together if we are to achieve our clean energy goals.”

As part of the contest, Hawaii Energy wants inspiring and motivating stories and photos from Hawaii homeowners and renters showcasing their outcomes and successes in conserving, or more efficiently using electricity. Winning stories will be used to help fellow Hawaii residents learn how they can reduce their electric bills with low to no-cost tips.

“We keep the use of our clothes dryer to a minimum and we started hang-drying our clothes,” stated Elisa Lau-Oshiro of Honolulu in her winning submission last year. “We also make sure our solar water heater is working effectively and efficiently, and we turn off lights in rooms that aren’t being used. Everyday changes have lowered our electricity bill by $30-$50 a month; and that adds up!”

Contest submissions must be entered no later than October 31, 2012 at 11:59 p.m. Judges will review all stories submitted and select the top ten. Those selected will be contacted and requested to provide a photo to complement their story. Contest entrants agree to allow Hawaii Energy to use their story, as well as their name, city and photo in future marketing and advertising campaigns. No purchase or payment is required to enter, but entrants must be a residential electric utility account holder on the islands of Hawaii, Lanai, Maui, Molokai or Oahu. There is no limit on the number of entries.

For more information about the contest or Hawaii Energy, please visit www.HawaiiEnergy.com.

Some Hawaii residents are rewarded for going green

Published: 10/10 2:11 pm

Updated: 10/10 2:12 pm

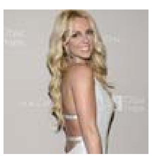
This video player supports Adobe Flash Player versions 10.1 and higher.

Download the latest version

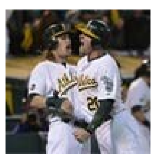
Some Hawaii residents are rewarded for going green

Nice reward for saving! Hawaii Energy, the conservation and efficiency program for Maui, Hawaii and Honolulu counties, announced the launch of its second annual Energy Success Story Contest. Ten winners will be selected, and each will receive energy efficiency gift bags valued at $200 each, with one overall winner receiving a home energy monitor system, installation included, valued at roughly $500. Hawaii Energy wants inspiring and motivating stories and photos from Hawaii homeowners and renters showcasing their outcomes and successes in conserving, or more efficiently using electricity. Contest submissions started this week and will continue through Wednesday, October 31. For more information on the contest or Hawaii Energy, visit HawaiiEnergy.com.

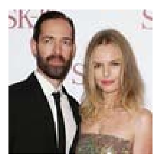
Top Photo Galleries



Celebrities-Females



MLB Playoffs



Celebrity-Hook Ups

Celebrities-Males

We Recommend

Kalihi store robber may be connected with other robberies (KHON)

Truck plows through window at Kaneohe Chinese restaurant (KHON)

Osbourne weds in Hawaii (KHON)

UPDATE: Victim of deadly stabbing at Ala Moana Center identified (KHON)

Hawaii's Most Wanted: Justin Costa (KHON)

More From The Web

MGM Grand announces Studio 54 replacement (Las Vegas Sun)

7 Legendary Monsters of South America (Mental Floss)

Your hotel room can be hacked with a 'dry erase marker' | PCWorld (PC World Latest Technology News)

10 Worst Cars of All Time (TheStreet)

Mom Tours Sausage Factory & Is Shocked by What She Saw (PHOTOS) (CafeMom)

[?

About Town 10-11-12 | West Hawaii Today, Kailua-Kona, Hawaii

Textile art workshop slated Saturday

Yukuke Yokoi, an artist from Okinawa, will present a bingata, or katachiki, workshop from 10 a.m. to 2 p.m. Saturday at Konawaena Middle School. Yokoi will teach participants the intricate textile art that dates to the Ryukyu Kingdom.

The workshop costs $85, including materials and a light lunch. Registration begins at 9:45 a.m.

An exhibit featuring original pieces for sale will be displayed during workshop hours.

For more information, contact Pat Nagy at 325-0060.

Oktoberfest is Oct. 19 in Kealakekua

Christ Church Episcopal, on Konawaena School Road in Kealakekua, celebrates Oktoberfest at 6 p.m. Oct. 19.

The event features authentic German food and beer and live music from The Last Fling Band, a German oompah band.

Tickets are $25 each, half-price for children, and available at the church office or at brownpapertickets.com Tables may be reserved for large parties.

For more information, call the church at 323-3429.

School thrift shop plans Saturday sale

Waimea Elementary School Thrift Shop will hold a clearance sale from 8 a.m. to noon Saturday.

All items are new or gently used. The sale will feature an array of items including keiki and adult clothing, Halloween costumes and decorations, cookbooks and two wedding gowns.

The thrift shop is located in the back of Waimea Elementary School's campus, near the post office. It is open from 1 to 3 p.m. Wednesdays; 8 a.m. to noon Saturdays.

For more information, call Gunda Iaea at 990-1959 or email gunda@hawaiiantel.net.

Hawaii Energy holds success story contest

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, has launched its second annual Energy Success Story Contest.

Submissions of inspiring and motivating stories from Hawaii homeowners and renters showcasing their successes in conserving or more efficiently using electricity must be entered no later than 11:59 p.m. Oct. 31. Judges will select the 10 best stories. Each of the winning entrants will receive an energy efficiency gift bag valued at $200. One overall winner will also be awarded a home energy monitoring system valued at $500.

For more information, visit hawaiienergy.com.

Korean War vets meet Saturday

The Korean War Veterans Association of West Hawaii Chapter 279 meets at 10 a.m. Saturday at Denny's Restaurant on Henry Street in Kailua-Kona.

Membership is open to any person who has seen honorable service in any of the U.S. armed forces, defined as Army, Navy, Marines, Air Force and Coast Guard if said service was within Korea including territorial waters and airspace at any time from Sept. 3, 1945, to the present, or said service was outside Korea from June 25, 1950, to Jan. 31, 1955. Associate members are also welcome.

For more information, call Joe Nimori at 329-3058 or Bob Welter at 929-7001.

Composting workshop slated Saturday in Hawi

Recycle Hawaii, funded in part by the Hawaii County Department of Environmental Management, will sponsor a composting workshop from 10 a.m. to noon Saturday at Montessori Education Center of Hawaii in Hawi.

The interactive and informative workshop will address the basics of backyard composting and composting with worms, an easy way to turn kitchen scraps into “garden gold.” The cost is $10; keiki are free. A voucher for a free backyard composter will be given to each family participating in the session.

Advance registration is not required. For more information, contact Ann Hassler at 937-1100 or email Crazy4Compost2@gmail.com.

Huliau to perform at N. Kohala library

Huliau, a contemporary Hawaiian dance company showcasing hula as a high art form, will perform at 6 p.m. Monday at North Kohala Public Library.

Kumu hula Michale Pili Pang, who previously led a halau in Waimea, leads the group that brings Hawaiian rituals, myths and legends to the stage with a contemporary flair.

The 45-minute program is sponsored by the Friends of the Library and presented by the University of Hawaii at Manoa Outreach College’s Statewide Cultural Extension Program. Additional funding is provided by the Hawaii State Foundation on Culture and the Arts, and the National Endowment for the Arts.

For more information, call the library at 889-6655.

Meditation class Sunday in Volcano

A free meditation class is slated from 4 to 5:30 p.m. Sunday at the Niaulani Campus of the Volcano Art Center in Volcano Village. Participants will learn to meditate or deepen their meditation, according to the teachings of Buddha.

Those attending should dress warmly and bring a cushion.

For more information, call 985-7470.

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Hawaii Energy Seeks Energy Heroes

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Posted: Oct 17, 2012 10:05 AM
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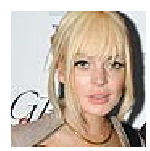

HONOLULU (HawaiiNewsNow) - Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, today announced the launch of its second annual Energy Success Story Contest. Ten winners will be selected, and each will receive energy efficiency gift bags valued at $200 each. One overall winner will also be awarded a home energy monitor system, installation included, market valued at roughly $500. Contest submissions will be accepted from Monday, October 8 at 8:00 a.m. through Wednesday, October 31.

"We had an amazing response to this contest last year, and we are hoping to reach even more people this year," said Hawaii Energy Program Manager Ray Starling. "People teaching people to conserve energy and live more efficiently is what this contest is really all about, so I encourage everyone with a story to please share it with us. It's going to take us all working together if we are to

achieve our clean energy goals."

As part of the contest, Hawaii Energy wants inspiring and motivating stories and photos from Hawaii homeowners and renters showcasing their outcomes and successes in conserving, or more efficiently using electricity. Winning stories will be used to help fellow Hawaii residents learn how they can reduce their electric bills with low to no-cost tips.

"We keep the use of our clothes dryer to a minimum and we started hang-drying our clothes," stated Elisa Lau-Oshiro of Honolulu in her winning submission last year. "We also make sure our solar water heater is working effectively and efficiently, and we turn off lights in rooms that aren't being used. Everyday changes have lowered our electricity bill by $30-$50 a month; and that adds up!"

Contest submissions must be entered no later than October 31, 2012 at 11:59 p.m. Judges will review all stories submitted and select the top ten. Those selected will be contacted and requested to provide a photo to complement their story.

Contest entrants agree to allow Hawaii Energy to use their story, as well as their name, city and photo in future marketing and advertising campaigns. No purchase or payment is required to enter, but entrants must be a residential electric utility account holder on the islands of Hawaii, Lanai, Maui, Molokai or Oahu. There is no limit on the number of entries.

For more information about the contest or Hawaii Energy, click HERE!

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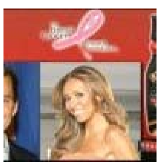

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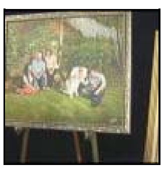

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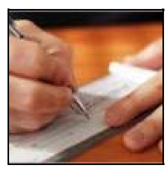

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CALENDAR // WHAT'S UP

October 22

Posted on October 17, 2012 by Nicole Kato | Email the author
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Monday October 22

CLASSES

Adult Art: Drawing & Painting
Kroc Center Hawaii, Mondays, Sept. 10 to Dec. 10, 6-9 p.m., $240. Experiment with charcoal, ink, watercolor and/or acrylic while learning to use line, tone, perspective and color. Each session will focus on one type of subject matter, such as still life, landscape, or the clothed human figure. (kroccenterhawaii.org)

Adult Learn-to-Swim Classes
Kroc Center Hawaii, various times, Sept. 10 to Oct. 31, $125. Two classes to choose from: Fundamental Aquatic Skills or Stroke Development. (kroccenterhawaii.org)

Ballroom Dancing
Kroc Center Hawaii, Mondays, Sept. 17 to Nov. 12, 6:45-7:45 p.m., $96, $15/session. Ballroom dancing is an art form in which one can express themselves in new and unique ways. (kroccenterhawaii.org)

Coast Guard Auxillary Boating Class
Key Projects Center, Kaneohe, Mondays and Thursdays, Oct. 1 to Nov. 12, 6:30-8:30 p.m., $45. The course covers subjects such as handling your boat, Navigation, equipment and safety. (391-9125, kid-coral@hawaii.rr.com)

First Aid Certification Course
Kroc Center Hawaii, 6:30-9 p.m., $70/class, $5/booklet. The courses in this program teach skills that participants need to know to give immediate care to a suddenly injured or ill person until more advanced medical personnel arrive and take over. Ages 15 & Up. (kroccenterhawaii.org)

Mask Making
Liliha Public Library, 2:30 p.m., free. Yuki Shiroma "Mask Making." (587-7577)

Stork Class
Kaiser Permanente –– Moanalua Medical Center, Mondays until Oct. 29, 6-8 p.m., call for cost and to register. (432-2260)

Zumba
Kaiser Permanente Moanalua Medical Center, Monday/Thursday until Dec. 13, 5:45-6:45 p.m., $6.50/nonmembers, $5/members. Zumba is a fusion of Latin and international music dance themes. Call

EVENTS CALENDAR

Ongoing Events // Ongoing
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What's Up // August 26
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COMMUNITY

Windward Oahu Coverstory // A Bright 'Les Mis' Paliku Production to register. (432-2260)

SPECIAL EVENTS

Breast Cancer Support Group

Kaiser Permanente – Mapunapuna Clinic, noon to 1:30 p.m., free. (432-8538)

Elder Abuse

Waipio Clinic, 94-1480 Moaniani St., Waipahu, 10-11 a.m., call to register and for cost. Come learn about the signs of abuse and steps you can take to prevent becoming a victim of abuse. (432-2235)

MOA Healthy Mondays

Pearlridge Center Uptown, 8:30-10:30 a.m., free. Experience purifying and flower therapies, as well as the Japanese Bontemae tea ceremony. (pearlridgeonline.com)

Walk With Ease

Windward Mall, Mondays, Wednesdays and Fridays, 8:30-9:30 a.m., six weeks Oct. 22 to Nov. 30, $25. Class size is limited and participants must pre-register. (247-6211 ext. 1107)

Efficiency Sales Professional Training Certification Program

Honolulu Country Club, Oct. 22-27, visit website for schedule and cost. Hawaii Energy is offering a limited number of attendees the opportunity to receive grants for the certification training and the workshops. (efficiencysalesprofessional.com)

Hawaii Energy Workshop Series

Honolulu Country Club, Oct. 22-27, $350 for qualified registrants. New six-day training to turbocharge your success. (hawaiienergy@saic.com)

Central Oahu Coverstory // Mililani Schools Join Tech Pilot

East Oahu Coverstory // CU Forum To Help Fight The Hackers

West Oahu Coverstory // City Council Lauds Ka Pa'alana School

Workshop to cover analysis of energy efficiency projects

October 25, 2012

Lahaina News

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KAHULUI - The workshop Financial Analysis of Energy Efficiency Projects will be held on Tuesday, Oct. 30, in the Maui Arts & Cultural Center's Alex Higashi Meeting Room.

The workshop will cover several approaches to calculating a project's returns, the pros and cons of various financial metrics, and how to generate compelling capital budgeting requests.

The workshop will be led by Mark Jewell, president of EEFG, and sponsored by Hawaii Energy.

The event is designed to help those that want to increase sales of energy efficiency solutions and personnel who must obtain project funding approval from within their organization to move projects forward.

To register, e-mail info@eefg.com or call (808) 421-8639.

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Energy efficiency workshops, certification program offered

October 27, 2012

The Maui News

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Hawaii Energy has partnered with efficiency experts EEFG Inc. to bring a new certification training program and energy efficiency workshops to the state, including one this month in Kahului.

On Maui, a "financial analysis of energy efficiency projects" workshop will be held 8 a.m. to 5 p.m. Tuesday in the Maui Arts & Cultural Center's Alex Higashi meeting room.

The Maui workshop is designed to cover several approaches to calculating a project's returns, its financial pros and cons and how to generate compelling capital budgeting requests, according to an announcement.

Participants do not need to attend all three workshops in order to receiving a training certificate, just for the topic they learn about, said Walter Enomoto, Hawaii Energy's Maui County program specialist.

The sessions should help those who want to increase sales of energy efficiency solutions and personnel, but must obtain project funding approval from within their organization.

Hawaii Energy is a conservation and energy efficiency program, except only for Hawaii, Honolulu and Maui counties. Hawaii Energy is offering a limited number of grants, which drop the cost significantly, for the certification training and workshops. Maui grant recipients can attend any of the workshops for $35, versus $495 per workshop for people who do not qualify for the special lower rate.

For more information about the workshops as well as lower rate qualifications and sign-ups, go online to www.effiencysalesprofessional. com.

The workshops will be led by EEFG President Mark Jewell and are sponsored by Hawaii Energy, www.HawaiiEnergy.com.

For more information or to register, email info@effg.com or call (808) 421-8639.

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Hawaii: 'A Globally Important Case Study' In Energy

Catharine Lo

"These are my people."

That was UH Information and Computer Sciences Professor Philip Johnson's reaction when he attended his first BECC conference in 2009. BECC stands for Behavior, Energy, and Climate Change. The annual conference focuses on "understanding the behavior and decision-making of individuals and organizations and using that knogwledge to accelerate our transition to an energy-efficient and low-carbon future."

What Johnson, who heads the Collaborative Software Development Laboratory at Manoa, meant was that when he talked about the open-source application designed by UH software developers to manage an online energy reduction and sustainability competition among campus dorms, nobody mistook "vampire load" for a reference to a Halloween costume mishap.

Instead, the audience understood how helping people to eliminate phantom loads translates into instant energy conservation, and why that is inherently valuable to a place like Hawaii that relies on imported fossil fuels to meet 90 percent of its energy needs. What's more, they were able to offer their own insight to further inform and improve the project.

During this year's BECC conference, which took place in Sacramento from Nov. 12-14, University of Hawaii Ph.D. student Yongwen Xu delivered a presentation about the software engine for the Kukui Cup game in a session on "Feedback and Response as a Behavioral Trigger." The forum provided the opportunity for UH to introduce its open-source solution to a relevant international audience.

BECC's 700 attendees included a diverse group of senior-level policymakers, social and natural scientists, program implementers, media, and energy experts. With sessions that span the range of behavioral impacts on energy and climate change issues — from marrying EVs with solar PV, to peer-influenced energy consumption habits, to leveraging conspicuous travel choices — there is an intense cross-pollination of ideas that goes on at BECC. The solutions that are fostered from those ideas benefit from both scientific knowledge and real-world applications that have been closely evaluated.

University of Hawaii Ph.D. student Robert Brewer, one of Johnson's and Xu's co-collaborators, points out that conference engagement is a two-way street. "People are blown away when I tell them we pay $0.35 a kilowatt hour," he said, illustrating how researchers and industry practitioners regard Hawaii's unique, if not daunting, energy challenge as a ripe opportunity for applying transformational strategies.

"Hawaii is a globally important case study," offered Mackay Miller, a Technology Innovation Analyst with the National Renewable Energy Lab. The kinds of governance, system planning, and technical quagmires Hawaii finds itself in as it negotiates the transition to clean energy are the same challenges that the mainland will also face on a larger scale, and other places will look to see how Hawaii will effectively "integrate all the moving parts," he suggested.

Also attending this year's conference were representatives from Blue Planet Foundation and Hawaii Energy. "Of all the things we can be doing in energy conservation, the future belongs to behavior change," said Ray Starling,

About the Author

Catharine Lo
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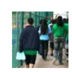

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Program Manager for Hawaii Energy, the ratepayer-funded program which administers the energy efficiency program for Hawaii, Maui and Honolulu counties under contract with the Hawaii Public Utilities Commission.

Starling is keen to stem practices that waste electricity, and he believes that behavior modification strategies can be an inexpensive way to turn them around. The success of Hawaii Energy's energy efficiency programs are critical, not only to achieving the state's mandate for 30 percent energy efficiency by 2030, but also to relieving the high (and rising) cost of oil-fired electricity borne by ratepayers. After all, the power of efficiency, by definition, is not about sacrifice (as it's often misperceived), but about doing more with the same amount.

Blue Planet's Program Director Richard Wallsgrove echoed the sentiments of the other Hawaii attendees. "BECC is a game changer. We met with some of the brightest minds from around the world to discuss simple and innovative ideas for tackling efficiency and solving the riddle of energy waste."

"Many people we talked to were fascinated by Hawaii's energy successes and challenges, and they helped us to envision how the concepts from BECC can be applied in Hawaiʻi," he continued. "We were inspired, and we are thrilled to bring that inspiration home, along with a wealth of ideas that will help reshape Hawaii's energy culture."

About the author: *Catharine Lo is the Communications Director at Blue Planet Foundation.*

Community Voices aims to encourage broad discussion on many topics of community interest. It's kind of a cross between Letters to the Editor and op-eds. We do not solicit particular items and we rarely turn down submissions. This is your space to talk about important issues or interesting people who are making a difference in our world. Columns generally run about 800 words (yes, they can be shorter or longer) and we need a photo of the author and a bio. We welcome video commentary and other multimedia formats. Send to news@civilbeat.com.

Posted by Catharine Lo on 11/16/2012

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Kian M Kwan · University of California, Berkeley

Valuable work and contributions. More power to all.

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Could Hawaii's Utility Be Doing More To Reduce Electricity Costs?

By Sophie Cocke | *11/30/2012*


Travis Thurston

As Hawaii strives to cut its dependence on imported oil, researchers at the University of Hawaii say that state policymakers are missing a major part of the equation when it comes to energy efficiency goals.

The Hawaii Clean Energy Initiative, signed into law in 2009, mandates that Hawaii reduce electricity consumption by 30 percent by 2030. It's an aggressive goal. It equates to shutting off all power on the neighbor islands plus one-third of Oahu, according to the state energy office.

But the state could make a big dent in the amount of oil it's importing to supply residents' electricity needs if it also focused on upgrading decades-old power plants, and in the process drive down electricity rates, according to Sherilyn Wee and Iman Nasseri, doctoral students at the University of Hawaii.

The state imports roughly 15 million barrels of oil for electricity use annually. Of that, only 5 million barrels are converted to electricity and 10 million barrels are wasted, according to their research.

That's because on average the utilities' generating units are only 30 percent efficient, said Nasseri. If the electric utilities switched out their steam-powered generating units to more efficient gas turbines, he said, efficiency could double, reducing the amount of oil needed to produce electricity by about half.

Hawaiian Electric Co., which operates the utilities on Oahu, Maui and the Big Island, says it is looking into converting some of its generating units to gas.

But the state's energy efficiency standards don't focus on the operations of the electric utility companies. Instead they only apply to reducing the amount of electricity residents consume and ignore the efficiencies that can be gained throughout the generation, transmission and distribution process.

Ray Starling, who heads Hawaii Energy, the state's energy efficiency program, said that when state policymakers discussed including the utilities' production facilities. But Hawaiian Electric Co. fought it, he said.

"In the (regulatory process), the utility basically took a position that they already do the stuff they need to be doing to be efficient and that the efficiency of the utility should not be something that is part of the (energy efficiency) mandate," he said.

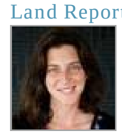
HECO spokesman Darren Pai said in an email that the intent of the energy efficiency standards was to focus on reducing the sale of electricity, not how it is generated. "Generating unit efficiency, which is very important and something we work hard at because it can reduce fuel use and costs to our customers, is focused on a different aspect of the energy picture," he said.

But Starling said that the utility could be doing a lot to make its operations more efficient, including upgrading generating units, which would both reduce oil imports and cut electricity rates. He said a better policy would be to look at whether or not the state was importing fewer barrels of oil, not whether customers were consuming less electricity.

"(The utility) could do a lot of things that would save a lot of energy. But the way we measure energy is saving kilowatt hours. I think we are measuring the wrong thing," he said. "You really want to measure how many barrels of oil you are burning. That's the measure of whether you are really saving or not."

About the Author

Sophie Cocke
Land Reporter-Host



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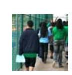
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26 people recommended this.


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26 people recommended this.

Starling said that electric utilities have traditionally been focused on providing reliable electricity to customers and efficiency has not been a priority. He said that the for=profit business model of regulated utilities doesn't encourage energy savings.

"If they're not as efficient as they could be, from their standpoint, it's not a big deal because they are going to recover their costs and get a profit on the amount of money their investors have invested in the company," he said. "Because of the business model of any regulated utility, there is not a lot of incentive for them to be highly efficient."

Pai says the utility is focused on efficiency measures.

"From an operational perspective, we are continually improving the efficiency of existing generating units and the transmission and distribution systems," he wrote by email. "This helps customers by reducing the fuel needed to meet their energy needs — and thereby the costs to them."

Hawaiian Electric Co. has 110 generating units spread across more than a dozen power plants which utilize different technologies, according to research conducted by Blue Planet Foundation, a private organization focused on eliminating fossil fuel use.

