

MEMORANDUM

May 24, 2013

To: Jim Flanagan, Chris Ann Dickerson

From: The Evergreen Economics Evaluation Team

Re: Hawaii Energy Program Year 2012 Evaluation Work Plan

This memorandum provides the work plan and budget for the evaluation of the Hawaii Energy Conservation and Efficiency Programs (Hawaii Energy¹) Program Year (PY) 2012² (PY2012 Evaluation). This plan is based on information available to-date on current program participation and known research priorities.

1. Introduction

The team conducting the PY2012 Evaluation (Evaluation Team) consists of the following firms:

- **Evergreen Economics** will be responsible for overall project management and take the lead on the impact evaluation work. Evergreen Economics will also produce all major deliverables, including the final evaluation plan and the final evaluation reports. Steve Grover and/or Tami Rasmussen will attend all in-person project management meetings with the Contract Manager and Hawaii Public Utilities Commission (PUC) staff.
- **EMI** will help Evergreen Economics design and manage the overall evaluation. They will also be the lead on the process evaluation and assist with the market effects and market baseline work.

¹ Hawaii Energy is a ratepayer-funded conservation and efficiency program administered by Science Applications International Corporation (SAIC) under contract with the Hawaii Public Utilities Commission as the Public Benefits Fee Administrator (PBFA) serving the islands of Hawaii, Lanai, Maui, Molokai, and Oahu. On July 1, 2009, Hawaii Energy took over management of the demand side management programs from Hawaiian Electric Company (HECO) and its subsidiaries, Maui Electric Company (MECO) and Hawaii Electric Light Company (HELCO), referred to as the HECO utilities. Note that throughout this report "Hawaii Energy" is used to refer to both the suite of programs offered through this initiative, as well as the organization that that implements it.

²Program Years run July 1 – June 30. The PY2012 cycle is July 1, 2012 – June 30, 2013.



- **Michaels Engineering** will manage all on-site metering and verification work and will conduct fieldwork in conjunction with local Hawaii resources, which we will attempt to recruit. This firm will also provide additional resources for the engineering analysis and will be the lead for reviewing *ex ante* savings values, with assistance from local Hawaii resources.
- **SMS** is located in Honolulu and will field all phone surveys planned for this evaluation.

In addition to these firms, the expert associates on the Evaluation Team will have the following responsibilities:

- **Robert Wirtshafter** will assist with the research planning and will be involved with the process evaluation and market studies.
- **Phil Willems** will assist with all the process evaluation and market baseline work.
- **John Stevenson** will be the lead for developing all phone survey instruments for all phases of this evaluation.

Below we describe the PY2012 Evaluation planning context by providing a description of PY2012 Hawaii Energy program plans and the primary activities the Evaluation Team plans to conduct.

2. Program Overview

As described in the *Program Year 2012 Annual Plan*³, the Hawaii Energy portfolio of program offerings (Portfolio) for PY2012 comprises a set of residential and business⁴ programs aimed at attaining direct energy savings (Programs), and a group of programs targeting residential, business and government customers and meant to transform the market (Transformational Programs). The Transformational Programs do not have direct energy-savings goals. The PY2012 Portfolio maintains the programmatic changes adopted in PY2011, with minor changes or additions to measures and offerings. Two notable changes for PY2012 include increased emphases on Transformational Program efforts, and on hard-to-reach (HTR) customer segments and ensuring that these customers are served equitably across all islands. Now in its fourth year of implementation, the Portfolio continues to be administered by Science Applications International Corporation (SAIC).

³ Science Applications International Corporation (SAIC), *Hawaii Energy Program Year 2012 Annual Plan* (Honolulu, HI: Hawaii Public Utilities Commission, July 12, 2012).

<http://hawaiienergy.com/media/assets/HawaiiEnergyPY2012AnnualPlan7.19.2012.pdf>

⁴ The term “business” includes all non-residential customer categories (commercial, industrial and agricultural).



PY2012 Programs

The subset of PY2012 Programs targeting residential customers (Residential Program) retains the same incentive categories as those in PY2011, and includes the following, as described in the *Program Year 2012 Annual Plan*:⁵

- **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. Geographic barriers are seen as an opportunity for PY2012.

The subset of PY2012 Programs targeting business customers (Business Program) also retains the same incentive categories as those in PY2011, and include the following, as described in the *Program Year 2012 Annual Plan*:⁶

- **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 incentives 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).

⁵SAIC, 24.

⁶ Ibid., 52.



- **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.

Table 1 summarizes the PY2012 Residential Program and Business Program offerings as listed in the *Program Year 2012 Annual Plan*.⁷

⁷ Ibid., 24, 52. Table 1 is composite of two separate tables included in the SAIC *Annual Plan*.