Jeff Mikulina, Blue Planet executive director, said that when it comes to energy efficiency policies, the full cycle of electricity production and delivery needs to be taken into account.

"We have to look at the entire system from the fuel source all the way to the end use — every efficiency throughout the entire system," he said. "We have some of the most inefficient, outdated plants possible. We have power plants that date back to the 1940s."

What to do with HECO's power plants in the long term is taking on a greater sense of urgency.

The utility, assisted by a 60-member advisory panel, is in the midst of charting a long-term energy strategy that's expected to include plans for its generating units. Pai said HECO is looking at a mix of options.

In addition to the planning process, other factors have brought discussions about HECO's generating units to the forefront.

Gov. Neil Abercrombie is encouraging importing liquefied natural gas to Hawaii, which would require HECO to convert at least some of its units to run on gas. Almost all of HECO's units burn oil.

More renewable energy projects are also coming online which are expected to replace oil-powered generators. Solar and wind facilities are increasing the need for technologies that can help stabilize electricity generation. And the Environmental Protection Agency is requiring upgrades to oil-based generating units beginning in 2015 to meet stricter environmental controls. Thus, HECO is expected to have to spend significant capital on upgrades anyway.

Adding scrubbers and air control devices to meet the new regulations could cost the utility $1 billion to $3 billion, according to Nasseri, who argues that switching to gas turbines makes more economic sense. By comparison, he said that switching steam-powered generators to gas turbines would cost about $150,000 per 100 megawatts, which in the end would be significantly cheaper.

"It better benefits the state, HECO and customers to switch these old steam turbines into new modern, efficient gas turbines," he said. "Of course natural gas could be an option. But even if you burn diesel instead of low sulfur fuel oil in those units, you still have higher efficiency, less cost and a cleaner burn."

DISCUSSION: *Do you think the state needs to put more pressure on HECO to operate its power plants more efficiently?*

Richard Bidleman · UC Berkeley

Next Article: Pacesetters - 2012-11-30

Hawaii Energy team grows moustaches for ‘Movember’ cancer awareness movement

Pacific Business News by Stephanie Silverstein, Reporter
Date: Friday, November 30, 2012, 2:14pm HST

Stephanie Silverstein
Reporter- *Pacific Business News*
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The Hawaii Energy team looks a little different this month.

Growing moustaches throughout November, nine of the state energy and conservation program’s 11 male employees teamed up to participate in “Movember,” a movement to raise awareness and funds for issues relating to testicular and prostate cancer.

When Hawaii Energy Junior Program Specialist Ian Tierney first heard about Movember, he also learned that a good friend of his was diagnosed with testicular cancer.

Enlarge Image

Courtesy Hawaii Energy

The staff of Hawaii Energy sported moustaches — real and fake — this month for "Movember" to raise awareness and funds for issues relating to testicular and prostate cancer.

“It kind of opened up my eyes to how close to home it can hit,” Tierney said.

He started participating in Movember to raise awareness about the cancer, and also raise a little money while having fun.

This is Tierney’s third year participating in Movember, but the first that the Hawaii Energy staff is participating as a team. His colleagues were enthusiastic about joining the cause. Even “Pluggy,” the company logo of an electrical outlet, is wearing a moustache this month.

“We’re always looking for team-building things, and Ian being so energetic and creative brought it to our attention,” said Shan Wirt, communications specialist.

Although the team has not set a financial goal, they are continuously spreading awareness about the cause.

“We just figured let’s bring awareness to it, let’s have some fun with it, and if we can raise some money on the side for the cause, that would be even better,” Tierney said.

The moustaches are a conversation starter for the team in and out of work. I actually met Tierney while hiking Manoa Falls, and sure enough, it was the moustache that got us talking about Hawaii Energy and the team’s mission to raise awareness.

“Random people see me in restaurants, I’m getting lunch or walking around downtown and they’ll kind of comment on my moustache, and I’ll briefly mention I’m doing it for Movember,” Tierney said. He directs them to the team website in case they want to donate to the cause, but his bigger goal is to raise awareness.

Wirt said a number of Hawaii Energy staff members talk with a lot of people through their work, and personally, as well. She said Program Manager Ray Starling was going to spread the word at a conference he was attending on the Mainland this month.

Although the team has had fun with Movember, Tierney said, “I think we’re all going to come to work on Monday with no moustache.”

> Stephanie Silverstein covers the hospitality industry and money for Pacific Business News.

Next Article: Pacesetters - 2012-11-30

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Holiday Tips to Save You Money & Electricity

From Hawaii Energy a ratepayer-funded conservation and efficiency program

At Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, our mission is to help you save money on your electric bills and reduce our dependence on imported oil.

Check out our top ten holiday tips to start saving today:

(1) Switch to LED Holiday Lights

By using six strings of 100 LED holiday lights instead of old-fashioned incandescent lights, you can save $10 - 15. What's more, LED lights are cooler to the touch and safer. (Savings are based on use of 600 non-blinking holiday lights for six hours for 30 days, but may vary based on effective electricity rate.)

(2) Use Timers for the Lights

Consider using a timer with a lighting sensor on your indoor and outdoor holiday lights.

(3) Turn Off Room Lights When the Holiday Lights on the Tree are Lit

When you turn off room lights, you save energy and make your tree the centerpiece of the room.

(4) Decorate with LED-Style Candles

LED-style candles are safer than traditional burning candles.

(5) Try Alternative Holiday Cooking Methods

Consider and try alternative holiday cooking methods to save time and energy – and to infuse some new flavors. On average, a 16-pound turkey takes four hours to cook in a conventional oven whereas it takes less than two hours to cook the same turkey outdoors kiawe-style.

(6) Turn off the Air Conditioner

Enjoy the Hawaiian "winter" – the slight chill in the air – while it lasts.

(7) Buy Gifts That Don't Use Electricity or Batteries

Gifts that don't need electricity or batteries are better for our environment – and your wallet.

(8) Invest in Rechargeable Batteries

If you must use batteries, consider rechargeable batteries.

(9) Buy ENERGY STAR® Labeled Items as Gifts

Always look for ENERGY STAR® labeled items.

(10) Walk, Instead of Drive, to See the Holiday Lights in Your Community

Walk off the eggnog and holiday cookies. Plus, you'll save on gas.

About Hawaii Energy

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission serving the islands of Hawaii, Lanai, Maui, Molokai and Oahu. The program plays an important role in helping to achieve Hawaii's goal of reducing total electric energy usage by 30 percent or 4.3 billion kWh by 2030.

Visit HawaiiEnergy.com or call toll-free 1-877-231-8222 (neighbor islands).

Does Your Building Have 'Heavy Users'?

High utility costs, new technology and a new state act make submetering a real possibility for many buildings.

By Donald Mastriano

Electricity, water and other utilities continue to get more expensive, with no relief in sight. Many older buildings have only one master meter to measure the use of electricity, and probably do not measure their other utilities either. Richard Ekimoto, senior partner of Ekimoto & Morris, LLLC, a local law firm that specializes in representing condominium associations, says, "The high price of electricity, along with the new state Act HB1746, has created a lot of interest in submetering from many condos."

Why Submeter?

Ask owners who live in such buildings, and, if they are conservation-oriented, they are likely peeved because they know that they are chipping in for the so-called "heavy users." Heavy users might run their businesses from home, could run air conditioning excessively while they're at work or on vacation, and could wash and dry clothes daily. However, because every owner in the condo pays the electric bill as a percent of common ownership, the burden of the heavy users gets distributed across the community—and, in many cases unfairly.

Inovonics wireless submetering components

And, what about renters? What incentive do they have to keep their use of utilities down when their landlord has no idea how much electricity they are using each month? When electricity and water were reasonably priced, the lack of metering might have been somewhat understandable. But in 2008, and more recently the past two years, the cost of electricity has gone sky high … in some cases draining the reserves of condos and even causing some condos to make special assessments just to cover the extra cost. Jeff Dickenson, senior vice president at Hawaiian Properties Ltd., says, "Submetering is a lot more fair, and most importantly it's easier to do yearly budgets when you take the highest line items out of it."

How Submeters Work

Submetering has been around for many years. The principle is that while the condo itself has only one "master meter," each apartment can be outfitted with a "submeter." This allows the association to determine how much electricity each unit uses each month and invoice it accordingly. Because the condo remains a "master" metered building, HECO continues to charge the commercial rate and the owners pay for their individual use at this reduced amount.

Wireless meters are safe and effective. They use the same wavelength as the portable phones most people use in their homes. They are easy to configure, reliable and most maintenance can be done over the Internet by the vendor.

National studies show that submetering encourages reduction in energy usage of 15 percent to almost 30 percent.

In its early days, metering (with electro-mechanical indicators) was often an arduous and expensive proposition. Early stage meters were hardwired, or they sent signals over existing electric lines (called power line carrier). But technology has allowed metering to progress to wireless systems, which has revolutionized the process for most buildings.

Wireless technology consists of a relatively small meter with a transmitter placed in, or outside, an apartment. That meter measures the amount of electricity that flows through that unit's breaker panel. That measurement is sent wirelessly using low voltage RF (800 MHz Radio Frequency, similar to portable hand phones used in most homes today) to a repeater probably out in the hallways of the building and then again wirelessly to a central data collector (computer) in the property manager's office for monthly reporting and invoicing.

How to Get Submetering

Though submetering is simple in concept, it can be complex to implement.

The condo association must first communicate with the owners and obtain a legal decision to submeter. It then must decide what technology to use, whom to buy it from, gather the funds, purchase and eventually oversee the installation and implementation. Following all these steps, the association must then begin collecting the monthly data and invoicing owners each month.

Prior to April of this year condo associations often had a difficult time making the decision to submeter. There could be heavy users on the board of directors, with vested interests in not submetering. To move forward with submetering usually required a lengthy legal process that eventually ended up with a vote requiring a high percent of owners choosing to change the payment method. Some persevering condos achieved this, but many never did. Finally, after intense

Attachment G
Page 64 of 155

lobbying, this year the state passed an act, HB 1746, that allows the boards of directors to make the decision for the condo community. (For more information, see ACT, HB 1746, sidebar)

Let's say a condo's board wants to submeter. Then the technical questions come up. What submetering equipment should they purchase for their unique building? Could they measure other utilities besides electricity? Who installs it, who maintains it, how do the owners get their monthly invoices?

Some of the answers are very technical and when an association enters into the process it faces competing companies with various submetering options. How's a board to know what to do?

Lisa Harmon, a program specialist with Hawaii Energy, which is the state energy conservation and efficiency program, is working with many buildings interested in submetering. It's part of Hawaii Energy's mission to help local businesses reduce their electricity use by offering incentives for energy-efficient technologies. It currently offers an incentive for each submeter installed in condos.

"There is a huge interest in submetering, because AOAOs are looking for a way to fairly allocate the cost of electricity. Submetering fosters conservation among owners and residents because they become responsible for paying the bill," Harmon says.

Once the submetering system is installed, Hawaii Energy provides workshops to educate residents about ways to reduce consumption and rebates for more efficient lighting and household equipment.

Hawaii Energy strongly recommends that associations research the types of submeter systems available. It suggests creating a request for proposal to solicit bids from various vendors. "Additionally," Harmon says, "consider whether a consultant might be worthwhile to tie the many aspects of the project together."

Selecting a Submetering System

To end up with the proper equipment you need to eventually work with a vendor such as Keith Sakai, owner of Keith's RF Submetering who's been selling and servicing submetering systems in Hawaii, Asia and on the Mainland since 1984. He is a master electrician, has owned his own commercial electrical contracting company and now estimates he has sold more than 750,000 meters.

Keith's RF Submetering offers the following guidelines:

- Do your homework, research and do your due diligence. Always check references.
- Make sure the system you select is long-standing and will meet the requirements of Hawaii Energy's incentive rebate program.
- Make sure the meters meet professional ANSI C12.1 requirements. ANSI is a federal guideline that helps insure meter accuracy. It requires that each meter has a rotating disk or LED light that indicates improper phasing, and requires a display counter.
- Order meters with a kWh display to protect against an owners challenge to a computer-only generated reading. The display can collaborate readings.
- Expect a minimum warrantee of five years, as that is what many municipalities require.
- Make sure your vendor has a complete billing solution. You need reliable monthly readings in a format your property management company can process into invoices for each owner in a timely manner.
- Make sure the electricians you select understand the system, and can work with your meter vendor.
- Make sure the hired electrician company has enough staff to install your meters in a timely manner. Check its references, too.
- Be careful with older systems, such as hard wire and power line carrier technology. They can be susceptible to outages and frequency problems that can interfere with measurements and invoicing owners each month.
- In some cases, more than just electricity can be measured. Some buildings can also measure and charge back for central hot water, and/or chilled water that is used for air conditioning. The property has to be reviewed and a proposal generated based on unique building configurations.

Leviton Meters for apartments and commercial applications

ACT HB 1746

On April 12, 2012, Gov. Neil Abercrombie signed HB1746 HD1 relating to condominiums. The act permits a condominium board of directors to authorize the installation of submeters for utilities if the association has the funds to pay for the project.

The measure does not mince words. It states, "Many older condominium projects in Hawaii operate with only a single meter measuring the aggregate consumption of utilities such as gas, water and electricity for all units within the condominium project." It stated that "consequently, utility expenses are paid for as a common expense based on each unit's undivided interest in the condominium, rather than individual units' actual utility usage." The legislature "finds that this method of apportioning utility costs is unfair to both unit owners and the condominium association." The Act gave a number of examples, for instance "a unit owner faces no consequences for waste energy consumption, such as leaving lights or air conditioning on at all times."

This act applies to projects for which construction commenced before 1978. It also stated, "recent technology permits the individual metering of utilities in many instances for a reasonable cost."

A problem can still crop up. A board could have a majority of directors not interested in submetering. In that case owners may have to find a way to elect a new board.

Bernie Briones, senior management executive at Hawaiiana Management has recently gone through the process with several condos she helps manage. She notes that submetering is definitely a good idea for some condos. "Many boards are interested at this time and that it's simply an equitable way as everyone pays for their own usage," she says. "Do research, plan and implement well and consider using a consultant because there are many aspects to the project."

Attorney Ekimoto recommends a "thorough communication program when undertaking such a project, having community meetings to explain to owners how the association simply cannot control expenses for the cost of utilities without submetering."

BMH Resource:

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission. Hawaii Energy offers cash rebates and other incentives to local residents and businesses to help offset the cost of installing energy-efficient equipment. In addition to rebates, the program conducts education and training for residents, businesses and trade allies to encourage the adoption of energy conservation behaviors and efficiency measures. The program plays an important role in helping to achieve Hawaii's goal of reducing total electric energy usage by 30 percent, or 4.3 billion kWh, by 2030.

HawaiiEnergy.com
Oahu: 839-8880
Toll-free: 1-877-231-8222
(Neighbor Islands)

Keith's RF Metering Co.
742-7273
keith@keithsrfmetering.com

Donald Mastriano, Ed.D., is a management consultant in Honolulu who has worked with many local businesses to help them become more efficient and successful. Recently, as a condo board member, he led a team that completed the process of submetering. Over the seven months, since the installation began, the association has lowered its daily use of electricity by more than 20 percent.

HAWAIIAN PROPERTIES
Building Relationships that Last
WINTER 2012

Christmas comes early to Country Club Village 6

Country Club Village 6

Hawaii Energy program specialist Lisa Harmon- presented a check to Resident Manager, Dan Daoang, Jr.

Board of Directors of Country Club Village 6 (CCV6) saw their electricity costs escalate quickly over the past year. The building was relatively new, only 3 years old, and it was already constructed using energy efficient lighting.

I worked with Mike Ross from Honu Tech on another project to install energy efficient lighting and the actual kilowatt (KW) savings was more than I had estimated after the installation, so we had Honu Tech inspect CCV6.

He recommended delamping light fixtures in the building and to install energy efficient lighting for the parking garage. The cost for both proposals was $32,110 with a payback in approximately 6 months after an $11,575 rebate from Hawaii Energy.

The installation of the energy efficient lighting and the delamping of the fixtures was performed by the building staff. The delamping took over a month but after the project was completed, the Association noticed an $860 decrease in electricity cost when compared to the same time period a year ago and utilizing the current KW rate. The following month the staff began the installation of the garage light fixtures, this took about 2½ months to complete.

(continue on page 2)

Christmas comes early to Country Club Village 6.....cont.

Once all fixtures were replaced, the Association's electricity cost decreased by $2,000 - $3,000 when compared to the previous year's KW usage and the current KW rate. We expect this amount to be even larger after reviewing the next HECO billing statement which would reflect the electricity usage after all of the energy efficient lighting have been installed for an entire billing period.

Hawaii Energy estimated the delamping and interior and garage lighting retrofits would save the Association an estimated 170,140 kWh annually which is equal to approximately $47,639 savings a year (based on $0.28 cents per kWh).

As an added bonus, Hawaii Energy did not provide a rebate of $11,575, instead - after recalculating the KW savings and verifying the work was completed, they provided a rebate check of $18,279 in November.

By: Kevin Agena

FREE

TRAINING FOR ON-SITE MANAGERS

Starting in 2013, Hawaiian Properties will begin coordinating training seminars for our Association's On-Site Managers. Training classes/seminars will consist of some of the following topics:

- Elevator 101
- Large/Small Building Maintenance
- Landscaping
- Communications
- Concrete Spalling

Additional information will be provided at a later time - watch for our announcement!

1165 Bethel Street
Honolulu, HI 96813
808-539-9777
Fax: 521-2714

Mailing Address:
P.O. Box 38078
Honolulu, HI 96837-1078

Office Hours

8:00 a.m.—4:30 p.m.

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Battle Your Property's Rising Electricity Costs With Hawaii Energy Incentives

Take advantage of Hawaii Energy's incentives to reduce your property's electricity costs. Increase your building's value by reducing expenditures. Hawaii Energy is here to help you save money on your electric bills and reduce our state's dependence on imported oil. As the ratepayer-funded conservation and efficiency program, we offer many incentives to businesses and residents. As a start, consider these:

LIGHTING RETROFITS - Lighting efficiency is a low-hanging fruit for immediate savings. Replace outdated lighting with reduced wattage T-8 lamps and ballasts, LEDs or CFLs. We offer an array of lighting incentives. Change to ENERGY STAR® compact fluorescent lamps (CFLs) to use up to 75% less electricity.

VFD FOR DOMESTIC WATER PUMPS - Condominiums can upgrade to more efficient pumps with variable frequency drives (VFDs) to reduce pump electricity consumption between 20% to 50%. We have incentives for existing (retrofit) facilities.

REFRIGERATORS/FREEZERS – With our "Bounty" program, Oahu households can earn a $25 reward plus free hauling & recycling for your old refrigerator/freezer. On Maui and Hawaii Island, receive $65. If your refrigerator is 15 to 20 years old, you're using 2 to 3 times more electricity (paying up to $500 more per year). If you switch to a new ENERGY STAR model, you get a $125 rebate.

SOLAR WATER HEATING – If you don't have an air conditioner or swimming pool, your home's largest energy consumer is the water heater. If your home has 4 or more people, switch to a solar water heater and you can save about 35% on your utility bill. Call us for rebate information.

SUBMETERING - If you are a master-metered condominium, consider submetering. We offer an incentive of $150 per unit (not to exceed 50 percent of the total project cost). Submetering fairly allocates the cost of electricity and fosters conservation. Electricity reduction can range from 3 to 20%, depending on the property and behavior changes.

GARAGE VENTILATION CONTROL SYSTEM - Reduce garage fan runtime to cut down on your electric bill. We offer an incentive for carbon monoxide monitoring systems with sensors (14 cents per kilowatt hour saved per year for up to 85% of the total project cost).

This is Just the Beginning.

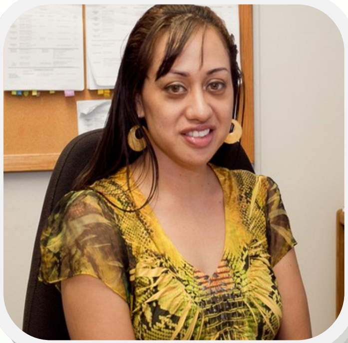
Hawaii Energy

Hawaii Energy has other easy and simple ways for you to save energy in your home.

To save you a little time and energy, visit us at HawaiiEnergy.com or call us at 839-8880 (Oahu) or on the neighbor islands toll-free at 1-877-231-8222.

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission, serving the islands of Hawaii, Lanai, Maui, Molokai and Oahu.

Hawaiian Properties is proud to announce...



Property Manager, Shaunagh Haiola has earned her Certified Manager of Community Association (CMCA) and Association Management Specialist (AMS) designations.

The CMCA designation is a valued accomplishment in the community management industry. Managers must complete Community Association Institute's (CAI) Professional Management Development Program (PMDP) course the M100, Essentials of Community Association Management. This course covers topics ranging from Facilities Management and Community Government to Risk Management and Financial Management.

Once the manager has completed and passed the M100, they can take the exam to become designated as a CMCA.

The AMS designation is the second tier in CAI's career track. Building upon the knowledge gained in earning their CMCA, candidates for the AMS designation must have:

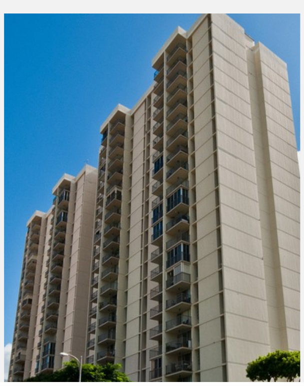
- Two (2) years verified experience in financial, administrative, and facilities management of at least one association.
- Successful completion of the M-100 course: The Essentials of Community Association\Management (either classroom or home study/online format).
- Successfully complete at least one M-200 series course (M-201 - M-206).
- Successfully pass the CMCA exam administered by NBC-CAM.

"We are extremely proud of her for achieving her goal of earning the CMCA and AMS designations," said Dass Ramadass, President of Hawaiian Properties, Ltd. "Shaunagh committed a great deal of time and energy into furthering her education and experience in the industry. Her commitment, hard work and effort will help to better serve our client's needs and prepare her for the top designation of Professional Community Association Manager (PCAM). The PCAM designation is the highest professional recognition available nationwide to managers who specialize in community association management. A manager who has earned the PCAM designation has displayed a significant commitment to the industry. Through extensive education requirements, they have gained an understanding of all aspects of community association management.

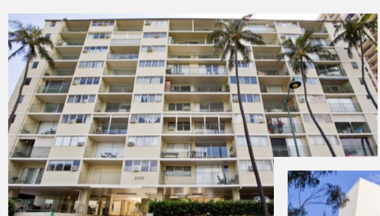
HAWAIIAN PROPERTIES IS EXCITED TO ANNOUNCE OUR NEW ADDITIONS INTO OUR OHANA!

Aoao's Century West * Ala Wai Palms * Woodwinds * Ko'olani * Hale Moani * Kapiolani Terrace * Plumeria Hale * Pearl Ridge Terraces * Napua Point * 1650 Piikoi * Mountainview Terrace * Hawaiian Crown and Nanihala.

KO'OLANI 372 UNITS



CENTURY WEST 352 UNITS



ALA WAI PALMS 71 UNITS

WOODWINDS 150 UNITS

PAYING THE PRICE - *Do You See What I See?*

By: Jeffrey W. Pope, ARM®

- **Annual Formal Site Inspection √**
- **Annual Reserve Funding √**
- **Annual Budget √**

While preparing for your annual budget, did you spend weeks and months haggling over the most obvious until basically every dollar had gone through the wringer a couple of times. Even to the most casual observer, it may seem like everything is in order. *But is it?* Well, probably not. What did we miss?

"The common areas that are most neglected and least likely to receive attention are right there - hidden behind the walls."

The pipe chases, which house the cast iron sewer lines and drain pipes, may be an aging Association's worst nightmare. High rise condominiums, built over 40 years ago, are now realizing their old cast iron pipes are aging much faster than expected, and things are not getting any better. The pipes usually go unnoticed until there is a leak or flood. The chances of the corroded cast iron pipes making their way onto the list of capital reserve items is probably slim to none. Even with the disclosure of such a maintenance nightmare, some Association Boards fail to acknowledge this critical area until it is too late. Then the verbiage changes from *oh no* – to phrases such as: pipe replacement, pipe lining, special assessment, long-term loan, and/or deferring maintenance once again in order to catch up.

So, what's next? There is no other way around it – *you must inspect the pipes*. This does not mean the Association should take the low road to save money by directing the maintenance supervisor to walk around knocking on doors with a saw and camera. The pipe chases need to be opened up in order to get a sampling of the pipe's actual condition. But just observing the exterior of the pipes may not be enough, and sending a camera down the length of the pipes might give a false impression. So what do we do? Wait for another leak?

(continue on page 8)

Do Condo Owners 'Get' Your Master Policy?

When it comes to condominium insurance, there is a lot of room for misunderstandings about personal condo owner insurance and the association's Master Insurance Policy.

Board Members, are you doing your part to educate your condo owners? Do you provide reasons why owners need personal insurance for their unit? If a unit is damaged by fire or other loss, do owners understand the consequences of inadequate homeowners insurance?

For example, do they know what happens if a water pipe bursts in their unit and damages their neighbor's property? If owner/tenant negligence was a cause, their personal liability coverage will reimburse the neighbor of his losses. Without this, the unit owner will be responsible for all expenses.

AOAO Master Insurance Policy covers property and liability claims involving the common area elements of the condo association. This includes the "as built" building's exterior shell, internal walls, floors, ceilings, kitchens, bathrooms and built-in cabinets. Personal condo owner insurance insures personal property and any parts of a unit that aren't covered by the condo association's insurance policy, including upgrades, furnishings, personal property and personal liability.

Surprisingly, it is estimated that only about 60 percent of condo owners throughout the Islands have personal insurance. This number is growing since Condominium Property Act HRS Chapter 514B was passed, which allows condo associations to require unit owners to provide insurance.

The standard policy for condo unit owners (HO-6 policy) assumes that the property will be used for personal use by the owner and immediate family. If renting, whether through rental pool or independently, a "rental endorsement" needs to be added to the standard policy. The same holds true if non-rental guests use the property in the owner's absence.

For those condominium units that participate in rental pools, supplemental rental liability insurance offered by many rental pool companies is not a substitute for homeowner insurance. It only covers rental pool guests.

(continue on page 8)

AOAO Board of Directors' Meeting: Effective, Productive and Enjoyable?

By: John Jepsen, PCAM®, CMCA®, AMS™

Greetings! I tip my hat, applaud and say -- "Good on you!" to those individuals who volunteer their time to serve as an AOAO Board member. The only compensation received for your efforts is a personal satisfaction of trying your best to make a difference. For the past 15 years, I have experienced everything from the Board being highly praised for a job well done to association members physically attacking a Board member. It is my hope that some of the information here can provide your Board with some thoughts on how to conduct efficient, productive and successful Board of Directors meetings. Board meetings should be enjoyable.

First of all, make sure there is a need for a meeting. Many associations believe they need to meet every month. However, if the only thing accomplished at a meeting is approving the previous meeting minutes and accepting the financials, you are wasting time. I truly believe that most boards only need to meet bi-monthly or quarterly. The board secretary should collaborate with all members to set an agenda that has a purpose, an outcome, and a plan.

If you do need a meeting, begin on time! If call to order is 7:00 p.m. and quorum is achieved, start the meeting. Next, stick to the agenda. I highly recommend that boards consider holding an owners' forum either before call to order or immediately after adjournment.

Board meeting rules should be adopted, published and distributed to association members. Clearly identify expected conduct at meetings and limit discussion time to 2 - 5 minutes. I also strongly encourage and require that members address their concerns in writing and provide those concerns to the secretary or managing agent at least 10 days prior to the meeting. This will enable the board to consider placing owner concerns on the agenda and addressing the matter as official board business.

During the meeting, boards need to follow three basic principles: 1. Address business one item at a time; 2. Promote courtesy, justice, impartiality and equality; 3. Follow the Rule of the Majority and — Protection of the Minority.

For boards that meet monthly, meetings should take no more than 1 hour. If you meet quarterly, it shouldn't exceed more than 2 hours. Be prepared and familiarize yourself with all agenda items prior to the meeting. In debate, be brief and to the point. Don't spend too much time attempting to convince others to accept your opinion. State the facts and let it go for decision. Board members can certainly agree to disagree, but always act as one and respond to the membership in one voice. At the conclusion of the meeting, all members of the AOAO board should walk away with the feeling that the meeting was successful and that the business of the association was accomplished.

HAWAIIAN PROPERTIES NEW HIRES

REIKO MARINO, Vice President of Special Projects

Reiko Marino recently joined Hawaiian Properties, Ltd. as Vice President of Special Services. Before coming to Hawaiian Properties, she worked for Certified Management, where she held the position of Sr. Vice President supervising over 15 property managers.

Reiko holds professional designations of Certified Manager of Community Associations (CMCA), Accredited Management Specialist (AMS) and Professional Community Association Manager (PCAM) from the Community Association Institute (CAI). She brings over 18 years of experience in the property management industry, with a proven track record of providing superior client services.

Reiko was born in Hawaii and raised in Kaneohe. She graduated from McKinley High School and went on to California to attend Fullerton College. She remained in California for 17 years, in which 13 of the 17 years was spent working at Hughes Aircraft Company.

JEFFREY VAIR, Property Manager

Hawaiian Properties, Ltd. is happy to announce the return of Jeffrey Vair in the Property Management division. Prior to his return, Jeff worked with Fairfield Properties, LP, a large San Diego based Property Management Company as a Property and Sales & Marketing Manager for their portfolio based properties in Las Vegas. Jeff has over 15 years of experience in the property management industry. His strong interpersonal and organizational skills will be a great asset to Hawaiian Properties, Ltd.

Jeff was born in Hawaii and obtained his B.A. at Washington State. He has lived and worked in Seattle, San Francisco, Las Vegas and Orange County California. He enjoys fishing, diving, surfing and football.

JEFFREY W. POPE, Property Manager

Jeffrey recently joined Hawaiian Properties in February 2012 as a Property Manager, with over 16 years experience as a residential manager. Jeff is an Accredited Residential Manager (ARM®) and has managed several large high-rise properties, to include: Ala Wai Plaza, 349 units; Ko'olani, 370 units; 1350 Ala Moana, 353 units; and Kukui Tower, 380 units. Jeff's current portfolio includes: Kuakini Medical Plaza, Dowsett Point, Woodwinds, Liliha Professional Building, and Kapiolani Terrace. Jeff also served 12 years as an Administrative Specialist in the United States Army. During his free time, Jeff enjoys watching sports and spending quiet time at home on his computer.

Do Condo Owners 'Get' Your Master Policy? cont.

Because of ownership changes and insurance needing to be renewed annually, it's important to remind owners of the importance of maintaining homeowner insurance.

Below is information you can share with your building's unit owners.

If your unit is damaged by fire or other loss, what are consequences of inadequate or no HO-6 insurance?

- The AOAO is obligated to repair only the basis of your unit to the original "as built" specifications. Items such as upgrades to the flooring, cabinets, countertops, personal property, etc. are not insured by the AOAO's policy.
- If you are responsible for the loss or it originates from your unit, and the AOAO is obliged to repair the damage, the AOAO can assess you all costs incurred up to its insurance deductible. The most common deductible is $5,000.
- The AOAO's policy does not cover an owner's loss of rental revenue or the cost of temporary relocation expenses during repairs. Protection is optional under a HO-6 policy.
- If you own a condo as a second residence, don't assume that a liability umbrella on the primary residence extends to the HO-6 policy on the condo unit.

Here is a list of coverage usually found under HO-6 insurance.

Owners should be aware that not all insurance carriers and policies are the same. Condo owners should talk to their insurance agent about individual requirements.

The average annual costs for this coverage can be between $150 and $250, depending on limits and the various sections selected. The hurricane coverage can increase the premiums by an additional 50 percent.

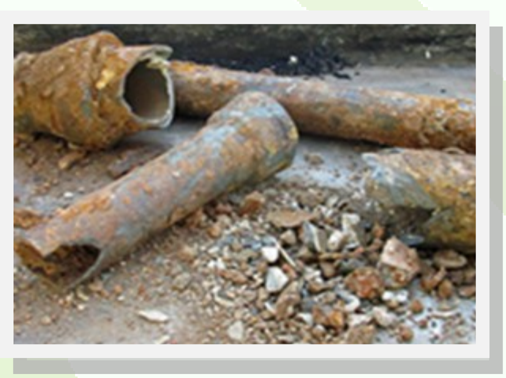
Coverage A - Dwelling (Upgrades and alterations to the unit)
Coverage B - Other Structures (not usually applicable)
Coverage C - Personal Property (Furniture, Clothing, Art, Computers, etc.)
Coverage D - Loss of Use
Coverage E - Personal Liability, including Landlord liability
Coverage F - Medical Payment to Others

Loss Assessment - Assessments imposed by AOAO because the loss exceeds insured limits. Some carriers include Deductible Assessments in the category. Hurricane - By Endorsement.

Courtesy of: Ron Tsukamaki, Atlas Insurance

PAYING THE PRICE, cont.

We encourage Association Boards to start the process by hiring a licensed, insured, and reputable plumbing company to conduct a formal inspection of



the pipes, steel bands, etc., and to provide the Board with an official report of the inspection. After you receive the inspection report, sit down and talk with your point of contact at the plumbing company then make a plan based on the formal inspection. Since repairs and/or replacement of the pipes will entail entering residential units, hold a series of Owners' Forums or community meetings with your residents and inform them of the problem, the steps the Board will take to rectify the problem, and disclose how your Board is planning on funding the project. But most importantly, if you are a Board member, prepare for some immeasurable criticism and resentment from your community due to the fact that this project may be rather costly, and because this project was probably not ever considered to be added into the operating or reserve budgets until this point in time.

Please take time to consider your aging pipes behind those walls. With early planning and proper funding, your Association can avoid a severe plumbing misfortune because you failed to see what we see.

2012 Legislative Update
Act 326

ANSWERS TO FREQUENTLY ASKED QUESTIONS

By Linda E. Ichiyama, Courtesy of: PORTER McGUIRE KIAKONA & CHOW, LLP, Attorneys at Law (Dated: November 9, 2012)

1. When does this law take effect?
This law took effect on July 1, 2012. The Department of Taxation ("Department") will provide a transition period to allow Associations to meet the requirements of this new law. Associations have until March 31, 2013 to provide to the Department all relevant information maintained in its records or may be subject to penalties.

2. Who does this new law apply to?
This law applies to any operator of a transient accommodation as well as any association of homeowners, community association, condominium association, cooperative, or any other nongovernmental entity with covenants, bylaws, and administrative provisions ("Associations") with which the operator's compliance is required for the property where the transient accommodation is located.

3. Who is an "operator" of a transient accommodation?
Under HRS § 237D-1, an operator is defined as "any person operating a transient accommodation, whether as owner or proprietor or as lessee, sublessee, mortgagee in possession, licensee, or otherwise, or engaging or continuing in any service business which involves the actual furnishing of transient accommodation."

4. What qualifies as a "transient accommodation"?
Under HRS § 237D-1, a transient accommodation is "the furnishing of a room, apartment, suite, or the like which is customarily occupied by a transient for less than one hundred eighty consecutive days for each letting by a hotel, apartment hotel, motel, condominium property regime or apartment as defined in chapter 514A or unit as defined in chapter 514B, cooperative apartment, or rooming house that provides living quarters, sleeping, or housekeeping accommodations, or other place in which lodgings are regularly furnished to transients for consideration."

5. What are "operators" required to do?
Operators are required to designate a "local contact" residing on the same island as the transient accommodation. Operators are also required to report to the Association the name, address, and contact information of the local contact.

6. What are Associations required to report?
Associations are required to report to the Department all "relevant information, maintained in its records, related to all operators who may be leasing their property as transient accommodations by December 31st of each year, or within sixty calendar days of any change in the relevant information, operation or ownership of the transient accommodation." Under the law, "relevant information" is defined as the operator's name address, contact information, registration identification number issued pursuant to HRS § 237D-4 and website address if advertising or soliciting the transient accommodation on the Internet. The registration identification number can be found on the certificate of registration issued by the Department to the operator of a transient accommodation. The Department has noted that the information the Association is required to submit is broader than the information an operator is required to report to the Association (for example, website address). The Department's Tax Announcements 2012-12 and 2012-13 clarify that no penalties will be imposed on Associations who fail to provide relevant information where the law does not require an operator to provide that information to the Association; however, we recommend that any Association exercise due diligence in attempting to obtain this additional information. Governor Abercrombie's Message No. 1443 also clarifies that an Association is only required to report information "maintained in its records."

(continue on page 10)

ANSWERS TO FREQUENTLY ASKED QUESTIONS ABOUT ACT 326 (Cont.)

By Linda E. Ichiyama, Courtesy of: PORTER McGUIRE KIAKONA & CHOW, LLP, Attorneys at Law

7. What is a "local contact"?
A local contact is any individual or company contracted by the operator of the transient accommodation to provide services as required under the law. This law does not create an employer-employee relationship between an operator and its local contact.

8. What if the contact information changes?
The operator must notify the Association and provide any updated information within sixty (60) calendar days of any changes. The Association is then required to provide the information to the Department within sixty (60) calendar days of receiving the new information.

9. How should the Association collect and report this information?
The Department has not yet issued guidance on how an Association should report this information. At this time, we recommend sending a form letter to any known operators of transient accommodations on the property, informing them of the new law and the information they are required to report to the Association. This letter should be sent by certified mail, return receipt requested. We also recommend including a specific request for: the operator's name address, contact information, registration identification number issued pursuant to HRS § 237D-4, and website address if they advertise or solicit the transient accommodation on the Internet. The Association must begin to collect the information in preparation for the reporting deadline of **March 31, 2013**. Porter McGuire Kiakona & Chow Act 326 FAQ

10. Does this require any changes in the Association governing documents?
No, not at this time.

11. How should this information be reported and when is it due?
The Department will issue further guidance when it determines the manner and form in which Associations should report this information. The Department is allowing for a transition period for this information to be collected. The Association must report all information maintained in its records to the Dept. by March 31, 2013.

12. Are there penalties for not providing the information?
Yes. The law states that any operator or Association who "willfully" fails to supply the information required is subject to a fine of not more than $100,000.00. Under Hawaii Revised Statutes § 231-40, "the term 'willfully' shall mean a voluntary, intentional violation of a known legal duty." Please note that the Department has allowed for a transition period to implement this new law, the deadline to submit the required information to the Department is March 31, 2013.

Holiday Message from Hawaiian Properties, Ltd.

As we enter the holiday season and reflect on the joys of 2012, we are grateful for the opportunity to serve you. Thank you for choosing to do business with Hawaiian Properties. We look forward to meeting your needs in 2013 and continuing our relationship for many years to come.

We also send our warmest regards to all of our business Associates and Vendors.

We hope you enjoy a happy, healthy and safe holiday season with your family, friends and loved ones.

The Hawaiian Properties Ohana

Posted Date: 12/6/2012

Hotel Rides Energy Efficiency Wave with Key Cards to Save on Costs

The Aloha Surf Hotel in Waikiki is part of Hawaii's first boutique hotel chain, **Aqua Hotels & Resorts**, offering a collection of 15 boutique and budget-friendly hotels in Honolulu and seven Hawaiian resorts on Maui, Kauai, Molokai and Lanai. As part of their commitment to Waikiki's revitalization efforts, Aqua Hotels has instituted a plan to minimize the hotel's impact on the environment. The green initiatives include the installation of Green Key Switches, also referred to as "key cards," in all 204 guestrooms at the Aqua Aloha Surf in Waikiki.

Magnum Energy Solutions (MES) provided the energy management solution, which utilizes a key card switch to automatically control both the HVAC and lighting in guest rooms. When a guest enters their room, they place their key card into the switch located inside the entryway, thereby activating the thermostat control unit, bringing it into "occupied" mode. When the guest leaves the room, they remove their key card from the key card switch and both the thermostat and the lights return to energy saving mode. Most rooms also have a battery-free, wireless balcony door sensor. When the balcony door is opened, a signal is sent to the in room HVAC unit, which switches off, until the balcony door is closed.

Energy & cost savings bonus

The key card-based energy management system has been in place since January 2012 and the savings are significant. With respect to lighting, the system has resulted in an average of 45 percent energy savings. The energy savings for the HVAC system, which is where the larger load exists, is about 50 percent.

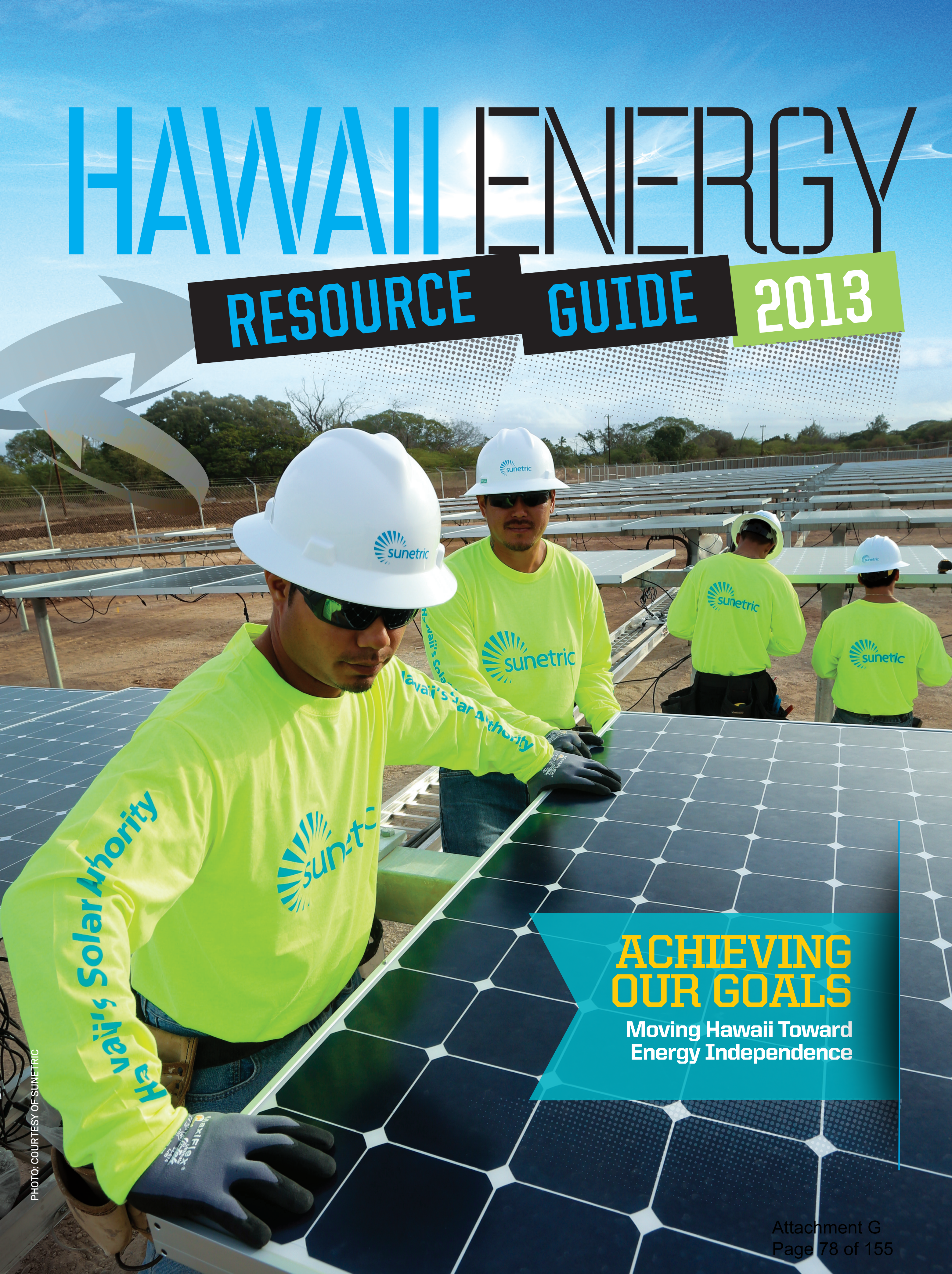
During 2011, the significant increase in the cost of fossil fuel caused a corresponding increase in the cost of electricity, particularly for Hawaii, given its isolated geographic location. Hotel owners in Hawaii are now paying about 33.5 cents per kWh, the highest electricity prices in the nation. New York has the second highest average rate at 18.6 cents per kWh.

To encourage energy efficiency measures and help hotel owners afford the initial costs of energy management technology, like the solution implemented at the Aloha Surf, Hawaii Energy offers $100 per thermostat installed that allows for guest room thermostat control and which is paired with an occupancy sensor. This rebate applies to hotels with central AC only. For hotels with split systems or window AC units, like the Aloha Surf, the project becomes a customized rebate, which requires pre- and post-data logging. The Aloha Surf, therefore, received a customized rebate totaling $25,500, which equals $125 per room installed with Magnum's technology.

The core of Magnum's in-room solution utilizes an innovative EnOcean radio chip. The products based on this technology collect the energy they need for wireless communication from the surrounding environment, using motion, indoor light, or temperature differentials. The principle of energy harvesting enables sensor networks to operate without cables and batteries. Therefore, Magnum's solution is both wireless and battery-free, which meant a fast installation completed by the hotel's staff. The team was able to complete about 15 rooms per day, which meant little to no disruption to daily hotel operations -- an important factor for the hotel's management and facilities team.

HAWAII ENERGY

RESOURCE GUIDE 2013



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Second in the nation

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Four years strong with the Hawaii Clean Energy Initiative, Hawaii accelerates to meet 70% of our energy needs through greater efficiency and renewable energy by 2030.

The Initiative's requirement to generate 40% of our energy locally emphasizes the need for Hawaii's energy independence.

Hawaii Business provides this guide to help local businesses navigate and discover cost-saving measures that stabilize the bottom line and contribute to a healthier, greener Hawaii.

A strategic imperative

SUNETRIC

"Investing in a solar system now hedges energy price volatility exposure and allows business owners and operators to focus on their core business and mitigating other forms of risk."

– Alex Tiller, Chief Executive Officer, Sunetric

"Business owners are always looking for ways to stabilize or fix variable costs," says Alex Tiller, chief executive officer of Sunetric. "Electricity rates are unpredictable, but one thing's for sure, they'll only rise higher."

Founded in 2004, and long before the state incentives were established, Sunetric is now Hawaii's largest locally-owned and -operated photovoltaic solar company. "Despite recent disturbing and disappointing attempts to curb the state solar tax credit system," says Tiller, "Hawaii remains the market with the best and brightest potential for the solar industry."

To safeguard against energy cost increases, many businesses and organizations have turned to solar energy to achieve energy efficiency and maintain economic viability.

"Investing in a solar system now hedges energy price volatility exposure and allows business owners and operators to focus on their core business and mitigating other forms of risk," says Tiller.

With experience in large-scale systems, Sunetric outfitted Kauai's Wilcox Memorial Hospital with what remains one of Hawai'i's largest solar photovoltaic ground mount systems. The system, built on 1.4 acres of land next to the hospital, saves hundreds of thousands in annual utility costs and ensures that the hospital will always be ready to meet the community's critical needs.