Table 1: Hawaii Energy Residential and Business Programs, PY2012

ProgramCategory	Measure
Residential Programs	
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, AOA Measures
Business Programs	
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, AOA Measures

PY2012 Transformational Programs

Hawaii Energy introduced Transformational Programs in PY2011, encompassing a broad set of initiatives intended to generate long-term sustained market change. The Program set aside 10 percent of the incentive budget for these initiatives for a total of \$2,377,326. Transformational Program offerings involve education, outreach and other government



support activities that may not result in direct quantifiable energy savings in the immediate timeframe of the activity (and, so, do not have energy-saving goals), yet are likely to contribute energy savings within a five-year period. Hawaii Energy will dedicate a greater amount of effort to its Transformational Programs across sectors in PY2012. Many of the initiatives are being expanded and new strategies are being introduced.

In keeping with goals from PY2011, Hawaii Energy will maintain a focus on individual behavior change, personal energy awareness, and societal change that, among other things, will contribute to the development of an infrastructure supporting improved energy efficiency and decreased energy use in Hawaii. The emphasis for these activities is on investments with longer-term savings potential rather than efficiency measures with only short-term savings. Table 2, from the *Program Year 2012 Annual Plan*,⁸ lists the current Transformational Program offerings by three main categories of behavior modification, workforce development training, and supporting services and resources.

⁸ Ibid., 121.

Table 2: Transformational Program Offerings, PY2012

Transformational Program Offering	Sector
Behavior Modification	
Energy Ambassador Development	
State, Federal, Civil Defense, National Guard	Government
Small Business Workforce Development	Government
Hawaii State Department of Education	Business & Industry
Energy Audit & Benchmarking, Tools & Support	
State, Federal, Civil Defense, National Guard	Business & Industry
Commercial Facilities	Business & Industry
Educational	Education
Workforce Development Training	
Academic Level	
University Targeted interactive Education, Competition – Kukui Cup	Business & Industry
Video Programming Net Zero, PSAs, etc. (O’lelo)	Business & Industry
Vocational / Entry Level	
University of Hawaii Community Colleges – Residential Audit Certifications	Residential
Professional Development	
Workforce Development – Courses, Certification, Application	Business & Industry
Teacher Workforce Development – Energy Education Development	Education
Residential Home Grading System Analysis and Pilot	Education
Workforce Development – Internships	Business & Industry
Outreach & Education	
Sustainable Energy Career Fair(s), Energy Expo, Rebuild Hawaii	Business & Industry
Energy Efficiency through Financial Literacy	Residential
Supporting Services and Resources	
Energy Resource Centers	
Workforce Development Course Marketing, Project Outreach and Communication(s)	
Project Assessment, Directed Improvement, Analysis	
Engineering Research, Development, Energy Consumption Analysis	

PY2012 Portfolio Targets and Budgets

Table 3 shows PY2012 electricity savings (kW and kWh) and Total Resource Benefit (TRB)⁹ targets, and budgets for the Residential, Business and Transformational Programs.

Table 3: Hawaii Energy Electricity Savings and TRB Targets, and Budget, PY2012

Program	kW	kWh	TRB	Total Budget
Residential	10,007	71,819,271	\$72,451,707	\$13,442,330
Business	6,889	46,163,535	\$62,581,908	\$16,429,514
Transformational	N/A	N/A	N/A	\$2,377,326
Total	16,896	117,982,806	\$135,033,615	\$32,249,170

⁹The 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 the energy efficiency projects and measure.

3. Evaluation Background

Similar to prior annual evaluations of the Hawaii Energy Portfolio, a major component of the PY2012 Evaluation research effort will be to verify that SAIC is meeting the performance goals set for it in its implementation contract with the Hawaii PUC. As discussed below, these contract requirements include both energy-savings-related goals and other implementation performance metrics. Elements from SAIC's contract that relate to the PY2012 Evaluation are described briefly below.

The SAIC contract for Hawaii Energy program administration lists four objectives as part of its Scope of Work:

- 1) Achieve the maximum magnitude of societal net benefits while acquiring comprehensive cost-effective electric efficiency savings;
- 2) Respond appropriately to markets in order to increase the level of and comprehensiveness of energy efficiency services to ratepayers;
- 3) Effectively capture potential "lost opportunity" markets; and
- 4) Provide a standard level of service to all customer classes and in each of the HECO Companies' service territories.

In addition to these four over-arching objectives, SAIC's compensation for implementing Hawaii Energy is based on multiple performance indicators, as shown in Table 4.