Other important industries such as tourism and real estate stand to gain from the benefits of solar systems. "We are continually surprised by how few resorts have maximized this technology to lower their operating costs," says Tiller. "Also, building owners that lease out their property can earn revenue from utilizing their roof to generate new revenue sources, even if they don't pay the power bills for the facility. You can call Sunetric to learn how."

With a full-service approach, Sunetric understands that providing quality solar systems is good for both the economic and environmental conditions here in Hawaii.

"The state's goal of 40% generation through renewables is not just a nice thing to have, it's a strategic imperative," says Tiller. "I think our

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"The center of clean energy technology research and development should be here in Hawaii."

– Scott Seu, Vice President Energy Resources and Operations, Hawaiian Electric Co.

leaders at the state level understand the risk of not hitting that goal, and Sunetric stands ready to work with them to find the best solutions for sustainability in Hawai'i."

Working Toward a Clean Energy Future

HAWAIIAN ELECTRIC CO.

"Getting Hawaii off our heavy dependence on imported oil and onto clean, renewable, local energy will bring us all greater energy security, a cleaner environment, and a stronger economy with lower, more stable energy costs for customers," says Scott Seu, vice-president of energy resources at Hawaiian Electric Co. "The center of clean energy technology research and development should be here in Hawaii."

Since 2008, the Hawaii Clean Energy Initiative has raised awareness of Hawaii's need for energy independence among businesses and residents alike. With a statewide goal of 70% clean energy by 2030, Hawaiian Electric is focused on adding the renewable energy sources necessary to create a diverse energy portfolio.

"We have a three-pronged approach," says Seu. "One is to develop new, cost-effective renewable energy sources across the islands, including wind, solar, biofuel and biomass, hydro, geothermal and soon, we hope, ocean energy. Another is to improve our ability to provide our customers' with the reliable service they have a right to expect from us. And third, to achieve these two goals, we are upgrading our electric grids - the lines, substations, transformers and computer controls that connect the energy generators to customers."

Hawaiian Electric companies provide electricity to 95% of Hawaii's people on five islands. "We are a major player, of course, but so are our business and residential customers, state government and all those involved in transportation," says Seu. To increase energy efficiency and conservation, HECO.com provides multi-lingual resources for customers to discover how to reduce energy costs, change behaviors, and contribute to the statewide goal of reducing oil dependence.

Customers who increase energy efficiency and promote conservation will experience the most financial benefits. "Two words: less and local. We have to get better at using energy wisely," says Seu. "And the more energy we get from local sources, the more our money stays in our economy." To help residential and business customers save money, Hawaiian Electric has programs that reduce customers' bills in exchange for allowing the utility to manage part of their electricity use temporarily.

Looking to the future, Seu says that Hawaiian Electric is working hard to get more cost-effective renewable energy onto island grids while exploring

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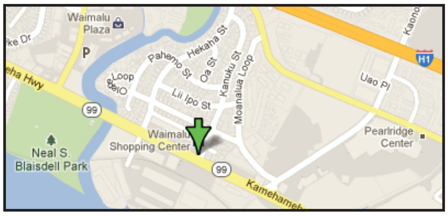

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other energy options. "We are helping the State evaluate using liquefied natural gas here. We are determined to get off oil and develop renewables, but as long as we use any fossil fuel in our energy systems, we ought to look for the cleanest and cheapest fuel to help our customers."

Renewable Energy for Your Future

ALTERNATE ENERGY

"Electricity is one of the biggest expenses that can be eliminated through solar energy technology," says Michael Ito, director of marketing at Alternate Energy. "Living in Hawaii, we are very fortunate to be greeted with an abundance of sunlight."

Locally owned and operated since 1993, Alternate Energy remains committed to helping Hawaii residents and businesses make the switch to solar. "The majority of businesses that we've installed for PV systems are generally small business owners," says Ito. "From warehouse owners to produce stores, it's the smaller businesses of Hawaii who really need help to offset their expenses from Hawaii's rising utility costs."

At current rates of about $0.35c/kWh, predicted energy cost increases pose a risk to the bottom line.

"There are great tax incentives currently available for business owners who decide to purchase and install a photovoltaic system," says Ito. "We strive to zero out the kilowatt-hours in a home or business." Being the only Mitsubishi Electric Certified Solar Contractor in the state, Alternate Energy assists clients with identifying relevant state and federal tax credits as well as financing options with client-selected solar energy contractors.

The Hawaii Clean Energy Initiative is a statewide effort to produce 70% of Hawaii's energy from clean energy and 40% of that being locally generated renewable sources.

"Solar energy here in Hawaii has seen tremendous growth for both residential and commercial installations," says Ito. "Because of such growth, solar energy plays a huge role in our state's clean energy goal."

"Electricity is one of the biggest expenses that can be eliminated through solar energy technology."

– Michael Ito, Director of Marketing Alernate Energy

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"Through solar energy technology, we are able to harness an unlimited amount of energy from the sun to offset all of our daily energy consumption for both our homes and our businesses," says Ito. "Most importantly we are able to assist our state in reducing our carbon footprint and the amount of fossil fuels we burn annually to produce energy. We all have to our part."

Hawaii's Most Diversified Electrical Contractor

AMERICAN ELECTRIC

Tom Vincent, CEO of American Electric has been with the company for 46 years. "American Electric has been doing business in Hawaii for 65 years, and I'm confident we will be here 65 more" said Vincent. "For many years we were one, if not the only company that could do the complex high voltage work for the utility companies. In the last decade we've diversified by adding telecom, photo-voltaic, residential and a service division" continued Vincent.

American Electric designs and delivers the most efficient electrical solutions, customized specifically to meet the customer's needs. "At American Electric a PV system on your roof is just as important as a multi-million dollar power plant for HECO. We take the same meticulous, professional approach on every project."

This approach is one of the reasons American Electric has expanded state wide and now has offices on Oahu, Maui, Kauai and the Big Island. American Electric is one of the largest electric contractors in the state with a reputation of quality second to none.

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"For Hawaii to meet its sustainable energy goals it has to include distributed generation and all other renewable technologies."

– Tom Vincent, CEO American Electric

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RevoluSun... Leading the Solar Revolution

REVOLUSUN

“Over the next ten years, the fruits of the massive investment in technology will produce disruptive changes hopefully transforming the way we think of and use energy,” Todd Georgopapadakos, Principal at RevoluSun.

“I expect there to be innovation not only in technology but also in business models.”

Installing PV systems is one of the most popular methods for local businesses to optimize operations and engage with renewable energy.

“Hawaii is leading the US in grid penetration of solar,” says Georgopapadakos. “So many of the challenges, technologies, and changes needed for the integration of higher levels of renewable energy will be seen here first.”

“Hawaii is leading the US in grid penetration of solar,”

– Todd Georgopapadakos, Managing Principal, RevoluSun

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Hawaii has always shown a commitment to renewable energy a good example of that is the creation of several low interest loans available for the purchase of PV systems available from Hawaii financial institutions,"says Georgopapadakos. "For property owners able to utilize the state and federal incentives these loans are the best way to pay for a PV system." A power purchase agreement or lease is an alternative for property owners unable to make use of the incentives or who are not in a position to obtain a loan. "The difference is in a PPA or a lease a third party owns the PV system and then sells power to the property owner," explains Georgopapadakos.

As Hawaii's renewable energy industry continues to grow, RevoluSun will continue to assist customers in making the right renewable energy choices to meet their needs.

Another Clean Source

HAWAII GAS

"Gas is an efficient, clean, and cost effective source of energy," says Jeffrey Kissel, president and chief executive officer for HawaiiGAS, formerly known as The Gas Co. "Using it supports Hawaii's efforts todevelop a renewable and sustainable energy future."

Established in 1904, HawaiiGAS is a local company with a deep tradition of serving the islands. Since then, HawaiiGAS has expanded operations to serve every major island in the state including Molokai and Lanai. "We produce Synthetic Natural Gas at our Kapolei facility and distribute it through approximately 1,000 miles of gas pipeline," says Kissel.

With no sources of naturally occurring gas energy, HawaiiGAS uses leading technology to convert a by-product from the Tesoro refinery into gaseous energy called Synthetic Natural Gas (SNG). HawaiiGAS also supports Hawaii's sustainability goals by producing Renewable Natural Gas (RNG).

"Our Renewable Natural Gas Plant is able to process up to one million gallons of renewable feedstock annually and converting it into renewable methane, propane, and hydrogen," says Kissel. "The renewable gas products will be blended into our SNG manufacturing process in early 2013 to provide our customers with a gas blend containing nearly 5% renewable energy."

Gas delivers two and a half times more energy to the customer over other fuels when used for water heating, cooking, and drying. HawaiiGAS clients range from hotels and resorts, restaurants, state and federal facilities, commercial laundry services, hospitals, and propane distribution companies serving residential customers.

"What also makes gas great is that it provides up to 60% savings over other forms of fuel for home, commercial, and industrial use," says Kissel. HawaiiGAS helps businesses incorporate the benefits of gas by conducting a simple energy audit to identify opportunities to switch to gas to meet their goals in energy efficiency, cost savings, and emissions reduction. HawaiiGAS offers several programs to reduce or even eliminate the cost of converting to gas energy.

To further Hawaii's energy efficiency, HawaiiGAS is working with the federal government to import Liquefied Natural Gas (LNG). "We intend to expand the use of LNG to diversify our own fuel supply mix and diversify the same for all of Hawaii," says Kissel.

"Because natural gas can be used in multiple industry segments including electricity generation and ground and marine transportation, which when combined represent nearly 60% of all energy imported to Hawaii each year, it provides an opportunity unlike any other source of energy to reduce costs, reduce emissions, and improve energy efficiency."

"Gas is efficient, clean and cost effective. Using it supports Hawaii's efforts to develop a renewable and sustainable energy future."

– Jeffrey Kissel, President & CEO for HawaiiGAS

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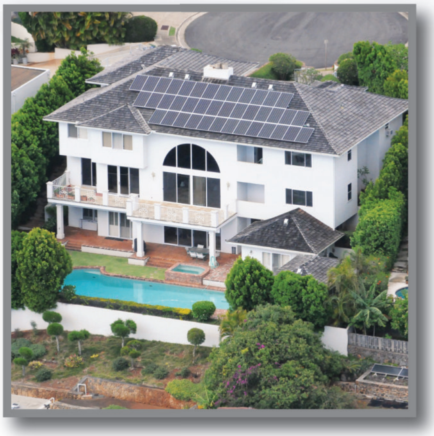

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"Solar systems are environmentally and socially responsible."

– James Whitcomb, CEO, Haleakala Solar

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Service and Solar

HALEAKALA SOLAR

For the last 35 years, Haleakala Solar has translated environmental awareness and operational savvy into a first-class company with over ten thousand solar systems installed statewide. "We are a concept-to-completion company and we provide services for our own customers as well as for customers with solar systems from other companies," says Whitcomb. "We have 180 employees to make sure there are enough people to take care of our customers needs."

"With the high cost of electricity and generous tax incentives a solar system, both solar hot water and PV systems provide an excellent return on investment," says Whitcomb. "A solar system also levels out the cost of electricity relieving the client from the constant increase in electrical rates."

Haleakala Solar is licensed to engineer and install an array of solar energy production systems including hot water systems, pool & spa heating, attic fans, solar lights, PV, and battery storage systems. Attune to the state's long-term environmental and operational vision, Haleakala Solar also provide energy conservation systems including LED lights, VSD motors, motion detectors, electrical energy storage.

"To meet the state's commitment to the Hawaii Clean Energy Initiative, it will take solar and PV as well as wind, biomass, and hydro efforts," says Whitcomb. "However, solar and PV are the fastest and easiest ways to achieve these goals."

"We want to create local jobs and keep money in the state instead of spending it to buy foreign oil," says Whitcomb. "Solar systems are environmentally and socially responsible. In addition to the financial benefits, there's a social benefit to know you are producing your own electricity--kind of like growing your own food."

Energy Efficiency Matters

ENERGY INDUSTRIES LLC.

"Excessive energy costs can have a devastating effect on a company's bottom line," says Miles Kubo, chief operating officer for Energy Industries LLC.

Energy Industries is one of the few local companies applying a holistic approach to help clients address both energy efficiency and renewable energy generation.

"Energy efficiency matters because a business can take control its electricity expenses by identifying and reducing the energy it wastes," says Kubo. Significant energy savings often result from addressing areas of waste including improperly sized air conditioning systems, outdated water heating systems, refrigeration systems, ventilation systems, and lighting. To complement energy-reducing retrofits, Energy Industries tailors solar photovoltaic systems to avoid installing PV systems larger than needed.

"Business owners should consider energy-efficiency projects with an internal-rate-of-return of greater than 20%, and PV projects with internal-

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Pacific Edge: 2012 Bus. Executive of the Year - CEO, Alex Tiller
Star-Advertiser: 2010, 2011 People's Choice Awards
Business Leadership Hawaii: 2010 Finalist - Innovative Company; 2011 Finalist - Community Spirit; 2011 Finalist - Best in Business
Pacific Business News: 2010 40 Under 40 - Founder, Sean Mullen; 2011 40 Under 40 - CEO, Alex Tiller
Hawaii Business Top 250: 2009—2012; Largest Solar Firm 2009-2012; Fastest Growing Company in Hawaii for '12
Inc Magazine: 2012 Inc 5000 - Top Solar Firm in Hawaii

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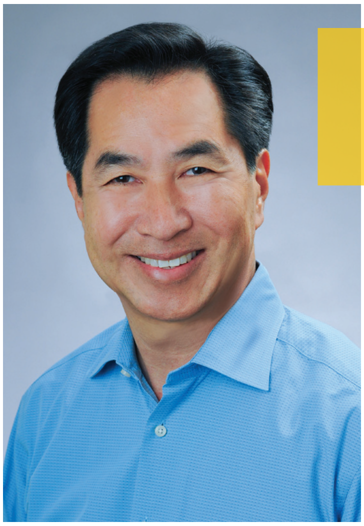

"All usable technologies will need to be deployed to strengthen the state's energy independence."

– Miles Kubo, Executive Vice President and Chief Operating Officer, Energy Industries LLC

rates-of-return greater than 15%," says Kubo. "These projects are like annuities, where the savings from utility bills provides a steady stream of cash over an extended period of time."

Energy Industries offers professional energy assessments to determine the degree of energy-saving opportunities and fully implements retrofit measures to achieve the savings . "We recently completed a program for the Honolulu Museum of Art . After determining that by centralizing the AC system it could reduce its consumption by over 1,000,000 kilowatt hours, we implemented the equipment replacement that will result in over $350,000 in energy savings annually," says Kubo.

In conjunction with assessing energy needs in thecommercial, industrial and institutional sectors, Energy Industries urges a tour-de-force approach to meet Hawaii's energy goals. "All usable technologies will need to be deployed to strengthen the state's energy independence," says Kubo. "Whether we achieve the 70% goal by 2030 is not as important as having everyone recognize the importance of a clean energy future and contribute to the effort of making the state less dependent on fossil fuels."

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miles.kubo@energy-industries.com
Info@energy-industries.com | 808-839-7300
energy-industries.com

Energy Conservation and Efficiency

HAWAII ENERGY

"We are here to help electric utility customers incorporate energy conservation and efficiency into their businesses and residences," said Larry Newman, Planning Manager & Residential Program Leader at Hawaii Energy.

In its fourth program year, Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission, serving Hawaii, Honolulu, and Maui

"Our core mission is to educate, motivate, and incentivize energy conservation behavior and efficiency measures."

– Larry Newman, Hawaii Energy Strategic Planning & Residential Program Manager

PHOTO: THINKSTOCKPHOTOS.COM

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counties. "Our core mission is to educate, motivate, and incentivize energy conservation behavior and efficiency measures," says Newman. "Hawaii Energy is here to help you save money on your electric bill and reduce our state's dependence on imported oil."

Within the last program year, Hawaii Energy assisted over 4,000 businesses from local mom-and-pops to some of the largest offices and hotels in the state.

Committed to serving our local economy, Hawaii Energy launched the Small Business Direct Install offering to provide qualifying small businesses and restaurants with free lighting retrofits. "Lighting efficiency is low-hanging fruit for immediate savings," says Newman. "In addition, there are a number of other efficiency measures to invest in that can significantly reduce electricity consumption."

For buildings with enclosed parking, Hawaii Energy offers an incentive of up to 85% of total project cost for garage ventilation control systems. Other incentives include submetering to fairly allocate electricity costs and reward conservation in master-metered condominiums and businesses within office buildings, strip malls, and hotels. Hawaii Energy expects to launch a set of offerings focused on restaurants in early 2013.

Businesses interested in working with Hawaii Energy can benefit from an initial energy assessment to identify opportunities to improve electricity usage and saving money. Based on the energy assessment, Hawaii Energy works with customers to discuss goals and tailor a plan of action. "We have a number of specialists ready to work with you," says Newman.

HAWAII ENERGY
Call: 839-8880 (Oahu) or
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Green Energy for All

AKAMAI ENERGY

"Being in the middle of the Pacific Ocean, we will always pay a premium for oil," says Richie Aqui, managing director of Akamai Energy. "The growth of clean energy in Hawaii has created an abundance of jobs and has saved the state millions of dollars in energy costs."

Driven to build a better Hawaii, Akamai Energy strives to provide the most affordable solar systems so that residents and businesses can contribute to our statewide commitment to energy independence. "We understand that going green can be a expensive and that getting the financing together can be a major hurdle," says Aqui. "Going green should be an option for everyone, not just some."

Incentive packages and assistance with power purchase agreements are a part of Akamai Energy's full-service mission to provide the highest quality photovoltaic system at an affordable price. A Power Purchase Agreement (PPA) is a financing structure in which a private entity owns and operates a solar system installed on a customer's property at no cost to the customer. The private entity then sells the energy to the customer at a discounted rate.

"A power purchase agreement is a very attractive option for most companies who don't have the up front capital," says Aqui."This allows a business to avoid being a victim of rising energy prices without a substantial initial investment."

Aligned with the Hawaii Clean Energy Initiative, Aqui sees other areas for growth in renewable energy use and solar systems.

"I'd like to see more young homeowners go green with PV solar," says Aqui. "I would also like to see more schools go green with solar systems. The savings on rising energy costs alone would help provide our keiki with a better educational environment."

"Going green should be an option for everyone, not just some."

Richie Aqui, Managing Director - Akamai Energy

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Military Drives Alternative Energy in Hawaii

SCOTT COONEY

Half of the fuel used during the 2012 RIMPAC military exercises near the Hawaiian Islands came from biological sources.
Photo: Sebastian McCormack, U.S. Navy

The Pentagon is investing billions in alternative energy and conservation, and that's good news for local companies

it's good news for hawaii's economy and local aspirations when the state's goals align with the American military's goals.

That's because the U.S. Department of Defense spent $6.5 billion in Hawaii in 2011 and employed 16.5 percent of the workforce. Only tourism brings in more money and employs more people in Hawaii.

Right now, the DoD's energy-security goals are aligned with the state's goals for a cleaner energy future. That has made the military a big spender in Hawaii's alternative-energy sector, including multimillion-dollar investments in solar, biofuels, conservation and other areas. The applications include fuel for ships and ground transport, and a multifaceted effort to turn military-base homes from energy hogs to energy misers.

“The military is a big partner with the state in any kind of initiative that involves sustainability … renewable or clean energy,” says Charlie Ota, VP of military affairs for the Hawaii Chamber of Commerce.

Mark Glick, Hawaii’s Energy Office administrator, says the state and U.S. Pacific Command have been collaborating on cleaner energy solutions. “The state appreciates the U.S. Department of Defense’s voluntary commitment to comply with the state’s goals to achieve 70 percent clean energy by 2030,” he says.

The Big Island Biodiesel plant opened in Keaau in July. Big Island Biodiesel is a sister company of Pacific Biodiesel, which is currently the only local producer selling biofuel to the military.

Photo: Courtesy of Pacific Biodiesel

The DoD’s push for sustainability has a strong national-security component. As the Pentagon sees it, the military’s dependence on foreign oil could cripple it if its supply lines were cut during war or another crisis. According to the DoD’s June 2012 report called Energy Investments for Military Operations, “Improvements in military energy security provide the Department with a unique opportunity to improve efficiency while increasing operational effectiveness.”

The Pentagon acknowledges that climate change is also a national-security threat. The 2010 Quadrennial Defense Review, the main public document revealing military planning, describes climate change as an “accelerant” of global conflict and geopolitical instability. Millions of people worldwide could become environmental refugees, forced from their homelands by drought, floods, infestations and disease caused by shifting climates, the review says. Thus, the Pentagon would also be aiming to neutralize its own carbon emissions and other greenhouse gases the way it would any other destabilizing entity.

Military doctrine is also being influenced by the fear that rising global demand will drive up the price of fossil fuels in the long term, and possibly reduce the supply to the U.S. military. The DoD is the single biggest consumer of energy in the world, accounting for 80 percent of the federal government’s energy consumption, according to Sharon Burke, assistant secretary of defense for operational energy plans. Last year, the military consumed the equivalent of about 5 billion gallons of oil at a cost of $20 billion. For each $10-a-barrel increase in the price of oil, the DoD pays more than another $1.3 billion a year.

The DoD is working to reduce its demand for oil. Starting with Executive Order 13514 in 2009, all federal agencies get annual scorecards that track opportunities and set goals for reductions of pollution, improvements in efficiencies and cost savings. This “what gets measured gets managed” approach helped lead to an 11.8 percent reduction in oil consumption by the DoD in 2011 from its 2005 benchmark year.

That’s why the DoD is also seeking long-term contracts with Hawaii biofuel producers for 32 million gallons a year as a replacement fuel. The Navy and the federal departments of Energy and Agriculture are ready to invest $510 million in Hawaii, assuming matching private sector investment, for biofuel refinery construction and upgrades. While this represents just six-tenths of 1 percent of the total current oil use by the DoD, it is clearly increasing. Hawaii is viewed as a strategically critical location for DoD operations, and having a stable source of fuel is important to ongoing operations in the region.

The state Department of Energy says 600 million gallons per year of biofuels can be produced in Hawaii by 2030. That’s an audacious goal, but, if it is reached and assuming a price of $150 a barrel by then, this would be a $2.9 billion a year market for Hawaii.

Major landowners and developers are investing in big biofuel projects, though actual sales to the military are, so far, limited. Hawaii BioEnergy is a company established by Kamehameha Schools, Grove Farm Co. Inc. and Maui Land & Pineapple Co. Inc. HBE has a contract to sell 10 million gallons of biofuels for 20 years to Hawaiian Electric Co., a deal that is currently going through regulatory approval, according to HBE's Joel Matsunaga. In 2011, Boeing and HBE announced a collaboration to study biofuel development for the aviation industry. The company has already built a 33-acre research facility on Kauai for development of jet fuel from microalgae, on behalf of the DoD.

Hawaiian Commercial and Sugar Co., owners of Hawaii's last sugar plantation, which is on Maui, is another major player in biofuels. HC&S has received a five-year, $10 million research grant to study the possibility of converting former sugar plantations to biofuel production.

Pacific Biodiesel, currently the only local producer selling biofuel to the DoD, is ramping up. Pacific Biodiesel is now only processing used cooking grease into biodiesel and sells about 1,000 gallons a month to local DoD operations, but it is looking to create 5.5 million gallons a year and 60 to 80 new jobs in agricultural biofuels. Pacific Biodiesel mainly supplies nontactical DoD vehicles, those not used directly for combat, according to Jenna Long, sales manager at Pacific Biodiesel. The company has been working with the DoD for about seven years, she says, providing B20 (20 percent biodiesel, 80 percent diesel) for most of the nontactical vehicles at the Marine Corps Base Hawaii at Kaneohe Bay and Joint Base Pearl Harbor-Hickam, and has recently successfully tested B20 in tactical vehicles at Fort Shafter.