Table 4: SAIC Contract Performance Indicators and Relative Awards

Performance Indicator	Percent of Performance Pool		
	PY2009	PY2010	PY2011/2012
Residential and Business Energy (kWh)	40%	40%	35%
Peak Demand (KW)	15%	10%	5%
Total Resource Benefits (\$)	30%	30%	40%
Market Transformation	10%	10%	10%
Broad Participation (Island Equity)	5%	10%	10%

The PY2012 Evaluation work plan has been designed to verify progress in each of these performance areas established for SAIC. It is based on the evaluation framework provided



in the PY2010 Hawaii Energy evaluation plan,¹⁰ updated based on the last two cycles of evaluation results and to fit the PY2012 Portfolio offerings.

The key components of the PY2012 Evaluation work plan include:

- a) Review and approval of *ex ante* savings estimates and ensuring that sound values and methodologies are used for estimating energy savings in the Hawaii Energy Technical Reference Manual (TRM).¹¹
 - This year the Evaluation Team will conduct a comprehensive review of the TRM including determining what secondary sources, such as recently completed evaluation studies, might be available to inform updates of saving parameters. Where the secondary sources are available and robust, we will attempt to rely on energy savings estimates from climates that most closely resemble Hawaii's.
- b) *Ex post* impact evaluations of all Programs, with an emphasis on measures and sites with high impact (and/or relatively high savings uncertainty), while allowing for expenditures on other useful evaluation activities.
 - Two earlier Hawaii Energy evaluations (covering PY2009 and PY2010) found very high rates of measure installation. During the PY2011 evaluation, we reduced the scope of the verification based on the observed verification rates for PY2009 and PY2010 to reserve funds for a baseline study.

For PY2012, we plan to conduct on-site surveys with residential and business customers for prescriptive measures. For large business customers and those installing custom measures, we plan to conduct engineering reviews combined with on-site inspection. We plan to maintain the reduced telephone sample sizes allocated for PY2011.¹² These results will be reported at the individual program level.
- c) Additional *ex post* impact evaluation (including on-site metering and/or billing analysis) for measures for which existing TRM values are uncertain or may need updating due to evolving market conditions (as needed).
 - The sub-metering measure introduced by Hawaii Energy in PY2011 has been identified as a current priority identified for *ex post* impact evaluation. The

¹⁰James Flanagan Associates, *Draft EM&V Plan For Hawaii Energy Conservation and Efficiency Programs*, submitted to the Hawaii Public Utilities Commission March 3, 2011.

¹¹Energy and demand savings estimates for Program measures and activities are approved on an *ex ante* basis and must be documented in a TRM prepared by the Public Benefits Fee Administrator (PBFA) (SAIC as program administrator) and reviewed by the EM&V contractor. The TRM must include estimates for all prescriptive measures, and descriptions of calculation methodologies for custom measures. The information in the TRM must be consistent with the information in any database or other tool used to calculate savings resulting from the Program.

¹² The PY2009 sample sizes were based on "worst case" estimates of 50 percent. Once we found estimates closer to 100 percent, the necessary sample to achieve statistically significant results is much lower.

current TRM savings estimate might be lower than what is being realized. We plan to conduct a billing analysis on a selection of sites that have completed sub-metering in PY2011 or PY2012. The goal of this analysis is to estimate the actual savings achieved by this measure to determine if it is in line with the current TRM savings estimate. We will develop recommendations for updates to the TRM if applicable.

d) Assessment of Transformational Programs.

- Given the expansion of Transformational Program efforts, PY2012 is an opportune time to evaluate them, in order to assess their evaluability, review key issues integral to program success for the most significant of the initiatives, and determine how effectively the Transformational Programs link to the rest of the Hawaii Energy Portfolio and serve to meet the needs of business and residential customers. Additionally, the Transformational Programs will be the focus of the PY2012 process evaluation (described below) and market assessment efforts

e) Process evaluation of Program and Transformational Program implementation including issues such as:

- Soundness of underlying program strategy and theory;
- Approximate magnitude of savings that may reasonably be expected, including estimates of likely distribution of savings (sector, for example) and timing (e.g., two years, five years, 20 years); such estimates will likely be made on a qualitative basis;
- Relationship of transformational programs with broader portfolio, including potential leverage points and observed market gaps relative to resource expenditures and similar efforts elsewhere in the country;
- Program-specific delivery:
 - Customer satisfaction among program participants;
 - Leveraging of trade allies;
 - Effective leveraging of training and educational efforts;
 - Analysis of program staffing, infrastructure and operations;
 - Targeting and incentives;
 - Marketing, outreach and training;
 - Tracking and database management;
- Development of new strategies;
- Progress toward short-, mid- and long-term goals; and

- Preliminary recommendations for expansion or reduction, relative to early experiences and expected outcomes.
- f) Market assessment.
 - The PY2012 market assessment efforts will focus on understanding the markets being addressed by the Transformational Programs. Based on a PY2010 evaluation recommendation, for the PY2012 Evaluation, we also plan to conduct research on food-related industries. The principal objective of this survey effort will be to develop a market characterization of the food-related sector, including relative potential from energy efficiency and applicability of program initiatives implemented elsewhere in the country.

4. Evaluation Approach

The PY2012 Evaluation includes impact evaluation, process evaluation and market assessment components, as described below. Given the increased emphasis on Transformational Programs, the work plan is structured to discuss these components as they represent parts of reviews of the two main segments of the Hawaii Energy Portfolio: Programs and Transformational Programs. The impact evaluation focuses on the assessing the energy-saving goal attainment of the Programs, while the process evaluation and market assessment concentrate on the Transformational Programs and their ability to generate long-term sustained market change, generate long-term sustained market change, including magnitude of energy efficiency savings relative to the overall portfolio. While the focus of the process evaluation will be the Transformational Programs, we will conduct targeted research to support the Program as needed as it considers strategies to modify programs as a result of the PY2011 process evaluation, as discussed below. This PY2012 evaluation and future evaluations will be able to leverage the extensive baseline data that is being collected currently for both residential and non-residential sectors as part of the PY2011 evaluation. Specifically for PY2012, we will make use of the business baseline data to inform the market assessment.

Impact Evaluation

The impact evaluation forms a major component of the PY2012 Evaluation and consists of two separate elements:

- 1) **Ex Ante Verification.** The *ex ante* verification consists of ensuring that measures reported as installed have actually been installed. Additionally, the verification element will involve a review of savings calculations to ensure they are being done following the procedures outlined in the TRM. Any deviations from reported installations and savings found at this stage will result in an adjustment to savings for the respective program year and will be discussed in the Verification Memo that will be produced as a deliverable for this task.



- 2) **Ex Post Impact Estimation.** The *ex post* impact estimation includes activities such as savings review, engineering analysis, billing regression and self-reported free-ridership. *Ex post* findings will be used to suggest adjustments to savings values on a prospective basis.

As discussed below, we have developed a flexible impact evaluation strategy that can be tailored to fit the specific elements of each of the Programs. Given the nature of the different measures, customer groups and program delivery strategies, a range of different impact methods will be employed. For each Program, a sampling plan will be developed for each major measure category to ensure a 90/10 relative precision level for key impact estimates.

The general impact evaluation steps are discussed below. Some elements, such as the review of *ex ante* savings and installation verification, will be conducted for all Programs. Other analysis techniques such as billing regressions and/or engineering review will be applied where most applicable on an as needed basis.

Step 1: Review Ex Ante Savings

The *ex ante* savings review includes independent evaluator assessment of two Program implementation resources: the TRM and the Program participant databases. The TRM contains assumptions of energy savings, lifetimes and costs for all measures addressed by Hawaii Energy. The Program participant databases contain individual records of participants, including the number of measures and services they received.

TRM Review

The impact evaluation will begin with a review of the *ex ante* savings values for all measures covered in each Program – it is the review of all the savings values included in the TRM. For each measure, we will review the current savings and cost calculations and any available documentation of the values and input parameters, such as operating hours. We will also compare the savings values with similar reviews the Evaluation Team has conducted as part of other impact evaluations, taking into account Hawaii's special conditions such as weather, and building and appliance/equipment stock. Our assessment will include a review of how savings are being applied for the Residential Peer Group Comparison program, the savings from which was measured during the PY2011 evaluation. An interim report will be prepared to document the review of these measures, including specific criteria serving as the basis for the review, and recommendations for changes to the TRM and/or additional evaluation to update information included in the TRM.



Program Participant Databases Review

We will request and obtain databases of participating customers for three-quarters of PY2012 and conduct a preliminary assessment of claimed (*ex ante*) savings using summaries of the participant databases with the TRM database of deemed savings values. This preliminary summary will be used to develop sample frames for primary research. Once PY2012 is complete and the participant databases are finalized, we will obtain final participant databases and update our estimates of *ex ante* savings. As discussed below, we will apply adjustment factors to the *ex ante* savings estimates using the results of primary and secondary research (e.g., the TRM review, and participant telephone and on-site surveys).

Step 2: Verification and Documentation of Baseline Conditions

The use of appropriate baseline characteristics is as important to an accurate evaluation as correctly specifying measure characteristics, since the program impact is calculated as the difference between the demand and energy use of the energy efficient measure and the established baseline. Incorrectly characterizing the existing equipment or facility that existed prior to the project installation, or the standard equipment/facility that would be normally installed, will result in an estimate that will either fall short or exceed actual realized impacts. This is particularly important for larger commercial programs.

In reviewing the baseline estimates for each sampled project, the Evaluation Team will use its independent judgment as to the appropriateness of the assumptions and calculations provided. First, the team will review the assumptions and algorithms used by Program implementers to estimate project impacts. Second, we will compare baseline characteristics used to estimate impacts for the incentive application with responses to participant survey questions about the equipment and facility operations that existed prior to the project installation or that would have been installed without Program incentives. Inconsistencies between the two will be investigated through discussions with the participant (most likely during the participant telephone survey) and in some cases during on-site visits.