Pacific Biodiesel also supplies part of the fuel for nontactical marine equipment, such as the boats that take visitors to the USS Arizona Memorial in Pearl Harbor. Pacific Biodiesel does not supply fuels to tactical marine vessels, as the chemical composition of its fuels does not currently meet the DoD's requirements for tactical ships and boats.

Lack of local supply didn't stop the Navy from conducting this year's RIMPAC exercises, described as the “Great Green Fleet,” with half of all the fuel used during RIMPAC coming from biological sources. The biofuel came from the mainland, derived from chicken fat and used cooking oils and a small percentage of algae-produced biofuels. RIMPAC was the first large-scale test of alternative fuels and the military called it an operational success, but the price tag for the biofuels was $12 million – almost seven times as much as regular fuel.

RIMPAC's biofuel expense drew criticism. David Kreutzer, research fellow at the Heritage Foundation, says some energy technologies that are too expensive for civilian use may make strategic sense for the military, but he believes biofuels are not among them. “Biofuels are more costly than the petroleum-based fuels – even when petroleum prices are high,” Kreutzer wrote in an opinion piece in the National Journal. In addition to the cost, Kreutzer cites the aspirational goals of the Air Force to replace 26,000 barrels of oil per day with high-priced advanced biofuels, and contrasts that figure with production from the Thunder Horse drilling platform in the Gulf of Mexico, which provides 175,000 barrels of oil per day, equivalent to the daily consumption of all Air Force jets.

In a less controversial move, the DoD is investing in sustainability and energy security at U.S. military bases in Hawaii and around the world. This self-reliance can help bases maintain vital operations during energy disruptions and enemy attacks on supply lines. The Army, Navy and Air Force are each committed to developing 1 gigawatt of renewable energy capacity on bases by 2025, enough energy to power 750,000 homes. For instance, Hunt Development has a proposed 5.9 MW solar installation, pending regulatory approval, on a Marine Corps site on Oahu that would power more than 5,000 homes. SolarCity has called its renewable-energy partnership with the military “SolarStrong,” a program it kicked off in 2011 by outfitting 2,000 military homes at Hickam Communities with solar panels.

The DoD is also reducing energy consumption in its nonhousing buildings. The Army has committed to buildings that fit the energy-efficient 189.1 standard set by ASHRAE, the international technical society focused on heating, ventilation, air-conditioning and refrigeration. According to the Army Corps of Engineers, lighting upgrades, solar PV panels, water efficiency and other measures can help cut the Army's energy use by 45 percent from current levels.

Similarly, the Navy and Marine Corps, in a public-private partnership with Forest City Military Communities, piloted a program in 2010 called the Resident Energy Conservation Program, which is aimed at reducing energy use by military families. Previously, military members' housing allowances (up to $2,739 per month) had been used as full payment for on-base rent, utilities and all other costs for service personnel and their families. The new program started billing families for energy use if they exceeded a normal usage range. The purpose was to curtail excessive consumption, as military families who have not had to pay their own electric bills average about double the energy use of similar households in the area who do pay their own electric bills.

Pacific Biodiesel farm manager Dan Rudoy shows off work being done as part of the Hawaii Military Biofuel Crop project.

Photo: Courtesy of Pacific Biodiesel

It's not all sticks; there are carrots, too. If military families consume less than the normal usage, they get rebate checks. The Hawaii Energy Smart initiative, launched in May by Hawaii Energy in conjunction with Forest City Military Communities, teaches energy-efficiency habits, including smart air-conditioning use, properly setting water heaters and timers, and using advanced power strips that stop phantom loads (that is, energy consumed while an appliance is plugged in but not turned on). The program's goal was to reduce electricity use in Forest City-managed housing in 36 Hawaii neighborhoods and roughly 6,700 military households. According to Hawaii Energy, the program saved $147,125 during June and July 2012, compared with the same two months in 2011 – about a 4.6 percent reduction in energy use. The program was deemed a success and is now being rolled out nationwide by the Navy.

A similar program, at the Navy housing neighborhood of Catlin Park, mauka of Honolulu International Airport, has also shown potential for reductions in energy use. The homes are being upgraded with solar PV, solar hot water, insulation weatherization and shade landscaping. In addition, residents who have achieved the lowest bills help others lower their energy use. In May, the military formally recognized the first "net zero" energy home at Joint Base Pearl Harbor-Hickam. Net zero means the family was drawing no net power from the grid through a combination of generating solar power and reducing power consumption.

DoD money is also helping dual-use Hawaii companies develop innovative products. Greenpath Technologies has supplied roofing and solar PV systems to the DoD and other clients, but is especially proud of the portable solar modules it developed for the military. The Soldier Transportable Alternative Energy Storage System provides portable solar power harvesting and energy storage for units deployed a long way from home. With STAESS and a similar product called STORM, the company is also looking for buyers in the fields of humanitarian aid and disaster relief.

Big Island Dairy, which has been looking for alternatives to its costly imports of feed supplement, may also benefit from the downstream effects of DoD expenditures. Military bases may use their buffer zones to grow biofuel crops. Pacific Biodiesel is heading up the Hawaii Military Biofuel Crop project, an agricultural pilot program for the DoD, with preliminary findings suggesting that short-term crops such as sunflowers can produce biofuels. The company is building a feed mill on the Big Island to extract oils from these crops that can be processed into biofuels. Pacific Biodiesel researcher Matt Johnson indicates that what's left after the oils are extracted is a high-protein feed, referred to as "seedcake," which can be produced less expensively than feeds Big Island Dairy imports from the mainland.

Cows can eat two to three pounds of this seedcake per day, according to Johnson, and it looks as though these biofuel crops have the byproduct of 1,000 to 2,000 pounds of seedcake per acre per planting. Sunflowers can realistically have three plantings per year in Hawaii's climate. Jatropha, kukui nuts, safflower, canola, soy and camelina are also being tested as potential biofuel crops, mostly in Waialua on Oahu. Johnson's research will be published when it is complete, and Pacific Biodiesel is planning to use it to teach workshops to farmers across the state and help them incorporate biofuel crops into their rotations.

The missing link in the chain was the processing facility the DoD money helped bring to Hawaii. "No farmer could afford the (crushing mill) by themselves," says Long. The $2.4 million congressional appropriation for the mill through the Corps of Engineers will help Hawaii develop the full supply chain from "soil to oil," as Long puts it. Pacific Biodiesel is constructing the crushing mill in Keaau on Hawaii Island, which is scheduled for completion in the first quarter of 2013. The facility will have the ability to process 20 tons per day, so the mill will help play a role in Hawaii's energy future, regardless of what the military does.

Despite its initial investments and these kinds of projects, the DoD was ranked "red" on its Scorecard on Sustainability/Energy, meaning it is lagging behind its goals, especially in two main areas: renewable-energy development and making its 3,628 buildings more energy efficient. We can expect significant expenditures in these two areas. For instance, in July, the DoD put out a request for proposal in the $300,000 to $400,000 range for an older heating, ventilation and air-conditioning system to be replaced by an energy-efficient system at its 103rd Troop Command Headquarters in Pearl City on Oahu.

With the directive coming from the top, similar RFPs will become more common. Hawaii businesses looking to do business with the DoD can go to "Fed Biz Ops" (www.fbo.gov), a website detailing RFPs and government contracts. Businesses can also get free help on how to do business with the government through the Hawaii Procurement Technical Assistance Center (www.hiptac.org), where specialists will help them find and apply for appropriate contracts from the DoD and other government agencies.

Asked for advice on working with the DoD, Pacific Biodiesel's Long urges patience and persistence. "It's slow developing a business relationship with the military," she says. However, she says the military's top-down directives on sustainability and alternative energy have made her job easier. "There's been more acceptance in the last few years than we used to see." ◘

Sunflowers are a biofuel plant, but what may make them more economical is seedcake (second photo from top), which is what is left after oil is extracted from the seeds. The seedcake might be used as animal feed. At bottom, the slab is poured for a seed crushing mill at Keaau on Hawaii Island.

Photo: David Croxford

Burning Oil

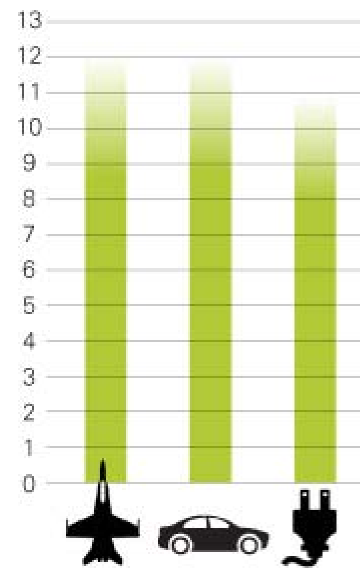
Jet fuel, other transportation and electricity each consume similar amounts of oil each year in Hawaii:

12 Million Barrels
Jet fuel for both military and civilian use

12 Million Barrels
Ground vehicles and other transportation, mostly civilian

10.8 Million Barrels
Generating electricity

Sources: State Department of Business, Economic Development and Tourism report, "Hawaii Energy Facts & Figures" (June 2012), and Hawaii Natural Energy Institute



Illustrations: Thinkstock.com

Blog » PBN biz blog PBN biz blog

Jan 7, 2013, 2:36pm HST

Report: On-bill financing of solar energy systems makes sense for Hawaii

Duane Shimogawa
Reporter- *Pacific Business News*
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A program that may help more Hawaii residents install solar energy systems by financing the heavy up-front costs through their electric bills has received a major boost.

Gov. Neil Abercrombie in 2011 called for the investigation into "on-bill financing," which the Hawaii Public Utilities Commission is currently examining. The PUC will ultimately make a decision about the program, but it's not quite clear as to when the agency will give the green light for the program.

But on Friday, the PUC released a report from its consultant, Harcourt, Brown & Cary, which concluded that the program makes sense for Hawaii.

The Colorado-based firm said that there are several reasons why it would work, including high energy costs, the ability of on-bill programs to serve renters and the opportunity to promote capital intensive solar technologies.

Harcourt, Brown & Carey recommends that the program includes the elements and structure such as all residential households (owners and tenants) being eligible to participate, the program supporting solar photovoltaic, solar thermal water heating and all permanently installed energy improvements offered by Hawaii Energy programs, as well as eligible projects achieving “bill neutrality” defined as energy savings exceeding the project costs when financed during a 12-year span.

On-bill financing, popular in other areas across the U.S., is a mechanism where a utility company includes the repayment for an energy efficiency or renewable energy project on the customer’s monthly bill.

Utility shareholders, ratepayers or third parties provide the project funds.

To read the full report, click here.

Duane Shimogawa covers energy, real estate and economic development for Pacific Business News.

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Top 3 Energy Incentives

Minimize your operating budget variances with energy efficiency measures.

By Michael Chang

There are many reasons to decrease electricity consumption beyond reducing the state's dependence on imported oil. An often-overlooked reason is that lower usage minimizes monthly operating budget variances.

If you have not already performed the following three energy efficiency and conservation measures, then you are at the mercy of your budget variances being driven by unpredictable and uncontrollable world energy price changes:

1) **Submetering** – drives behavior and fairness to all

2) **Domestic water pump retrofit** – often overlooked

3) **Lighting retrofit** – always your first action! To encourage adoption, Hawaii Energy, the ratepayer-funded conservation and efficiency program, offers substantial financial incentives for these measures and more.

Top 3 Energy Incentives

1) Electrical Submetering

Condominiums and commercial buildings with electrical "master meters" can minimize operating costs by submetering common areas, owners' units and mixed-use vendors, as well as parking structures and retail spaces.

A master meter consists of a single utility meter to monitor the electrical service to the entire building. Master meters are problematic since payment for electricity is a fixed amount based on percentage ownership within the property instead of correlating to a unit's electricity usage. It was often selected and installed for two reasons:

- lowest initial construction costs
- lowest "bulk rate" dollars per kilowatt hours (kWh) operating costs over the life of the building

The removal of personal responsibility driven by master meters can place AOAOs and other buildings in various levels of financial hardship. This can range from realignments of monthly expenditures to match cash flows to full-blown budget fire drills as a result of rapid and frequent electricity cost fluctuations. In these instances, AOAOs may have to resort to balancing budgets by taking measures such as:

- deferring discretionary services such as grounds and equipment maintenance
- dipping into reserves
- reviewing special assessments to make up the difference

Installing a submetering system can greatly minimize these scenarios. Moreover, in 2012, the legislature adopted and the governor signed into law Act 18, which enables boards to authorize the installation of submetering, provided that AOAOs pay for the installation cost.

Available Incentive

Hawaii Energy offers a substantial incentive of $150 per unit (up to 50 percent of the total project cost) for submeters used for billing. The cost of submetering ranges from $350 to $550 per unit, with monthly billing service fees from $1.50 to $5 per bill.

Submetering not only fairly allocates the cost of electricity; it encourages residents in each unit to conserve energy. Depending on the property and the occupants' willingness to change their behavior, electricity reduction can range from 10 to 25 percent.

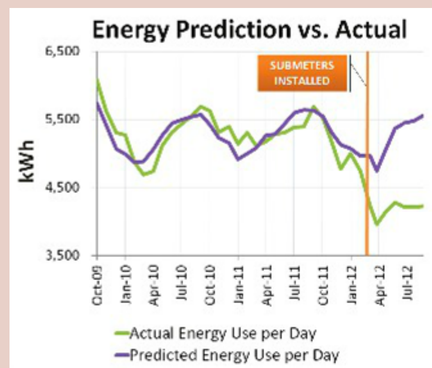
As with any purchase and installation, Hawaii Energy strongly recommends that associations do their due diligence to find a qualified contractor. Over the last 18 months, eight properties have installed submetering. Fifteen more properties are underway or will start soon.

Contact Hawaii Energy for recommended best practices to replicate successful projects.

CASE STUDY

Craigside, AOAO

Just months after installation, Craigside in Nuuanu is already achieving significant energy reduction. In March 2012, submetering was installed for 242 units. From March to September, actual usage was down from its predicted usage by about 20 percent (approximately 1,000 kWh reduction per day, which is equal to about $9,120 in electricity cost savings per month, based on 30 cents per kWh and adjusted for weather-related changes).

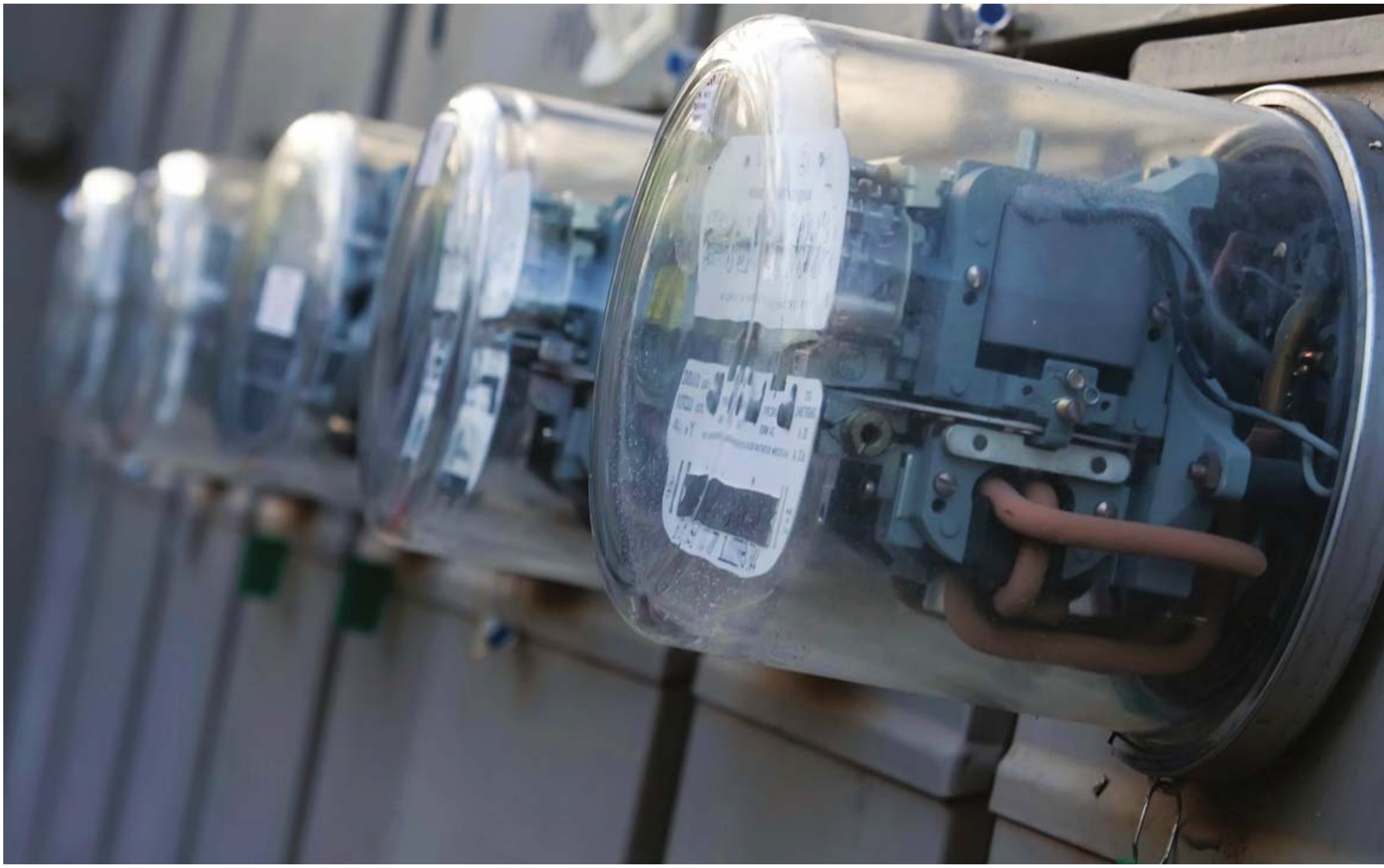


2) Domestic Water Pump Retrofit

Does electricity come to mind when you turn on the faucet in a high-rise building? Probably not, since water and electricity do not normally mix. What many residents don't realize, however, is that it takes a lot of electricity to pump up the water they use every day.

Retrofit domestic water pumps (also known as "booster pumps") are a great hidden source of energy savings. The pumps take potable city water from the street and pump it up to high-rise buildings (generally, those that are six floors or higher) or across campuses of buildings.

New pump packages use high efficiency motors, pumps, variable frequency drives (VFDs) and controls



to optimize the performance to match the building water use demands. You can even go further by looking into the incorporation of "bladder" tanks (ask your mechanical engineer, contractor or pumping professional).

Available Incentive

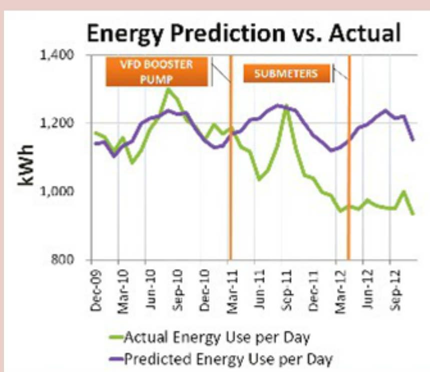
A pump retrofit can yield 20 to 50-plus percent savings in electricity usage related to water pumping. In many cases, new VFD pump systems that are responsive to water usage can dramatically reduce electricity consumption without any lifestyle changes by occupants.

Hawaii Energy's incentive of $80 per horsepower reduction, plus an additional $3,000 incentive for VFD systems, help reduce retrofit payback to between 12 and 24 months.

CASE STUDY

2233 Ala Wai Blvd., AOAO

With 52 units, the building as already achieved impressive initial savings with a domestic water booster pump retrofit in March 2011. In September 2012, electricity consumption was approximately 200 kWh less per day when compared to the same month in previous years. This reduction is equal to about $1,824 in electricity cost savings for the month (based on 30 cents per kWh and adjusted for weather-related changes).



3) Lighting Retrofit

Replacing existing fixtures with energy-efficient lighting is one of the fastest and easiest ways to save electricity and money. A hot topic is LED lighting, which is maturing at a rapid pace. The once overly dramatic claims made for the first wave of equipment are being tempered with the experience of early adopters and attrition of equipment that has not met its performance claims. Spend time with a lighting professional or a knowledgeable peer who can guide you through the wide range of lighting technologies.

One-for-one lamp replacements will not give you the greatest return on your investment. Rather, you should ask for a comprehensive lighting retrofit that includes a review of the type of tasks being performed in each area. Once the need is defined, select the appropriate efficient lamp and fixture technologies. Then, take the extra step to ensure that the lighting burn-hours are controlled with timers, motion sensors or photo-sensors. An alternative to "hardware stuff" is to incorporate turn-on and off procedures into operational personnel duties (for example, security guards turning certain lights on or off as part of their rounds at specified times).

A lighting retrofit is an opportunity to take a close look at the design of your exterior lights. Energy efficiency and conservation can be as simple as focusing lights only on needed areas and eliminating "wasted" light. This will not only cut your electricity costs and reduce our aggregate evening electricity

Hawaii Energy program specialist Lisa Harmon presented an incentive check to Country Club Village 6 resident manager Dan Daoang.

ENERGY

demand, but also minimize light pollution to help keep our night sky dark and protect the natural rhythm of endangered wildlife. To learn more about the importance of reducing light pollution in Hawaii, visit the University of Hawaii's Institute for Astronomy Website at www.ifa.hawaii.edu.

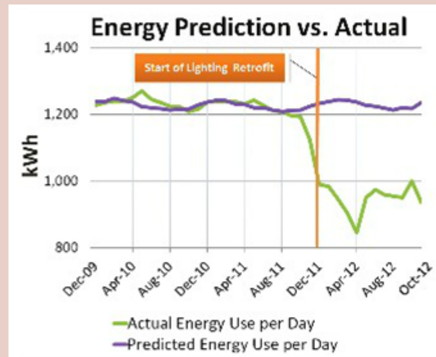
Available Incentive

Hawaii Energy offers an array of incentives for replacement of outdated lighting with more energy-efficient options, which can drive the paybacks to less than 2 years and in many cases less than a year! Let us help you identify what can be done within your budget and operating restraints.

CASE STUDY

Country Club Village 6, AOAO

In 2012, the Village was able to take advantage of the Hawaii Energy lighting incentive. The property received a total of $18,279, which was 43 percent of the project cost, for de-lamping, and interior and pawrking structure lighting retrofits. The total project cost was approximately $42,000. The potential savings is an estimated 103,000 kWh annually. This is equal to roughly $28,840 in potential savings a year (based on an average of 28 cents per kWh). The simple payback for the project is just over 13 months.

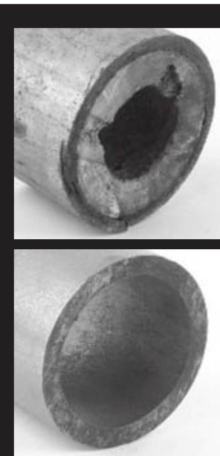


BMH Resource:

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission. Hawaii Energy offers cash rebates and other incentives to local residents and businesses to help offset the cost of installing energy-efficient equipment. In addition to rebates, the program conducts education and training for residents, businesses and trade allies to encourage the adoption of energy conservation behaviors and efficiency measures. The program plays an important role in helping to achieve Hawaii's goal of reducing total annual electric energy usage by 30 percent, or 4.3 billion kWh, by 2030.

HawaiiEnergy.com
Oahu: 839-8880
Toll-free: 1-877-231-8222
(Neighbor Islands)

Michael Chang, deputy program manager of Hawaii Energy, is responsible for leading the operations team of Hawaii Energy. Michael has developed a broad range of energy experience gained from 18 years in the local energy industry identifying ways to cut energy costs, implement energy-saving actions and achieve energy efficiency goals while working for Hawaiian Electric Company, Johnson Controls and now Hawaii Energy.