In some cases, baselines may be represented by the general market norms at the time of implementation. For example, the baseline of an installed new AC unit will be assumed to be what would have been installed if there were no program. The Evaluation Team will establish this baseline by studying market conditions, either by survey of HVAC installers or distributors, field observations of retail locations, manufacturer sales information, interviews with non-participant buildings, or some combination of these. For the PY2009 evaluation, we conducted telephone surveys with non-participants and with market actors. Subsequent evaluations included more targeted trade ally research. For the PY2011



evaluation, we conducted a large-scale baseline survey including both residential and non-residential customers. The PY2012 Evaluation will draw on those prior efforts. We will also identify any new market issues that arise during the course of our analysis that might be addressed with new or follow-up market research in subsequent evaluation cycles.

Step 3: Verification of Conformance of Installed Project with Project Specifications and Ex Ante Assumptions

A second important element of impact analysis is to determine the extent to which the installed measure or group of measures conforms to the specifications upon which the *ex ante* impact estimates were based. Such verification is either completed via surveys or interviews with program participants, or through on-site visual inspection of the baseline and installed measures. Examples of this analysis include:

- Verifying the number of measures installed, compared to that for which incentives were paid;
- Verifying measure specifications, operation schedule, facility operation conditions, and other factors that influence energy use; and
- Accounting for interaction with other equipment or systems.¹³

For the PY2012 Evaluation, we plan to conduct telephone and on-site surveys using an approach similar to that used for PY2010, but maintaining the lower sample sizes for customer surveys established for the PY2011 evaluation, which were based on the nearly 100 percent verification rates of the previous three evaluations. We will conduct on-site visits with a sample of residential and business customers who received prescriptive rebates, and conduct engineering reviews combined with on-site inspection for large business customers and those installing custom measures.

For PY2012, we also plan to request a sample of low-income residential CFL and other measure give-away documentation. We will analyze the data for a sample of events based on Program guidelines established as a result of the PY2010 evaluation findings and recommendations.¹⁴

¹³ The impact of a project is not always limited to the piece of equipment or system being modified. Often times there are interactions with other equipment or systems that need to be accounted for in the overall energy analysis. For example, improving well pump efficiency results in an increased flow rate. This increase in flow rate increases friction losses through the piping system. This can offset a good portion of the savings since pump power is proportional to volumetric flow cubed. A complete and global understanding of the system and its interactions with the surroundings is required to obtain accurate energy calculations.

¹⁴ More information is found in the *Memo to the PBFA from the EM&V Contract Manager for the HPUC* dated October 5, 2011. (HPUC EM&V Policies Addendum B 10-05-11.pdf)



Step 4: Develop Adjustment Factors and Calculate Verified Gross Impacts

The engineering analysis described above will produce two adjustment factors that will be applied to the *ex ante* estimates to calculate the verified gross impacts: the installation rate and the engineering adjustment factor.

- **Installation Rate.** The installation rate is developed to adjust the *ex ante* impacts for non-installation of some or all units of a particular measure. The installation rate does not account for any other errors in or miscalculations of the *ex ante* impacts; rather, it solely reflects the portion of projected gross impacts that was actually installed.
- **Engineering Adjustment Factor.** The engineering adjustment factor corrects the projected gross impacts for nonconformance of the installed measures to the specifications in the project plan. For any project, *ex ante* gross impacts may be adjusted for a variety of reasons, including, but not limited to, the following:
 - One or more errors in the input assumptions used in the calculations to estimate project impacts, such as the coincidence factor, baseline specifications, operating characteristics, operating hours, efficiency performance specification, capacity and loading;
 - One or more errors in the algorithm used to estimate impacts; and
 - Incorrect tracking system data entry.

Step 5: Conduct Additional Analysis As Needed

Depending on the Program, participation levels, and the measure being analyzed, additional analysis techniques (i.e., engineering and billing regression) may be applied to further refine the savings estimates and confirm the energy savings being claimed, making use of Program metered data if available. The methods and their respective applicability are briefly discussed below.

Engineering Analysis

Large commercial and industrial custom projects will likely require additional engineering work and analysis that may include end-use metering at the participant site. This will allow for site-specific savings estimates to be developed for larger, more complex projects. In the case of new construction projects (both residential and non-residential), engineering modeling or simulation may be required to further develop impact estimates. In all cases, we will discuss the rationale for conducting more in-depth metering with the Contract Manager, and the benefits of additional metering will be balanced against the other evaluation needs as part of the evaluation prioritization and portfolio analysis. All site



metering work will be designed to adhere appropriately to the International Performance Measurement and Verification Protocol (IPMVP®).¹⁵

Billing Regression Analysis

The new sub-metering measure introduced in PY2011 requires additional analysis to determine if the respective TRM savings value, which has not yet been evaluated, is appropriate. We plan to conduct billing analysis on a selection of sites that completed the sub-metering measure in PY2011 or PY2012. To the extent possible we will control for any variations in weather, occupancy or participation in other programs while estimating the change in energy use due to the sub-metering measure. The exact number of sites to be included in this analysis has not yet been determined, though we will likely sample a large portion of completed projects in order to collect enough data to yield statistically significant results. The projects selected for analysis will likely be those sites with a full year of post-sub-metering billing data available. The findings of this analysis will be used to update the savings value in the PY2013 TRM, as needed.

Step 6: Calculate Impacts

The objective of net impact analysis is to estimate the portion of verified gross impacts that are directly attributable to Hawaii Energy's energy efficiency initiatives. To ensure that all Programs are addressed by the impact evaluation, additional impact estimation methods may be used beyond those used to determine gross impacts. One such method is review of the TRM net-to-gross (NTG) ratios (NTGR) for reasonability and consistency with estimates in other similar jurisdictions, taking into account Hawaii's special conditions, including energy prices, building and appliance stock, customer preferences, regulatory environment, economy and other issues, and ensuring that the likely effects of both free-ridership and spillover are considered. The Evaluation Team recommended NTGRs for the programs within the Hawaii Energy Portfolio as part of the PY2011 evaluation. Primary data collection may address the following questions:

- What were the circumstances under which the participant decided to implement the project (i.e., new construction, retrofit/early replacement or replace-on-burnout)?
- What was the existing equipment that the high-efficiency measure(s) replaced?
- To what extent did the Program *accelerate* installation of high-efficiency measures?

¹⁵IPMVP documents may be downloaded from the Efficiency Valuation Organization (EVO) web site at http://www.evo-world.org/index.php?option=com_content&view=article&id=272&Itemid=504&lang=en



- What were the primary influences on the participant's decision to purchase and install the high-efficiency equipment?
- To what extent did the Program influence the installation of high-efficiency equipment?
- Was the measure an emerging technology?
- What other influences contributed to the measure installation(s)?

In developing related participant survey questions, we expect to build on state-of-the-art approaches developed for other regions, including California, Oregon and Wisconsin, while avoiding those approaches that have been shown to be methodologically problematic.

In addition to Program-level information from participants, the Evaluation Team may use information obtained from both non-participants and trade allies (i.e., contractors and equipment suppliers) to develop an understanding of the current supply market in the HECO service territory, and also to corroborate participant-based NTGRs with market-level information. For the PY2009 evaluation, the team developed a related set of questions for non-participants, though the non-participant surveys queried individuals about lighting equipment change-outs and purchases during the study period excluding references to Hawaii Energy. The specific focus of the PY2009 non-participant survey was to provide insight on program awareness and primary decision influences and program targeting, and the PY2011 evaluation developed NTGRs by program. Future evaluations may revisit free-ridership and spillover, especially as programs are modified and/or added.

The PY2011 evaluation team produced a memorandum that summarized NTG issues and assessed approaches used across the country to attempt to estimate net savings. In the memorandum, we provided Program-level NTGRs based on those used in other jurisdictions for similar programs, target markets and measure categories. These NTGRs will be used for the PY2012 Evaluation. Future Program evaluations might seek to update these NTGRs and/or follow-up on and/or augment the non-participant market research conducted for the PY2009 evaluation.

Review of PY2012 Transformational Programs

The Transformational Programs represent an increasingly significant portion of the Hawaii Energy Portfolio, with a financial investment of \$2M in PY2011 and \$2.5M in PY2012, or ten percent of the Program incentive budget. Thus far, they have not been included in the broader EM&V effort. Given the magnitude of this investment, and the importance of the Transformational Programs to long-term energy savings in Hawaii, it is appropriate at this juncture to take a closer look at them. Therefore, the process evaluation component of the PY2012 Evaluation will focus on the Transformational Programs, as will a market assessment. Additionally, these efforts will inform our evaluation of this important part of



the Portfolio. A description of our approach for the PY2012 Evaluation follows, first discussing the process evaluation and market assessment components more generally, then providing an overview of the evaluation of the Transformational Programs, more specifically.

Process Evaluation

The process evaluation will build on findings from prior Program evaluations to provide input to the Hawaii PUC for optimizing the Hawaii Energy Portfolio. The insights and recommendations identified during the process evaluation research will serve to inform Program and Transformational Program refinement and help to ensure that goals are achieved. The process evaluation approach that is adopted each evaluation year reflects this priority, with research intended to guide effective review of program processes and other elements that will affect operational efficiency.