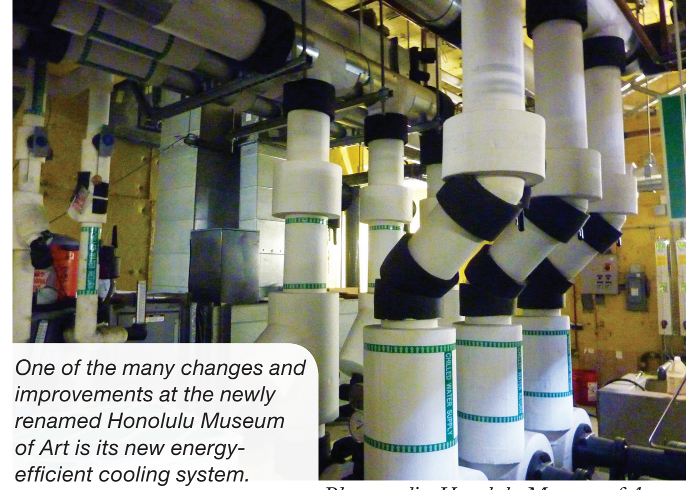


ENERGY

Saving Money & Art

Honolulu Museum of Art lands $346K for an energy efficient system.

By Aimee Harris



One of the many changes and improvements at the newly renamed Honolulu Museum of Art is its new energy-efficient cooling system.

Photo credit: Honolulu Museum of Art

Recently, the Honolulu Museum of Art (formerly the Honolulu Academy of Art) completed a major energy-efficiency retrofit by installing a new HVAC system. The museum received a $346,026 incentive from Hawaii Energy-administered Public Benefit fund, making it the largest incentive received to date by a charitable organization.

"Sophisticated, self-funding projects like this represent the very best opportunities for nonprofits in managing rising energy costs," says Miles Kubo, the chief operating officer of Energy Industries.

Hawaii Energy, a ratepayer-funded conservation and efficiency program under contract with the Hawaii Public Utilities Commission, offers rebates and other incentives to residents and businesses to help offset the cost of installing energy-efficient equipment. Energy Industries provided the museum with a comprehensive program that protects the artwork, increases energy-efficiency and reduces utility expenses. The museum's electricity consumption has been reduced by 28 percent, saving it an estimated $250,000 annually.

The $1.5-million retrofit project, additionally funded in part by an art donor and local financing, is expected to generate enough monthly energy savings to cover the financing costs of the mechanical system improvements. After the first year, the museum's monthly electricity savings is expected to surpass its financing payments, creating a positive cash flow for the museum.

The project's largest undertaking was the redesign and replacement of five aging, unconnected chillers with an integrated central plant of three energy-efficient chillers, working in tandem. Should one malfunction, the other serves as a backup. This is crucial in the maintenance of the museum's artwork, providing the climate control in the galleries and vaults.

Ray Starling, program manager for Hawaii Energy says, "We applaud the Honolulu Museum of Art for being the energy heroes that they are, and Energy Industries for helping them get there."

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Save Water, Save Energy Poster & Poetry Contest

Posted: Feb 22, 2013 11:45 AM
Updated: Feb 22, 2013 11:45 AM

HONOLULU(HawaiiNewsNow) - The Board of Water Supply (BWS) is now accepting entries for its 2013 Water Conservation Week Poster and Poetry Contests. The annual contests promote awareness of the island's limited drinking water supply and teach Oahu's youth to be more water-efficient.

"These annual contests encourage Oahu's school children to contribute to efforts that ensure the sustainability of Oahu's groundwater supply," said BWS Manager and Chief Engineer Ernest Lau. "We encourage Oahu's bright young minds to produce posters and poetry that reflect their thoughts on the value of our water and the need to conserve it."

For the 2013 contests, the BWS is partnering with Hawaii Energy and other program sponsors to invite Oahu students to consider the relationship between water and energy through the theme, "Save Water, Save Energy." This theme explores the important concept that conserving water has a dual benefit - it promotes sustainability of our limited water resources and also saves electricity.

"We at Hawaii Energy are excited to be a sponsor this year, as part of our program's goal to reduce the state's total electricity usage by 30 percent by 2030," said Ray Starling, Program Manager of Hawaii Energy, the ratepayer-funded conservation and efficiency program serving Hawaii, Honolulu and Maui counties. "It is a little known fact that a substantial amount of electricity is needed to pump, treat, store and deliver the water we all use daily. By conserving water and electricity, residents can reduce their water and wastewater bills, lower electricity costs and provide for a better quality of life."

The poster contest is open to Oahu students in grades K-6, and the poetry contest is open to Oahu students in grades 7-12. The "Save Water, Save Energy" theme was specifically chosen to spark the creativity of students to depict the mutually beneficial relationship between water and energy conservation.

"These poster and poetry contests are excellent opportunities for students to learn about the need to preserve our water resources and adopt a water-efficient lifestyle," said BWS Chairman Duane Miyashiro. "As we raise generation after generation of water-smart residents, we ensure that our island's water resources will continue well into the future."

Students entering the poster contest should submit one original piece of artwork that relates to the theme on a 12 x 18-inch sheet of paper. Any art medium can be used except 3-dimensional work, chalk, charcoal, and oil-based crayons.

Students entering the poetry contest should submit one original poem, typed on a standard 8½ x 11-inch letter size paper. The poem must be 150 words or less and no longer than 20 lines. Any form of poetry is acceptable.

Entries must be submitted with a completed entry form by March 6, 2013, to the BWS's Communications Office at 630 South Beretania Street, Monday through Friday, 7:45 a.m. - 4:30 p.m., or to any Satellite City Hall on Oahu during their normal business hours. The contest entry form, complete contest rules, and additional information - such as educational materials and activities - are available online or can be obtained by contacting the BWS Communications Office at 748-5041 or by email . Additionally, contest information will be provided online via the BWS's Facebook page and its Twitter account.

The winning and honorable mention posters and poems will be showcased at different venues across the island in 2013, as well as featured in the 2014 Water Conservation Calendar, which will be made available to the public at the end of the year. In May, the winning students will be recognized at a special ceremony and presented with awards.

WE RECOMMEND

- Escaped Prisoner: How Teddy Munet escaped

State stays on course to meet 2030 energy goals

ENERGY

BY DUANE SHIMOGAWA
shimogawa@bizjournals.com | 955-8036

Hawaii is ahead of schedule in meeting its long-range goal for energy efficiency, according to the manager of a program designed to help it meet that goal.

"We are way ahead and will meet that goal and then some," said Ray Starling, program manager for Hawaii Energy, which has been hired by the state Public Utilities Commission to move the state closer to energy efficiency.

Starling

The goal is part of the Hawaii Clean Energy Initiative, which intends to achieve 70 percent clean-energy usage by 2030, with 40 percent coming from locally generated renewable sources and 30 percent from efficiency measures.

Starling is overseeing a big part of the energy-efficiency portion of the initiative, which, if successful, would save 4.3 billion kilowatt-hours of electricity by 2030.

Administered by McLean, Va.-based Science Applications International Corp., Hawaii Energy is funded by ratepayers and serves the Big Island, Lanai, Maui, Molokai and Oahu. It is in the final year of a second two-year contract with the PUC, and the contract could be extended through 2016.

Starling said one goal is to build only zero-energy buildings that would be self-sufficient.

Another initiative for 2013 is to set aside several million dollars for its direct-install project, which includes retrofitting lighting fixtures.

"We have been pushing the Neighbor Islands to do this as well," Starling said.

Another project involves putting measuring devices mainly in Downtown Honolulu buildings, enabling them to monitor electrical and cooling systems.

Hawaii Energy also plans to expand its installation of meters in each unit of condominium complexes. To date, eight buildings have been outfitted with devices, and about 15 more are under consideration by condo associations.

Starling said the key is to focus on behavior, "getting every individual to have at least a sense of what energy is all about and how they can do something about it."

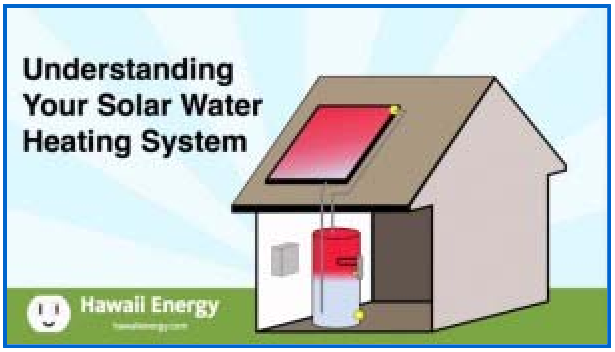
Utilizing the funds generated by charging ratepayers — about $1.90 per ratepayer per month — Hawaii Energy offers cash rebates and other incentives to residents and businesses to help offset the cost of installing energy-efficient equipment.

Additionally, the program, which employs about 35 people, trains residents, business managers and contractors in how to adopt energy-efficiency measures.

In its annual report to the PUC in December, Hawaii Energy said it spent $25.7 million in ratepayer funds out of a $32.3 million budget.

Hawaii Energy Increases Solar Water Heater Rebate

Posted By Sonia Isotov On 03/11/2013 @ 11:59 am In Business | No Comments



[1]

Courtesy photo.

By Sonia Isotov

For a limited time, Hawaii residents will be able to receive a $1,000 instant rebate for the installation of a new, qualifying solar water heater, according to a news release by Hawaii Energy, the energy efficiency and conservation program for Hawaii, Honolulu and Maui counties.

Hawaii Energy recently increased increased its instant rebate on new, qualifying solar water heating systems from $750 to $1,000. Residents are advised to act soon, as this rebate is only for a limited time.

"If residents haven't already done so, now is the time to take advantage of our increased rebate for solar water heating systems," said H. Ray Starling, the program director for Hawaii Energy, in a written statement.

"Don't put it off until next year, or wait for that old energy-guzzling electric water heater to fail, because rebates, as well as state and federal tax credits are subject to change."

For residents that would like to avoid upfront expenses, Hawaii Energy offers an interest buy-down option called "Hot Water, Cool Rates." Available in lieu of the instant rebate and through participating lenders, Hawaii Energy provides a $1,000 to the lender to buy down the interest on a qualifying solar water heating loan.

The lender then provides a zero to low interest loan depending on the applicant's credit and other factors determined by the lender. Residents can choose from a list of local banks and credit unions.

"With the average cost of a solar water heater approaching $7,000, many homeowners may seek financing to pay for their systems," added Starling. "Hawaii Energy's Hot Water, Cool Rates option makes it possible for more Hawaii residents to afford these great energy-saving systems."

Article printed from Maui Now: **http://mauinow.com**

URL to article: **http://mauinow.com/2013/03/11/hawaii-energy-increases-solar-water-heater-rebate/**

URLs in this post:
[1] Image: **http://mauinow.com/files/2013/03/video-understandingshw.jpg**

Published on *RenewablesBiz* (http://www.renewablesbiz.com)

Agency bumps up rebate for solar water heaters

Mar 11 - McClatchy-Tribune Regional News - Alan Yonan Jr. The Honolulu Star-Advertiser
A cash rebate for Hawaiian Electric Co. customers who install solar water heaters will be increased to $1,000 for a limited time in an effort to boost sales of the energy-efficient units.

The rebate, which had been $750, will be available for systems bought starting today, said Hawaii Energy, which administers the state's energy conservation program in Honolulu, Maui and Hawaii counties. Hawaii Energy officials did not say how long the higher rebate would be available.

"If residents haven't already done so, now is the time to take advantage of our increased rebate for solar water heating systems," said H. Ray Starling, Hawaii Energy program director.

Electric water heaters typically represent the single biggest charge on an electricity bill in households that don't have air conditioning or a swimming pool, Starling said.

Households of four or more that switch from an electric to a solar water heater can save up to 40 percent, about $600 a year, on their electric bill.

Hawaii Energy's $1,000 instant rebate, combined with state and federal tax credits, reduces the cost of the average solar water heating system from roughly $6,600 to about $2,000, according to the Hawaii Energy website.

For HECO customers who don't want to pay for the cost of a solar water heater up front, Hawaii Energy offers an interest buy-down option.

Available in lieu of the instant rebate, Hawaii Energy provides a $1,000 incentive to participating lenders to buy down the interest rate on a qualifying solar water heating loan.

The lender then provides a zero to low interest loan depending on the applicant's credit and other factors determined by the lender.

Residents can choose from a list of local banks and credit unions.

A cash rebate for Hawaiian Electric Co. customers who install solar water heaters will be increased to $1,000 for a limited time in an effort to boost sales of the energy-efficient units.

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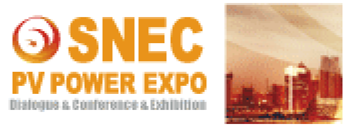

Hawaii Energy Raises Solar Water Heating Rebate

in News Departments > Policy Watch
by SI Staff on Tuesday 12 March 2013

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comments: 0

Hawaii Energy, the state's energy conservation and efficiency program, has incre
instant rebate on new, qualifying residential solar water heating systems from $7
The new rebate is expected to be available only for a limited time.

A typical household of four or more that switches to a solar water heater can sav
about $600 a year - on its electric bill, according to Hawaii Energy. The $1,000 ir
combined with applicable state and federal tax credits, reduces the cost of the av
water heating system from approximately $6,600 to about $2,000.

More information on the program is available here.

Don't miss the latest solar energy news -- **register to receive Solar Industry's headlines**.

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From the Pacific Business News
:http://www.bizjournals.com/pacific/news/2013/03/11/hawaii-energy-raises-rebate-for.html

Mar 11, 2013, 11:29am HST

Hawaii Energy raises rebate for installing solar hot water heating systems

Staff *Pacific Business News*

Hawaii Energy has boosted its solar hot water heater rebate for Hawaiian Electric Co. customers to $1,000 for new solar hot water heating systems for a limited time.

The rebate for the solar hot water heaters has been $750, which, when combined with state and federal tax credits, helps offset the cost of installing a residential solar hot water system for residents on Oahu, the Big Island and in Maui County. The average cost of a solar hot water system is about $6,600.

“If residents haven’t already done so, now is the time to take advantage of our increased rebate for solar water heating systems,” Hawaii Energy Program Director H. Ray Starling said in a statement. “Don’t put it off until next year, or wait for that old energy-guzzling electric water heater to fail, because rebates, as well as state and federal tax credits, are subject to change.”

Hawaii Energy also offers, in lieu of the instant rebate, a $1,000 incentive to lenders to buy down the interest on a qualifying solar hot water heating loan, or a $200 rebate for a heat pump water heater.

Agency bumps up rebate for solar water heaters

POSTED: 01:30 a.m. HST, Mar 11, 2013 LAST UPDATED: 02:04 p.m. HST, Mar 11, 2013

StarAdvertiser.com

By Alan Yonan Jr.

star-advertiser / january 2011 HECO is willing to pay the upfront costs of installing solar water heating systems for qualified customers in Honolulu, Hawaii and Maui counties. This solar water heating system was installed on a Circle Drive home in Wahiawa.

A cash rebate for Hawaiian Electric Co. customers who install solar water heaters will be increased to $1,000 for a limited time in an effort to boost sales of the energy-efficient units.

The rebate, which had been $750, will be available for systems bought starting today, said Hawaii Energy, which administers the state's energy conservation program in Honolulu, Maui and Hawaii counties. Hawaii Energy officials did not say how long the higher rebate would be available.

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The lender then provides a zero to low interest loan depending on the applicant's credit and other factors determined by the lender.

Residents can choose from a list of local banks and credit unions.

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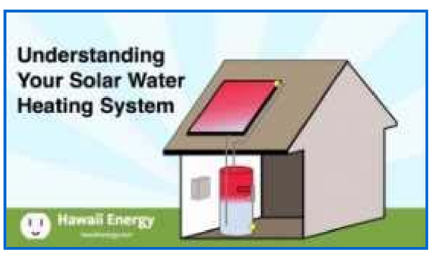
Hawaii Energy boosts solar water heater rebates

March 14, 2013 | Written by Chris Meehan | Hits: 573



At a time when most solar rebates are shrinking or going by the wayside because of the demand for more solar, Hawaii Energy is bucking the trend by increasing its solar hot water rebates for homeowners. The utility, the pacific island state's largest, announced March 11 that it increased its instant rebate on new solar water heating systems from $750 to $1,000.

While photovoltaic systems are generally the most discussed when people talk about going solar, solar hot water is also a way to reduce homeowners' energy costs cost effectively. However, particularly in the U.S., growth in the solar hot water industry is often anemic compared to growth in the PV industry. That's even though solar water heaters can bring down hot water heating costs. For instance in Hawaii they can cut costs by up to 40 percent, which equates to about $600 annually for a family of four, according to Hawaii Electric.

“If residents haven't already done so, now is the time to take advantage of our increased rebate for solar water heating systems,” said Hawaii Energy Program Director H. Ray Starling. “Take the first step towards big energy savings with the installation of a system today. Don't put it off until next year, or wait for that old energy-guzzling electric water heater to fail, because rebates, as well as state and federal tax credits are subject to change.”

Between Hawaii Electric's newly increased $1,000 instant rebate and state and federal incentives the average price tag of a $6,600 solar hot water heating system (including retrofits) is reduced by more than two-thirds to about $2,000, the utility said. “Residents should act soon, as this rebate is only for a limited time,” the utility said. While it didn't offer any hard deadlines, Hawaii Energy's general policy for such rebates is they last for a year or until the funds supporting the rebate are exhausted.

If homeowners can't afford the full, up-front price of a solar hot water system, the utility also offers “Hot Water, Cool Rates,” program. Under that program the utility provides the $1,000 rebate to a system financier's loan to reduce the interest rate of the loan to lower- or zero-interest rates. “Hawaii Energy's Hot Water, Cool Rates option makes it possible for more Hawaii residents to afford these great energy-saving systems,” Starling said. It's also offering a $200 rebate for heat pump water heaters for smaller households. Such systems are smaller and less expensive than a solar water heater system.

From the Pacific Business News
:http://www.bizjournals.com/pacific/print-edition/2013/04/05/energy-officials-turn-attention-to.html

SUBSCRIBER CONTENT: Apr 5, 2013, 12:00am HST

Energy officials turn attention to conservation

Efficiency plays key role in state's move toward energy independence

Duane Shimogawa
Reporter- *Pacific Business News*
Email | Facebook | Twitter | LinkedIn

The state is taking a hard look at what many in the energy industry call an overlooked, yet extremely critical part of the Hawaii Clean Energy Initiative — efficiency.

The state's current mandate calls for 70 percent of its energy usage to come from renewable sources by 2030. Of that 70 percent, 40 percent will come from the production of clean energy and 30 percent from energy conservation. The state estimates that it currently is at 13 percent and 12 percent, respectively.

Energy industry officials believe that Hawaii is on pace to meet its goal of producing renewable energy. But some are concerned that it's behind schedule in terms of energy efficiency.

"There is much more that needs to be done in the [energy-efficiency] arena," Hawaii Energy Program Director Ray Starling told PBN in an email.

The **National Renewable Energy Laboratory/Hawaii** Clean Energy Initiative Energy Efficiency Working Group, which includes Starling and about 20 other renewable-energy and efficiency stakeholders from across the state and beyond, met in Honolulu this week to discuss barriers to energy efficiency.

"This is about the time to get all the stakeholders [together] and share information in terms of success barriers and anything that we can do to help each other," said Kosol Kiatreungwattana, a National Renewable Energy Laboratory energy engineer, adding that it's time to "initiate the conversation."

Launched in 2008 when the Hawaii Clean Energy Initiative began, the group initially planned to meet quarterly but has changed its schedule to about a couple times a year.

Kiatreungwattana said the group is looking at developing a strategic plan.

“The thing we see is that all of these stakeholders, organizations and businesses are doing their own thing,” he said. “There’s no sharing of information, no specific plan.”

Kiatreungwattana, who led this week’s meeting, said the next step will be drafting a final report to the Hawaii Clean Energy Initiative this summer. It will address major issues such as the best energy-efficiency technologies that will work for the state as well as managing efficiency, behavior and financing.

“How can you get proper financing for the project?” he asked. “How can you get the funding to have the endkeeper see projects moving?”

State Sen. Mike Gabbard, D-Kapolei-Makakilo-Ewa, chairman of the Senate Committee on Energy and Environment and one of the stakeholders, believes the state has work to do to meet its efficiency goal. To that end, he is championing Senate Bill 1087, which would establish a “green infrastructure financing program.”

“There’s huge potential in this legislation to spur private financing investment to help homes and businesses access energy-efficiency improvement, such as solar water heating and air conditioning,” he told PBN in an email. “It would also make it easy by allowing these improvements to be paid off on their electricity bills.”

The bill would establish a regulatory financing structure authorizing the state Public Utilities Commission and state Department of Business, Economic Development and Tourism to provide low-cost loans for green infrastructure equipment. It has passed the Senate and is making its way through the House.

Gabbard noted that the state has been making some strides in the efficiency area, including the installation of solar photovoltaic systems, changing out light bulbs, improving air-conditioning systems and making other infrastructure improvements in the 10 Capitol District buildings, including the state Capitol.

“They’ve also been working with 30 ‘green champions’ who work in the different state agencies and have been encouraging their colleagues to save energy by closing their doors, turning off their lights and computers when not in use, and unplugging other electronic devices,” he said. “These combined efforts have allowed these 10 buildings to reduce their energy consumption by 7 percent over the last year, and the state Capitol actually did the best by reducing its energy use by 16 percent.”

Jeff Mikulina, executive director of the Honolulu clean-energy advocacy nonprofit **Blue Planet Foundation** and a member of the energy-efficiency group, told PBN that in some ways the state is making progress toward its 30 percent efficiency goal.

“That’s going to require significant new tools and approaches,” he said. “One of those is how we build and how you initially design and build homes.”

He noted that the state could improve its building codes by making sure new buildings are net-zero construction.

“We certainly have the technology to do net-zero buildings,” he said. “The challenge is that it raises the upfront costs, [but] we ought to give it a good, hard look.”

Blue Planet Foundation estimates that Hawaii residents spend about $1 billion on energy annually.

“But a lot of folks don’t know that and I think a big challenge is helping people get that information,” Mikulina said. “Energy literacy programs and smart meters like those on Kauai are good, as they record in real time how much energy is consumed.”

Honolulu-based **Energy Industries**, one of the state’s largest energy-efficiency contractors, knows the challenge of changing behaviors. Brandon Hayashi, energy project developer, compared efficiency to a silent missile — not as sexy as renewable energy but just as important.

“From a large perspective, there are a number of issues why we aren’t getting there,” he said. “Some are on the level of the owner, who does not understand the power of efficiency.”

But there have been several examples of businesses buying into efficiency, including convenience store giant 7-Eleven, which is investing more than $10 million to reduce energy consumption and related costs by 30 percent annually in Hawaii.

“When the Hawaii Clean Energy Initiative was pulled together and established goals for energy efficiency, there were some things that were not addressed,” Starling said. “Part of the work that the National Renewable Energy Laboratory is doing is trying to see what we left out and pull all the things back in, in order to have a complete [picture].”

Duane Shimogawa covers energy, real estate and economic development for Pacific Business News.

Turn in your old refrigerator for cash

By Web Staff

Published: Tuesday, April 16, 2013, 7:48 pm

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, wants to help residents save electricity in their homes with a "bounty" cash reward in exchange for turning in old refrigerators or freezers. In honor of Earth Day 2013, Hawaii Energy reminds residents that it will pick up and recycle old working refrigerators or freezers for free and pay cash for eliminating those old units. Oahu households will receive $25, and Maui and Hawaii Island households will get $65. This offer is coming soon to Molokai and Lanai.