This type of evaluation is particularly useful for gaining an understanding of the interplay of implementation aspects of for new programs or program elements. For PY2009, the evaluation team focused on the transition of Programs from the HECO utilities to SAIC as a third party administrator. The PY2010 evaluation concentrated on identifying and characterizing infrastructure-related issues, monitoring performance metrics related to longer-term Program performance and potential, and assessing the progress and efficacy of several pilot Programs and strategies that were being introduced by SAIC. The PY2011 evaluation included continued tracking of participant satisfaction and feedback on the Programs, an assessment of NTG issues and development of updated NTGRs for the PY2012 Portfolio.

As noted above, the PY2012 process evaluation will be focused on the Transformational Programs and will include targeted research to provide the Program with market intelligence to inform review and possible modifications of strategies to address the PY2011 process evaluation findings. Research may include secondary review of programs operating in other states and regions and analysis of the baseline data that is being collected for the PY2011 evaluation. Evaluation efforts will also examine the effectiveness of the Transformational Programs on their own and as a piece of the larger Hawaii Energy Portfolio. We will investigate how the Transformational Programs are being implemented, whether they are meeting their intended goals, and if they complement the broader Portfolio in meeting the needs of residential and business customers.

Key process evaluation goals include:

- **Provide Early Feedback.** This research will be designed to provide early feedback to SAIC and the Hawaii PUC on the operational efficiency and effectiveness of program delivery. Recommendations for improvements will be



developed to help inform mid-course corrections, as necessary, and reinforce the robustness and flexibility of the Hawaii Energy Portfolio.

- **Develop and Monitor Performance Indicators.** Process evaluation activities are intended to support monitoring the status of key performance indicators identified through prior review of and development of logic models. As a part of this work, the Transformational Program theories will be assessed.
- **Ensure Long-term Scalability and Goal Attainment.** This research will continue to test key assumptions in program design that directly affect achievement of near- and long-term goals (mentioned above in terms of likely effects, including energy savings from the program), and those relating to the target market, and residential and business behavior and decision-making.

Market Assessment

For the PY2011 evaluation, our team conducted a comprehensive baseline study that reported on the energy-using measures for a representative sample of the state of Hawaii's residents and businesses. For PY2012, market assessment efforts will focus on understanding the markets being addressed by the Transformational Programs, which are described in the following section discussing the overview of our evaluation of these programs.

We will also take a deeper look at the baseline data for the food-related industry. The baseline data provides site- and sector-specific information on energy use and a detailed inventory of energy-using equipment, including indication of the existence of specific energy-saving equipment.

We will analyze these data to determine if significant potential exists for increased implementation of energy efficiency measures and/or related behavior beyond what the Portfolio is already targeting. If so, we will conduct market research to provide information on market awareness and willingness to participate in energy efficiency initiatives Hawaii Energy may wish to offer in coming years. If, on the other hand, we find that such potential does not exist, we will direct the budget that would have been spent on this market research towards conducting additional program evaluability assessments of the Transformational Programs (as described below). The scope of such assessment efforts will be determined after it is decided they will be conducted.

Food-Related Industry Market Research

The PY2010 Evaluation Report recommended that Hawaii Energy make an effort to increase the participation of restaurants and other food-related industries. This recommendation was made based on findings that in PY2010 food-related businesses (including restaurants, retail food, food processing and cold storage) represented 16



percent of the commercial electricity consumed by HECO customers and received less than one percent of the program rebates available to them.

Preliminary results for PY2012 rebates show a marked increase in the rebates given to food-related business. Rebates totaling \$340,500 were awarded to these businesses, approximately tripling the amount this sector received in PY2010. This increase in food-related activity is a commendable achievement for Hawaii Energy. The early success suggests that this area holds great potential for further activity. The market assessment plan is designed to bolster related outreach efforts underway which may apply to both resource and non-resource programs.

The baseline study includes a large number of food service sites that will provide a good picture of current energy use in the sector. Table 5 provides a summary of the food-related businesses included in the study.

Table 5: Food-Related Businesses in Baseline Study

	Oahu	Hawaii	Maui	Total for 3 Islands
On-site Interviews Conducted (out of 417)				
Retail-Food	14	5	5	24
Restaurant	36	7	5	48
Total On-sites	50	12	10	72
Mail Surveys Received (out of 622)				
Retail-Food	18	11	8	37
Restaurant	53	15	17	85
Total Mail Surveys	71	26	25	122

Overview of Transformational Program Evaluation Approach

In addition to the process evaluation and market assessment activities targeting the Transformational Programs, we will conduct a specific evaluation of this part of the Portfolio, as described below.