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The goal of the Bounty Program is to eliminate old, inefficient refrigerators or freezers. Refrigerators that are 15 years old or older can use two to three times more electricity than new ENERGY STAR® models. Those old "energy hogs" can cost households up to $500 or more a year in energy costs. (Savings may vary due to electricity rates and other factors.)

"Many homes have older refrigerators using up a lot of electricity, costing residents hundreds of dollars to operate every year," said Larry Newman, Hawaii Energy Operations Director. "Our Bounty Program makes it easy to surrender old, but working refrigerators and freezers. Just call us today, and we will take care of the rest."

To participate in the Bounty Program, on Oahu call 537-5577, and on Maui and Hawaii Island call toll-free at 1-877-231-8222. The Bounty Program is offered through June 2013, or as long as funding lasts. Bounties are available on a first-come, first-served basis to electric utility account holders, with a limit of one refrigerator and one freezer per household. The appliances must be full-size (at least 14 cubic feet) and currently in use to qualify. Some restrictions may apply, call for more information.

Hawaii Energy has two other refrigerator offers. Residents can receive a $50 rebate when they purchase a new ENERGY STAR® refrigerator (with a minimum size of 16 cubic feet and price of $600 or less). Or, if they purchase a new ENERGY STAR refrigerator and recycle the old working refrigerator, residents can get a $125 rebate with Hawaii Energy's "Trade-up for Cool Cash" offer.

For more information, log onto www.HawaiiEnergy.com

Star Advertiser

Wednesday, April 17, 2013 83.0°F

Hawaii Energy issues Earth Day reminder about fridge rebates

By Star-Advertiser Staff

POSTED: 12:50 p.m. HST, Apr 16, 2013
LAST UPDATED: 12:50 p.m. HST, Apr 16, 2013

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, is issuing an Earth Day reminder to consumers about various rebates it offers for turning in old refrigerators and buying new, energy efficient models.

Residents can receive up to a $125 rebate from Hawaii Energy if they purchase an Energy Star-approved refrigerator and turn in an old, working refrigerator.

Hawaii Energy also offers a separate rebate under its “Bounty Program” ranging from $25 on Oahu to $65 on Maui and Hawaii island to anyone who turns in an old, full-size, working refrigerator or freezer. WIth both rebates Hawaii Energy will haul away the old appliances at no cost. The Bounty Program will be offered through June 2013, or as long as funding lasts.

Residents also can receive a $50 rebate when they purchase an Energy Star refrigerator with a minimum size of 16 cubic feet and price of $600 or less.

Earth Day is observed April 22. For more information go to www.HawaiiEnergy.com.

MORE FROM THE STAR-ADVERTISER

Business Briefs

Refrigerator rebate offer is deemed a cool success

Hawaii Energy offers to haul off old working refrigerators

Hawaii residents cash in on refrigerator rebates

Verification necessary before rebates issued

Agency bumps up rebate for solar water heaters

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How Hawaii Energy is Helping even big Maui Resorts Cut Their Energy Costs by 30 Percent Energy Usage by 30 percent

By Jen Russo

April 17, 2013 MAUI NEWS No Comments

Hawaii burned 11.3 million barrels of petroleum last year to make electricity. Consider it Hawaii's contribution to global warming and climate change.

Of course, the state of Hawaii isn't too happy about that. In fact, it has a goal of reducing energy consumption by 30 percent by 2030–a reduction of 4.3 billion kilowatt hours in 17 years. That much change can only come through lifestyle changes, ranging from small stuff like turning off lights in rooms you're not using and swapping incandescent light bulbs for CFL or LED bulbs to ditching your car in favor of public transportation and building a lot more solar and wind energy generators.

To help, the state's Public Utilities Commission (PUC) has contracted Hawaii Energy to run a ratepayer-funded energy reduction program that's administered by the Science Applications International Corporation (SAIC). The program is paid for through the MECO (or HECO or HELCO) Public Benefits Fund (PBF), which constitutes about 1.5 percent of the total revenues for the state's electric companies.

This program monitors and distributes rebates that are available to household and business consumers. To qualify, you have to be a paying customer and satisfy items on the sanctioned list of available rebates: new energy efficient refrigerators, solar water heaters, ceiling fans, air conditioners and so forth. There are rebates from ranging from $50 to $1,000 for households that purchase these items. The rebates are offered for companies as well, and in some cases rebate investments can add up into the hundreds of thousands of dollars, depending on the project.

"Now that ARRA [American Recovery and Reinvestment Act] funds have run out, I think Hawaii Energy is the go-to source in Hawaii," says Brian Fitzgerald of the Oahu PR firm MVNP. "Several businesses and organizations have received custom rebate incentives from Hawaii Energy. Castle Medical Center ($647,637) and Honolulu Museum of Art ($346,026) are recipients of the largest rebates given by Hawaii Energy to date. But many others have benefitted as well. Anything that helps a building run more energy efficiently is open for possible rebate."

Hawaii Energy reports that Hawaii ranks first in electric energy rates, with Maui consumers paying 36 cents per kWh compared to the national average of just 11 to 12 cents per kWh. On the flip side, the state spends more than $5 billion a year on imported oil.

Governor Neil Abercrombie says that by reducing water and electricity use, public and private sector innovators are helping reach the state's goal of 70 percent energy by 2030. On April 26, he will recognizing the Westin Ka'anapali Ocean Resort Villas with the Kela Award for their green initiatives. He will also give the Hyatt Waikiki, Wyndham Waikiki and Aqua Aloha his administration's Green Business Awards.

The work at the Westin KOR makes up the largest Hawaii Energy projects on Maui. Begun in 2012, it's cost $383,353 and saved an estimated 1.9 million kilowatt hours annually, reducing the resort's electricity purchases by a third. For that, Westin received $215,657 in state rebates.

"We do work closely with Hawaii Energy on all of our energy projects," says Sulinn Aipa, the Westin KOR Operations Coordinator. "You can absolutely consult with them before and anytime during projects. However, rebates and best options for maximization were not a deciding factor for us. We already knew what retrofits we wanted to do and we appreciated any incentives that were applicable."

Aipa says Westin's drive for more energy efficiency began in 2008 when she pushed for a committee to reduce water and energy consumption and increase recycling and waste management.

"I started in 2007 when they had just opened the North Tower," says Aipa. "I was part of the Associate Development Program. You had to choose a project you were passionate about. For me, that was an energy committee to protect natural resources."

The efforts Aipa had already established led the way to the resort's energy saving goals, but there is more to the efforts to get the resort to go green than just numbers. Aipa also promotes company environmental projects like reef and beach cleanups, as well as volunteering at Malama Honokowai.

Westin KOR wants to reduce their energy consumption by 30 percent and water reduction by 20 percent by 2020. Their recent retrofit project included the installation of two cogeneration units that supply 80 percent of their own power. They also added irrigation controls that cut water use by 14,821 gallons and installed thousands of LED lights throughout the resort. They even offer an incentive for guests to defer daily housekeeping: a complimentary breakfast buffet. They say that saves the resort about $65,000 a year.

Aipa also gives a presentation every semester to the Island Sustainability class that's part of University of Hawaii Maui College (UHMC) BAS Sustainable Science Management Program and sits on the advisory committee for their bachelor program.

"We help inform the students mainly on sustainable hospitality and what the resort does," she says. "I always stress building sustainable in turn-key is really important."

Aipa says the resort should hit 15 percent of their reduction goals this year. As far as the future goes, she says education will be the key to changing behavior.

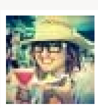
The rebates currently offered are on a first-come, first-served basis. Hawaii Energy also consults with companies considering investing in energy saving, offering the best ways to improve efficiency.

"We have a Transformational Department that does training for the community," says Malie Alsup, Marketing Manager for Hawaii Energy. "We have held various energy efficiency workshops on Maui, and generally it's energy officials [who are] attending. The best way to get info on these is to sign up for our energy newsletter on our website."

For more information, check out hawaiienergy.com/business for a general overview on what they offer, then call them directly at 808-839-8880 for more specifics.

Photo: Chameleon at the English Wikimedia Project

Tags: Hawaii Energy, Sulinn Aipa, Westin Kaanapali Ocean Resort Villas



ABOUT JEN RUSSO

View all post by Jen Russo »

NO COMMENTS

Hawaii Energy puts bounty on old refrigerators and freezers

April 25, 2013
Lahaina News

HONOLULU - Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, wants to help residents save electricity in their homes with a "bounty" cash reward in exchange for turning in old refrigerators or freezers.

In honor of Earth Day 2013, Hawaii Energy reminds residents that it will pick up and recycle old working refrigerators or freezers for free and pay cash for eliminating those old units. Maui households will get $65; this offer is coming soon to Molokai and Lanai.

The goal of the Bounty Program is to eliminate old, inefficient refrigerators or freezers.

Article Photos

Newman

Refrigerators that are 15 years old or older can use two to three times more electricity than new Energy Star models.

According to Hawaii Energy, those old "energy hog" refrigerators and freezers can cost households up to $500 or more a year in energy costs.

"Many homes have older refrigerators using up a lot of electricity, costing residents hundreds of dollars to operate every year," said Larry Newman, Hawaii Energy operations director.

"Our Bounty Program makes it easy to surrender old but working refrigerators and freezers. Just call us today, and we will take care of the rest."

To participate in the Bounty Program on Maui, call 1-877-231-8222. The program is offered through June 2013 or as long as funding lasts.

Bounties are available on a first-come, first-served basis to electric utility account holders, with a limit of one refrigerator and one freezer per household.

The appliances must be full-size (at least 14 cubic feet) and currently in use to qualify. Some restrictions may apply.

Hawaii Energy has two other refrigerator offers. Residents can receive a $50 rebate when they purchase a new Energy Star refrigerator with a minimum size of 16 cubic feet and price of $600 or less.

Or, if they purchase a new Energy Star refrigerator and recycle the old working refrigerator, residents can get a $125 rebate with Hawaii Energy's "Trade-up for Cool Cash" offer.

For more information, visit www.HawaiiEnergy.com.

Program Offers Cold Cash for Old Refrigerators and Freezers

April 25, 2013
The Maui Weekly

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The conservation and efficiency program for Hawai'i, Honolulu and Maui Counties, wants to help residents decrease energy use in their homes with a "bounty" cash reward in exchange for turning in old refrigerators or freezers.

In honor of Earth Day 2013, Hawai'i Energy will pick up and recycle old working refrigerators or freezers for free and pay cash for eliminating those old units. Maui and Hawai'i Island households will get $65; O'ahu households will receive $25. This offer is coming soon to Molokai and Lana'i.

The goal of the program is to eliminate old, inefficient refrigerators or freezers. Refrigerators that are 15 years old or older can use two to three times more electricity than new Energy Star models. Those old "energy hogs" can cost households up to $500 or more a year in energy costs. (Savings may vary due to electricity rates and other factors.)

"Our Bounty Program makes it easy to surrender old, but working refrigerators and freezers," said Larry Newman, Hawai'i Energy operations director.

On Maui and Hawai'i Island, call (877) 231-8222 toll-free.

The Bounty Program is offered through June 2013, or as long as funding lasts. Bounties are available on a first-come, first-served basis to electric utility account holders, with a limit of one refrigerator and one freezer per household. Appliances must be full-size (at least 14 cubic feet) and currently in use to qualify. Some restrictions may apply, call for more information.

Residents can also receive a $50 rebate when they purchase a new Energy Star refrigerator (with a minimum size of 16 cubic feet and a price of $600 or less). Residents who purchase a new Energy Star

- Home Gardening Support Network
- EdVentures on Maui
- The Book Shelf
- Sports
- Love Your Smile
- and Another Thing…
- Kalama Park Action Team
- EV in Paradise
- Special Events
- ‘Olelo Pa‘oihana
- Capitol Connection
- Imua with Maui Canoe Club
- Maui Outdoor Circle
- Kihei Community Association
- Hawai‘i Fun Facts
- Buy Local Maui

refrigerator and recycle the old working refrigerator, can get a $125 rebate with Hawai'i Energy's "Trade-up for Cool Cash" offer.

For more information on this and other Hawai'i Energy offers, visit www.HawaiiEnergy.com.

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Biz Wrap: Fridge Rebate Reminder; New CEOs Named

· No Comments · Facebook Comments (0) · Business

Kathleen McGilvray Nielsen was named CEO of YWCA of Hawaii Island. Photo courtesy of YWCA.

Posted on April 26th, 2013

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by Denise Laitinen

Green energy business stories abounded this week in light of Earth Day, with an energy conservation program reminding Big Island residents they can still qualify for rebates when purchasing new refrigerators.

And a Hilo-based solar firm is helping car dealerships around the island reduce their energy costs.

It's also been a busy week in terms of high-profile job changes. Several Hawaii Island businesswomen were recognized as leaders in their field at a ceremony on Oahu.

Hawaii National Bank promoted Donn Mende at its Puainako location while Bay Clinic and YWCA announced the appointments of new CEOs.

And Reed Flickinger, long-time editor of West Hawaii Today, saw his position eliminated this week.

Here's a look at what's happening in business news around the island this week:

Refrigerator Rebates Offered

Earth Day may be over (it was April 22), but Hawaii Energy, the conservation and efficiency program for Hawaii County, is still offering rebates for turning in old refrigerators and buying new, energy-efficient models.

Hawaii Island residents can receive up to $125 in rebates from Hawaii Energy if they purchase an Energy Star-approved refrigerator and turn in an old, working refrigerator. Hawaii Energy also offers a separate rebate under its "Bounty Program" offering up to $65 to Big Island residents who turns in an old, full-size, working refrigerator or freezer.

Events For Friday 04/26/2013

Aloha Friday at VAC
@ Volcano Art Center, Niaulani Campus
Enjoy free lessons in hula, lei making, lauhala weaving or ukulele playing. Every Friday, a hands-on demonstration lesson is given in a cultural craft that will vary from week to week. All events are free (donations welcome); park entrance fees apply.

Petroglyph Tour
@ Kings' Shops at the Waikoloa Beach Resort
Every Sunday, Thursday, Friday and Saturday, meet at the King's Shops center stage at 10:30 a.m. to take an hour long tour of nearby petroglyphs. Free event.

Hula at King's Shops
@ Kings' Shops at the Waikoloa Beach Resort
Hula tells Hawaii's story with the graceful hands of talented dancers, some trained from childhood in this intricate ancient art of dance and chant. Event begins at 6 p.m.

Movies Under the Stars
@ Queens' Marketplace
Fridays & Holiday Specials at Dusk in the Coronation Pavilion Join us for a free weekly movie under the stars. From 5:30 p.m. to 9:30 p.m.

Traditional Hula Performance
@ Kings' Shops at the Waikoloa Beach Resort
Hula tells Hawaii's story with the graceful hands of talented dancers, some trained from childhood in this intricate ancient art of dance and chant. From 6 p.m. to 7 p.m.

View All Events

The Bounty Program is offered through this June, or as long as funding lasts. Some restrictions may apply.

For more information, go to www.HawaiiEnergy.com. To participate in the Bounty Program, call toll-free at 1-877-231-8222 or click here to learn more.

Eight Island Car Dealerships Installing PV Systems

Kyocera Solar announced this week that it has supplied solar modules to Hilo-based ProVision Solar that will power eight car dealerships around the island.

ProVision Solar photo.

Since December 2012, four of the photovoltaic systems have been installed and the remaining four will be installed throughout this year.

In a released statement, Marco Mangelsdorf, president of ProVision Solar, said the four installed systems have a generating capacity of nearly 235 kilowatts and provide up to 100% of the power needs of the businesses involved.

So far the photovoltaic systems have been installed at Kama'aina Motors and Kama'aina Nissan in Hilo; Parts Center Hawai'i in Captain Cook; and Parts Center Hawai'i in Waimea.

Hilo Used Cars, Parts Center Hawaii in Hilo, Kona Nissan, and Kona Chrysler are scheduled to have PV systems installed before the end of the year.

West Hawaii Today Editor Position Eliminated

Stephens Media has eliminated the position of editor at West Hawaii Today. According to a report in the Big Island Chronicle, Reed Flickinger was terminated yesterday as part of management structure changes.

Flickinger worked for West Hawaii Today for 29 years, rising from reporter to management.

David Bock, publisher of The Hawaii Tribune Herald, another Stephens property, will serve as news director overseeing both editorial operations.

Kathleen McGilvray Nielsen Named CEO of YWCA

The YWCA of Hawai'i Island has hired Kathleen McGilvray Nielsen as its new Chief Executive Officer.

McGilvray Nielsen will oversee operations of the service organization, which is directed to women and children. Programs include a 24/7 sex assault crisis hotline and Healthy Start program for mothers and babies.

The YWCA operates two facilities in the Hilo area and one in Kona.

Prior to her appointment at the YWCA, McGilvray Nielsen administered the Workforce Investment Board and its education and training programs for the County of Hawai'i.

Bay Clinic Names New CEO

Harold Wallace Jr. was recently named chief executive officer of Bay Clinic Inc. by its board of directors.

Wallace has served as the interim CEO since June of last year. The health center is expanding access to medical and behavioral health care with the renovation of its Pahoa Family Health Center and the construction of a new Ka'u Family Health Center.

Prior to joining Bay Clinic, Wallace was CEO of a health center in Texas.

Hawaii National Bank Promotes Donn Mende

Hawaii National Bank announced it has promoted Donn Mende at its Puainako location.

Mende was promoted from assistant vice president to vice president of the Puainako branch. He is also the branch manager.

The bank, which was founded in 1960 in Honolulu, has two branches on Hawaii Island, both in Hilo.

Big Island Businesswomen Recognized

Several businesswomen from Hawaii Island were recognized last night at the 2013 Businesswoman of the Year award ceremony on Oahu.

Sponsored by Pacific Business News, the women were feted at dinner at the Royal Hawaiian Hotel.

Barbra Pleadwell, partner of Hastings & Pleadwell, which has offices in Hilo and Honolulu, was a finalist in the for-profit category; while Debbie Goodwin, director of advancement for W.M. Keck Observatory, and Brenda Ho, chief executive officer for Hospice of Hilo, were finalists in the nonprofit category.

Nancy Cabral, of Hilo-based Day-Lum Inc., and Michelle Tucker and Michelle Scully, of Sterling & Tucker, which has an office in Hilo, were recognized as among of the top 25 women owning businesses in Hawaii.

If your business has an opening, closing, promotion, retirement, new product release, special event, award, new location, or expansion, please let us know. Email us at newsdesk@Bigislandnow.com.

TAGS

Barbra Pleadwell · Bay Clinic · Brenda Ho · Day-Lum Inc. · Debbie Goodwin · Donn Meade · Hastings & Pleadwell · Hawaii energy · Hawaii energy rebates · Hilo Used Cars · Hilo Web Design · Hospice of Hilo · Kama'aina Motors · Kama'aina Nissan · Kathleen McGilvray Nielsen · Kona Chrysler · Kona Nissan · Nancy Cabral · Partner · Parts Center Hawaii · ProVision Solar · Reed Flickinger · w.m. keck observatory · YWCA of Hawaii Island

SIMILAR POSTS

- State Clarifies Renewable Energy Installations Tax Credit Requirements
- Kaiser Permanente To Open New West Hawai'i Clinic
- Biz Wrap: New Hires and New Apps
- Biz Wrap: Cariloha Opens In Waikoloa, Shopping Center Goes Solar

HVAC

THE BUZZ WORD

Hawaii's insiders say demand is heating up for high-efficiency, variable-flow systems that offer cooling where needed, greater comfort at higher room temperatures and individual metering. Variable systems in greatest demand commercially are those that qualify for LEED points.

IS "VARIABLE"

BY VANESSA VAN VOORHIS

"Variable refrigerant flow (VRF) systems are in significant demand because of their part-load energy efficiencies," says John Arizumi, president and general manager of Carrier Hawaii. "On very large systems, variable-speed chillers with VAV (variable air volume) zoning are widely used."

The buzz word is "variable," Arizumi says, because it allows the speed of the compression and air volume to vary directly proportional to the load demand in real time, versus the old systems that are either full-on or full-off.

"With variable speeds, the load can be tracked more precisely, allowing for improved comfort and energy efficiency," he says. "Even residential systems are using inverter technology that varies the speed of the compressor and fans for the same reason."

"As we design, install and operate buildings using chilled-beam technology, the bumps along the road will be well worth it in the end."
~ Kevin Saito of ASHRAE

Kevin Saito, the Hawaii chapter president of ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) and business development manager and engineering director for Heide & Cook LLC, says he, too, has noticed a growing trend in the commercial market for VRF systems, especially for small- to mid-sized buildings.

"Similar to the well-known practice of installing variable-speed drives on pumps to reduce energy as the A/C load is reduced, a VRF system reduces the flow of refrigerant through the refrigerant piping, while a computer monitors and regulates how much cooling is needed at each indoor unit," Saito says. "Computer-controlled compressors located in the outdoor units then deliver enough refrigerant to each indoor unit and actively responds to the building cooling load as it varies throughout the day. VRF systems are designed so a single outdoor unit may be connected to multiple indoor units, saving initial construction cost. These systems are very energy efficient when compared to their single-zone ductless split cousins seen in the residential market."

Drew Santos, president of Admor HVAC Products, says there is strong demand in the residential market for ductless mini-split heat pumps and VRF heat pump systems. "In 2011 and 2012, our ductless-split business increased by 20 percent in a down market," he says.

Michael Chang, director of strategy and innovation at Hawaii Energy, says replacing older chiller systems and air-cooling units can provide significant energy-saving opportunities because of improved technology. Modern, high-efficiency chillers are 20 percent to 40 percent more efficient than older machines, he says.

"They use variable-speed drives, oil-free magnetic bearings, larger and more-effective heat exchangers, multiple staging of compressors and other modern design features," Chang explains. "The chiller selection process is important and the installation of permanent cooling performance metering (kW/ton) will allow for the optimization of maintenance savings over time."

Air-cooled package units, often mounted on rooftops of small commercial facilities, are the least expensive of the HVAC options in terms of initial cost and maintenance, he says.

"The most cost-effective opportunity to reduce energy consumption in these units is to replace them with the highest efficiency unit available," Chang says. "New systems gain efficiency by actively controlling the outside air percentage with dampers based on loading or air quality, and the use of more efficient compressors."

PROFESSIONALS' FAVORITES

Building Industry asked industry pros about their favorite products in terms of cost efficiency and rate of return on investment.

Air Treatment Corp. sales engineer Ryan Lee and his fellow staff members prefer **Turbocor** compres-

The Danfoss Turbocor Compressor is redefining the lifetime operating costs for mid-range chillers and rooftop applications. Using aerospace technologies—magnetic bearings, two stage centrifugal compression, a variable speed permanent magnet motor and intelligent electronic controls—Turbocor is a sustainable, energy-efficient solution that is compact, lightweight and quiet.

sors used in chillers, which they say are efficient at part loads and offer payback within three to five years versus screw or roll chillers.

Other favored products include variable frequency drives (VFDs), coalescing air separators such as

Spirovent Air by Spirotherm "scrubs" the air from your system that can cause problems such as corrosion, component wear, poor efficiency and even noisy pipes. Simple to install with a straight in-line design, it is available for residential and light commercial applications.

Spirotherm for chilled-water loops and **Dolphin WaterCare** non-chemical water treatment systems. Dolphin

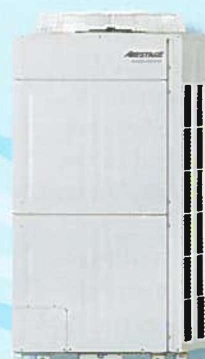
Dolphin WaterCare is chemical-free process that eliminates scale and the need for chemicals in water purification. It can be used for waters of cooling towers, HVAC and process chillers, ammonia condensers, process heat exchangers, fluid cooler and hot water systems.

controls scale and bacteria, reduces water use and the blowdown water can be used for irrigation, notes Air Treatment staff.

Santos prefers Fujitsu's heat pump systems, including **Halcyon** ductless

The all-new Fujitsu Halcyon Wall Heat Pump Air Conditioner (12,000 BTU - 1 ton) is a ductless mini-split system. Rated at 25 SEER efficiency, it is one of the most efficient heating and cooling systems on the market.

Fujitsu General America's Airstage™ V-II Variable Refrigerant Flow (VRF) line is a large capacity, zoned heat pump system. With operational efficiencies up to 21.7 IEER (to AHRI 1230 standard), it is the perfect fit for small and large buildings.



and **Airstage VRF**. The estimated rate of return on investment is one to three years for the Halcyon and two to five years for the Airstage, he says.

In addition to heat pumps, Chang says he likes the energy savings of electronically commutated motors (ECM) and ventilation systems that are activated by carbon monoxide monitors for fan-energy savings.

Arizumi says his personal favorite has always been the **Carrier Infinity** split-duct system with VAV for residential homes because of its

The Infinity® heating and cooling system from Carrier kills airborne germs and allergens, while its intelligent system automatically adjusts for peak efficiency and performance.

affordability, air filtration system, lower required maintenance and aesthetics. The payback period is normally less than three years, he says.

The Saito says, in general, he compares A/C options, such as rooftop units (RTU) to VRF, to determine return on investment (ROI). "In the case of an RTU, initial cost and service or maintenance cost may be lower, but the VRF is more energy efficient and may come with energy saving incentives to offset the initial cost," he says. "Understanding the owner's intent is critical to understanding how to calculate the ROI. If the owner wants to construct a new building and sell within five years, this impacts the A/C system selection and initial cost may be the greatest factor. In this case, ROI may be moot. In some cases, the lowest initial cost option may not be the best life-cycle cost option from an ROI point of view. Using energy efficiency ratios, a ratio that calculates the amount of cooling the equipment produces against the amount of power it consumes, can lead to inaccurate decision making and I caution against this practice."

He recommends consulting with a qualified expert who can address specific needs and assess factors that should be taken into consideration.

Also on Saito's personal list of "Top 5 HVAC Technologies" is **chilled beams**. It's not new to the HVAC industry. Europeans have used chilled beam systems for cooling for two decades. However, it's a relatively new technology for Hawaii.

The University of Hawaii at Manoa recently unveiled the state's first chilled-beam system at the new 160,000-square-foot Cancer Center on the John A. Burns School of Medicine campus. The six-story building has earned LEED Gold certification, with 30 percent of its energy efficiency stemming from its chilled-beam cooling system.

Baseline cooling, with 100 percent outside-air ventilation, is supplemented by 58-degree chilled beams to maintain a comfortable room temperature, says Kevin Luoma, senior engineer for WSP Hawaii, Inc., which consulted on the system's design. One of the challenges of chilled-beam systems in hotter, more humid climates like Hawaii's is condensation at dew point.

"I believe we will experience lessons learned as we design, install and operate buildings using chilled-beam technology, but the bumps along the road will be well worth it in the end," Saito says.

The 150,000-square-foot UH Cancer Center utilizes energy-efficient technologies, including chilled beam cooling system—the first in the state. Pictured is the chilled water pump within the refrigeration plan on the Center's ground floor.

TIPS FOR BUILDERS

Smart cooling begins at the design level, says Santos of Admor HVAC Products.

"The big thing in Hawaii is that builders are building their homes tighter," he says, citing a Gentry Homes development project in Ewa Beach as an example. "Cutting-edge design has raised the bar on energy efficiency by reducing air infiltration to the home, making it tighter and getting the cooling load so low that the air conditioning is not a huge factor in your energy bill."

Hawaii Energy's Chang recommends using life-cycle costing for system selection and individual metering of all utilities to encourage responsible behavior and fairness to all the users.

Heide & Cook's Saito encourages builders to arm themselves with basic HVAC information from unbiased sources so they can tell the difference between technical accuracy and salesmanship when selecting a system. "(HVAC system) design professionals registered in the state are unbiased, brand agnostic and technically accurate," he says. "They would be my recommendation to start with in the search for a trusted source."

The air conditioning cycle has four parts: compression, expansion, evaporation and condensation, Saito says. That has not changed in more than 100 years. What has changed and will continue to change, he says is how the industry approaches each part, especially with the integration of computers into almost every aspect of the industry.

Going 'Green'

"Business managers and chief financial officers understand that going green also means lowering their bottom line," Saito says. "More efficiency can equate to lower operating expense. With the cost of electricity going up each year, business owners are viewing green (energy technology) as a way to sustain their companies or create an advantage over their competition."

He says other recent environmental trends include the use of recycled materials in the manufacturing of HVAC equipment and an increased focus on indoor air quality in the workplace.

"With workers spending more hours in the work space, they are exposed to increasing amounts of stuff (in the air), and there are articles appearing about lawsuits launched by negatively affected employees," Saito says. "Business owners are faced with balancing more outside air to keep the space well ventilated—and the lawsuits at bay—and the high cost of conditioning the additional outside air."

Arizumi says the energy code and high electricity rates are driving everyone toward high-efficiency air conditioning, both residentially and commercially, which is the intent of "going green."

"Most commercial projects and all federal and state projects are requiring LEED-certification as a measurable way of going green," he says. "This is expensive and can add 10 percent to 20 percent to construction costs because it requires third-party verification of each step of construction—design, materials verification, techniques and commissioning—to verify LEED-design compliance. This involves many man hours of all trades to comply with the LEED requirements."

Many [LEED-certified facility] projects are neglected soon after construction, which defeats the green initiative and the added cost is wasted.
~ John Arizumi of Carrier Hawaii

Carrier's new warehouse and office facility in Kapolei is basically LEED-compliant, Arizumi says, but he chose not to pursue LEED certification to save added costs. He notes that it's important to remember that all the systems in a LEED-certified facility have to be continually monitored and regularly serviced during the life of the building to maintain its "green" status. Many projects are neglected soon after construction, he says, which defeats the green initiative, and the added cost is wasted.

Dollars & Sense

The most significant changes on the horizon in the HVAC industry involve technology, the economy and increasingly stringent regulations, professionals say.

Santos foresees unprecedented energy savings through innovations in sophisticated, computerized technology and variable speed compressors that automatically ramp up and down depending on the load.

"Residential air conditioning units will sense when you walk into a room and when you leave," he explains. "When you leave, it will turn the air conditioner up to a higher setting so you can save energy. Then when you return, it will automatically go back into the temperature you want it at. That's pretty cool stuff."

But technological advances don't matter much if customers cannot afford to take advantage of them, which is why Saito believes the health of the economy will have an important impact on the HVAC industry.

"An owner who is struggling to meet payroll, pay the utility bills or meet the rent payments is not a prime candidate to replace the A/C system," Saito says. Businesses owners struggling to generate a profit often cannot afford to invest in energy-saving technology. It creates a downward spiral in which businesses move closer to going under with each passing month or year, he says.

"When buyers stop buying, the consequences are felt throughout the HVAC industry," Saito says. "Less equipment is sold, installed and maintained; factories and distributors begin plans to reduce expenses; and even tax revenues can slow down."

To those who have cash in reserve, he recommends making the investment in the near future.

"Lending rates are attractive and can be leveraged with cash in hand and potential tax incentives to increase operational efficiency through upgrading their aging A/C systems," Saito advises. "Investing in more efficient A/C systems will help their bottom line for years to come, and making a commitment to servicing and maintaining those systems at peak performance will ensure the highest rate of return, protecting their investment."

Arizumi sees regulation as an issue. Too much regulation, he says, will continue to drive up the cost of HVAC systems, making them far more expensive than they should be.

"On one hand we are mandated by ASHRAE Standard 90.1 to raise energy efficiency, and on the other we are being mandated to comply with the stringent requirements of Standard 62.1 for indoor air quality," Arizumi says. "This compliance significantly drives up the amount of outside air we are required to bring in, condition and regulate, which drives the energy cost back through the roof."

One such regulatory cloud on the horizon was before the Hawaii legislature earlier this year: HB 1154 (SB 1301) Relating to Professions and Occupations. Aldrin Villahermosa, president and owner of AMV Air Conditioning, told legislators the bill was overreaching in its scope and would cause a significant increase in HVAC costs for builders by creating unnecessary hurdles for subcontractors.

"The original intent of the bill was to ensure public safety by ensuring the proper handling of gray water—the discharge from condensation from air conditioning systems—taking that water and using it for other means to make the building more energy efficient," Villahermosa says. "In that light, it's a good thing for Hawaii and its people."

The bill, which doesn't mention gray water, creates an across-the-board qualification process for electricians, plumbers and HVAC installers. For a given job, it would require for each scope of work one 10,000-hour journeyman to every two apprentices.

New open office space at the UH Cancer Center, with active chilled beams used for air conditioning. Courtesy of WSP Group.

"Let's say you just want to put a little split system in your house, for your bedroom, or whatever it may be," Villahermosa explains. "Normally, you'd pay about $1,700 for it. But with this type of legislation, you would have to have multiple jurisdictions covered in one installation. You would have to have a plumber/pipe fitter for installation, you would have to have a sheet metal installer to hang that unit, you have to have a union insulator to insulate that pipe and you have to have an electrician to run the wire. Before you know it, a job that could be done by one company, and in most cases by one man, now involves at least five people. With the two-to-one journeyman ratio, that job will easily jack up to $3,000. It's a pretty impactful bill in that it can dramatically change the whole construction industry." BI

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Tuesday, June 18th, 2013 | Posted by Guest Contributor | Print This Article

Hawaii Energy Launches Facebook Promotion

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, today announced the launch of a Facebook promotion to increase awareness of the program's limited-time rebate for solar water heating systems, which recently increased from $750 to $1,000. From Tuesday, June 18 through Saturday, August 24, Hawaii Energy is giving electric utility customers a chance to win energy-saving prize packs valued at $50 each.

Entering for a chance to win is easy! Interested participants just need to "like" the "Hawaii Energy Contest" Facebook page (http://on.fb.me/19tf5jM), and then share what they would do with the $600, or more, in savings they would enjoy if they installed a solar water heating system at home. A total of ten winners will be selected, with one winner announced each week during the promotion.

“This is a fun way for Hawaii’s residents to interact with us through social media and to learn more about the benefits of solar water heating,” said Hawaii Energy’s Marketing Manager Maile Alsup. “With Hawaii having the nation’s highest electricity costs, three times the national average, we’re excited to learn about what residents would do with the savings on their electric bill if they had installed solar water heating at home.”

A typical home's largest energy consumer is the electric water heater if the household does not have air conditioning or a swimming pool. When a household of four or more switches to a solar water heater, they can save up to 40 percent – at least $600 a year – on their electric bill. Hawaii Energy’s limited-time $1,000 instant rebate, combined with applicable

state and federal tax credits

, reduce the cost of the average solar water heating system from approximately $6,600 to about $2,000. (Note: Tax credits are subject to change. The average system cost for existing home retrofits is $6,600. Actual cost may vary as different household needs require different system sizes. Contractor installation costs may also vary.)

Contest entrants agree to allow Hawaii Energy to use their story, as well as their name, city and photo in future marketing and advertising campaigns. No purchase or payment is required to enter, but entrants must be a residential electric utility customer on the islands of Hawaii, Lanai, Maui, Molokai or Oahu.

For more information about the contest or Hawaii Energy, please visithttp://on.fb.me/19tf5jM * or www.HawaiiEnergy.com.

* This promotion is in no way sponsored, endorsed or administered by, or associated with Facebook.

About Hawaii Energy

Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission, serving the islands of Hawaii, Lanai, Maui, Molokai and Oahu. Hawaii Energy offers cash rebates and other incentives to residents and businesses to help offset the cost of installing energy-efficient equipment. In addition to rebates, the program conducts education and training for residents, businesses and trade allies to encourage the adoption of energy conservation behaviors and efficiency measures. The program plays an important role in helping to achieve Hawaii’s goal of reducing total electric energy usage by 30 percent or 4.3 billion kWh by 2030. For more information, visitwww.HawaiiEnergy.com.

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From the Pacific Business News
:http://www.bizjournals.com/pacific/blog/socialmadness/2013/06/hawaii-energy-launches-facebook.html

Jun 18, 2013, 12:04pm HST

Hawaii Energy launches Facebook contest to promote solar hot water rebates

Duane Shimogawa
Reporter- *Pacific Business News*
Email | Google+ | Twitter | LinkedIn

Here's something productive you could do with the countless minutes you spend on Facebook: Enter Hawaii Energy's promotion to win an energy-saving prize pack valued at $50 each.

Hawaii Energy, the conservation and efficiency program for the state (except for Kauai County), said Tuesday that it is launching a Facebook promotion to increase awareness of its limited-time increased rebate for solar water heating systems, which recently jumped from $750 to $1,000.

The promotion, which runs through Aug. 24, includes "liking" the "Hawaii Energy Contest" Facebook page and then sharing what you do with the $600 or more in savings you would get if you installed a solar water heating system at home.

A total of 10 winners will be selected, with one winner announced each week during the promotion.

"This is a fun way for Hawaii's residents to interact with us through social media and to learn more about the benefits of solar water heating," Hawaii Energy Spokeswoman Maile Alsup said in a statement. "With Hawaii having the nation's highest electricity costs, three times the national average, we're excited to learn about what residents would do with the savings on their electric bill if they had installed solar water heating at home."

A typical home's largest energy consumer is the electric water heater, if the household doesn't have air conditioning or a swimming pool, Hawaii Energy said.

For example, when a household of four or more switches to a solar water heater, they can save up to 40 percent, or at least $600 a year on their electric bill.

For more information about the contest, visit http://on.fb.me/19tf5jM or www.HawaiiEnergy.com.

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WINDWARD // WINDWARD OAHU WAHA NUI

Waha Nui – June 19, 2013

Posted on June 19, 2013 by Carol Chang | Email the author
Windward • Windward Oahu Waha Nui | 1,462 Total Views

Like Share Tweet

Kaneohe's **Carrie Aku-Harakai** participated in the traditional Nightingale ceremony at Widener University in Pennsylvania, where she earned her nursing degree. The candlelight program includes **Florence Nightingale**'s pledge to uphold the integrity of the profession ... The brother-sister ace salsa team from Kailua, **Judah** and **Sunshine Oschner**, will lead workshops and perform at the 12th annual Hawaii Summer Salsa in Paradise Festival June 20-23, happening at several venues in Honolulu (285-0072) ...

Heather Piper

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Picture 1 of 2

Hauula's **Anne Kamuth**, Kailua's **Julianna Lopez** and Kaneohe's **Richard Rosen** all were finalists in the Hawaii Energy Success Story Contest, and their stories on efficient power use will help spread the word so others can save ... Kailua's **Don Mangiarelli** has been appointed head coach of the Saint Louis

EVENTS CALENDAR

Ongoing Events // Ongoing
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What's Up // August 23
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What's Up // August 24
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What's Up // August 25
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COMMUNITY

Windward Oahu Coverstory // A Bright 'Les Mis' Paliku Production

Central Oahu Coverstory // Mililani Schools Join Tech Pilot

Attachment G
Page 149 of 155

varsity soccer team – coming up from the JV program and bringing plenty of experience in the sport. Don's day job is running Enterprise Technology Solutions …

Kailua's **Heather Piper** is Central Pacific Bank's new senior vice president and director of credit administration. Heather also is chairwoman-elect for HANO (Hawaii Alliance of Nonprofit Organizations) … Waimanalo choreographer **Kalae Kaina** (and artistic director of Shakti Dance Movement) is preparing for the Island Oasis Ensemble of bellydancers show, a first for HPR's Atherton Studio at 7:30 p.m. June 29 (955-8821) …

Kailua's sassy, sultry songstress **Roz Cohen** performs at 7:30 p.m. Saturday at HPR's Atherton Studio in "Klezmer, Cabaret, and All That Jazz." You name it, she can do it – in three languages (955-8821) … Kaneohe's **Maia Miller** earned her degree in exercise science from University of Evansville last month with merit honors from the national societies of Collegiate Scholars and Leadership and Success at the Indiana school. Maia, who also played on the women's volleyball team, plans to seek a doctorate in physical therapy …

Trinity Christian School's **Philip Bretz** has won a $2,500 National Merit Scholarship

East Oahu Coverstory // CU Forum To Help Fight The Hackers

West Oahu Coverstory // City Council Lauds Ka Pa'alana School

MIDWEEK BOOKSTORE

Contest tests residents' energy savvy

Hawaii Energy, the conservation and efficiency program for Hawaii, Honolulu and Maui counties, has launched a Facebook promotion to increase awareness of the program's limited-time rebate for solar water heating systems, which recently increased from $750 to $1,000. From now through Aug. 24, Hawaii Energy is giving electric utility customers a chance to win energy-saving prize packs valued at $50 each.

Entering for a chance to win is easy. Interested participants just need to "like" the Hawaii Energy Contest Facebook page (on.fb.me/19tf5jM), and then share what they would do with the $600 or more in savings they would enjoy if they installed a solar water heating system at home. Ten winners will be selected, with one winner announced each week during the promotion.

Math boot camps offered next week

Hawaii Community College will hold Math Refresher Boot Camps the last week in June at the University of Hawaii Center, West Hawaii Kealakekua Campus and at Kanu o ka Aina New Century Public Charter School in Waimea.

The camps are free and open to individuals who have applied and been accepted to Hawaii Community College, received a grade of C or better in high school algebra I and are interested in a Career and Technical Education program of study, which includes Culinary, administration of justice, carpentry, auto mechanics, hospitality and more.

The 20-hour camps are designed to refresh participants' knowledge of math topics. Participants should then be able to retake and score higher on the COMPASS MATH placement test. A higher score may mean they can forgo a developmental math class, saving both time and money.

Camps are scheduled from 8:30 a.m. to 12:30 p.m. Monday through June 28 at the UH Center, West Hawaii in Kealakekua, and 4:30 to 8:30 p.m. Monday through June 28 at the Kanu o Ka Aina New Century Public Charter School in Waimea. Classes are held in the computer lab.

Call 969-8830 for more information and to register.

Hospital presents acid reflux talk Wednesday

Kona Community Hospital will host an informal lecture about acid reflux disease from 6:30 to 8 p.m. Wednesday in the Community Meeting Hale, Building G, at the West Hawaii Civic Center. Admission is free and open to the public.

General surgeon Nathan Tomita will discuss treatment options, including a new incisionless surgical procedure available in West Hawaii for chronic acid reflux sufferers. A question-and-answer session will follow Tomita's presentation. Informational handouts will be available.

For more information, call 322-6960.

Monday, June 24th, 2013 | Posted by Guest Contributor | Print This Article

Hawaii Energy Partners with Hana Nonprofit to Energize Conservation and Efficiency Efforts

Hawaii Energy**,** the energy efficiency and conservation program for Hawaii, Honolulu and Maui counties, recently teamed up with Ma Ka Hana Ka 'Ike, a nonprofit construction-skills training program for at-risk youth in Hana, to bring solar water heating systems to households in the area. Through collaboration with Hawaii Energy, Ma Ka Hana Ka 'Ike students helped install solar water heating systems in three Hana homes. This gave students the opportunity to work hands-on in the energy efficiency and conservation field with a licensed professional.

"We are excited to be a part of this project, which not only facilitated the installation of solar water heating systems for in-need households in Hana, but also provided an opportunity for the training of Ma Ka Hana Ka 'Ike team members and students in the design, installation and maintenance of these systems," said Ray Starling, Hawaii Energy Program Director. "Through this mentorship approach to education, Hana youth gained valuable and practical hands-on training."

As part of the effort, students learned how to design a solar water heating system, order materials, mount solar panels and orient them for optimum performance. They also learned plumbing skills, including soldering, insulating and constructing to code. Hawaii Energy procured the system through Inter-Island Solar Supply Maui, and Red
job sites. Hawaii Energy is in the proces

conform to Hawaii Energy's solar water heating system standards and specifications. On-going system service and maintenance will be provided by Ma Ka Hana Ka 'Ike and/or individuals from Hana. Green Global Communities, Inc. also assisted with the project.

"With Hana being such a close-knit community, the three extended families that have benefitted from these installations are now sharing with others about the application and financial savings from system installation," said Rick Rutiz, Executive Director of Ma Ka Hana Ka 'Ike. "Thanks to this wonderful project, Ma Ka Hana Ka 'Ike and Hawaii Energy staff have been able to teach Hana area residents about rebates, tax incentives and return on investment for solar water heating systems. This is leading to heightened interest in energy efficiency in the remote East Maui region."

A typical home's largest energy consumer is the electric water heater if the household doesn't have air conditioning or a swimming pool. When a household of four or more switches to a solar water heater, they can save up to 40 percent on their electric bill.

For more information on Hawaii Energy, visit HawaiiEnergy.com. To learn more about Ma Ka Hana Ka 'Ike, please visit HanaBuild.org.

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Author: Guest Contributor

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Hāna Students Install Solar Water Heating in 3 Homes

Posted By Wendy Osher On 06/24/2013 @ 10:17 am In Maui News | No Comments


[1]

Photo courtesy Hawaiʻi Energy and Ma Ka Hana Ka ʻIke.

By Maui Now Staff

Three homes in East Maui had solar water heating systems installed under a partnership between the Hawaiʻi Energy initiative, and the non-profit Ma Ka Hana Ka ʻIke construction skills training program for at-risk youth, an announcement said.

"We are excited to be a part of this project, which not only facilitated the installation of solar water heating systems for in-need households in Hāna, but also provided an opportunity for the training of Ma Ka Hana Ka ʻIke team members and students in the design, installation and maintenance of these systems," said Ray Starling, Hawaiʻi Energy Program Director in a press release.

Under the partnership, students had the opportunity to earn hands-on experience in the energy efficiency and conservation field which included work alongside a licensed professional.


[2]

Photo courtesy Hawaiʻi Energy and Ma Ka Hana Ka ʻIke.

According to the announcement, students learned how to design a solar water heating system, order materials, mount solar panels and orient them for optimum performance. They also learned plumbing skills, including soldering, insulating and constructing to code.

"Through this mentorship approach to education, Hāna youth gained valuable and practical hands-on training," said Starling.

"With Hāna being such a close-knit community, the three extended families that have benefited from these installations are now sharing with others about the application and financial savings from system installation," said Rick Rutiz, Executive Director of Ma Ka Hana Ka ʻIke in the press release.

He continued saying, "Thanks to this wonderful project, Ma Ka Hana Ka ʻIke and Hawaii Energy staff have been able to teach Hāna area residents about rebates, tax incentives and return on investment for solar water heating systems. This is leading to heightened interest in energy efficiency in the remote East Maui region."

Hawaiʻi Energy reportedly procured the systems through Inter-Island Solar Supply Maui; while Redo Trucking delivered them from the vendor to the respective job sites.

Officials with Hawaiʻi Energy say they are in the process of inspecting the systems to ensure that the installations conform to solar water heating system standards and specifications.

According to Hawaiʻi Energy estimates, a household of four or more can save up to 40% on their electric bill when they switch to a solar water heater.

Officials with Hawaiʻi Energy describe the program as a ratepayer-funded conservation and efficiency program administered by SAIC under contract with the Hawaii Public Utilities Commission. The program currently serves the islands of Hawaiʻi, Lanaʻi, Maui, Molokaʻi and Oʻahu.

Article printed from Maui Now: **http://mauinow.com**

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