Research questions for this evaluation include:

- Do the Transformational Programs address all major market transformation needs? Do significant gaps in Transformational Program efforts exist that may be addressed using program models elsewhere in the country?
- Are the Transformational Program strategies clear and sound – do program theories and logic models exist for them? Are the Transformational Programs linked, or at least consistent with, the broader Hawaii Energy Portfolio? Is appropriate information being collected for their evaluation?



- Does the magnitude of the PY2012 investment reflect initial success and long-term importance of the Program?

Our recommended approach is three-fold:

- 1) Transformational Program Portfolio-level Assessment
- 2) Program Evaluability Assessment, including likely energy impacts (all Transformational Programs)
- 3) Detailed Program Review (select Transformational Programs)

The effort will commence with an overview of the entire Transformational Program portfolio in order to provide background and context for the evaluation, and to identify any potential gaps in the portfolio based on needs identified in recent (and prior) baseline research, and our understanding and review of the *PY2012 Hawaii Energy Annual Plan*.

We will then conduct two levels of program-specific evaluation: A program evaluability assessment, consisting of a structured review of basic elements for each Transformational Program to assess overall evaluability; and a subsequent detailed program review for selected Transformational Programs that will dig deeper into key issues integral to program success. Table 6 lists the Transformational Programs and the expected approach to be used for each. Note that while program selection for the detailed program reviews will be based on analyses described above, we used our knowledge of the PY2011 Transformational Programs and industry experience to develop the following forecasted activities, specific allocation of budget for the detailed program reviews may change based on findings from the preceding assessments.

Table 6: PY2012 Transformational Programs and Proposed EM&V Effort

Transformational Program	PY12 Status	EM&V Effort <i>x =“no”</i> <i>check mark =“yes”</i>	
		Program Evaluability Assessment	Detailed Program Review
Government			
Energy Efficiency Performance Support	CONTINUING	✗	✗
Energy Efficiency Subject Matter Expert Support for Legislature	CONTINUING	✗	✗
Energy Efficiency Language Inclusion in County and State Master Plans	CONTINUING	✗	✗
HCEI Collaboration – Support Internships if Funds Available (DBEDT)	CONTINUING	✗	✗
Rebuild Hawaii	NEW	✓	✗
Education for State and County Employees	NEW	✓	✗
Energy Audits of State Govt. Buildings	NEW	✓	✗
Business			
Energy Education for Energy Professionals (EEFG, CEM, BOC)	CONTINUING	✓	✓
Energy Resource Center(s)	CONTINUING	✓	✓
Energy Efficiency Service Sector Career Fair	CONTINUING	✓	✗
RISE– Rewarding Internships for Sustainable Employment	CONTINUING	✓	✗
UHCC – University of Hawaii Community Colleges Green Mechanical Council	NEW	✓	✗
Energy Audits and Education in Food Service and Accommodations Industry	NEW	✓	✗
Energy Efficiency Education for Private Business Employees	NEW	✓	✗
Residential / Education			
NEED Training - National Energy Education Development Project	CONTINUING	✓	✓
EAD– Energy Ambassador Development	CONTINUING	✓	✗
Kukui Cup	CONTINUING	✓	✗
School Audits	CONTINUING	✓	✗
Residential			
School Belkin Energy Meter Kits	CONTINUING	✓	✓



Energy Efficiency through Financial Literacy	CONTINUING	✓	✓
Energy Efficiency Local Resident Experts (Energy Ambassador)	EXPANDED	✓	✗
Landlord/Tenant Incentives and Solution	NEW	✓	✗
Documentary about Energy Efficiency Homes – ZNE	NEW	✓	✗

5. Data Collection

Secondary Data Sources

As part of the PY2012 Evaluation, the Evaluation Team will continue to supplement our experience and knowledge of programs implemented in other states with a review of evaluation reports and other program summaries, such as those found in the following databases:

- California Measurement Advisory Council (CALMAC): www.calmac.org
- Northeast Energy Efficiency Partnerships: <http://neep.org/emv-forum/emv-library/state-policies-activities>
- Energy Efficiency Best Practices Project: www.eebestpractices.com

As noted previously, we will prioritize savings values from regions that have the most similar climate and conditions as Hawaii, given that those sources are relatively robust and current. These databases will be reviewed for information on programs similar to those in the Portfolio and alternative design elements that might be considered for future Hawaii Energy pilot programs. For example, some programs implemented in other states have achieved significant success with direct install programs for small business that require no out-of-pocket expense for this cash-strapped segment. We will investigate whether a similar approach might be suitable for Hawaii.

Primary Data Sources

Once the review of secondary data sources is complete, work will begin on designing the primary data collection tasks for the various Hawaii Energy initiatives, tailoring each specifically to the evaluation objectives and research issues identified for each Program and Transformational Program. As part of developing the PY2012 Evaluation research plan, we will develop a sampling strategy designed to achieve a minimum of 90/10 relative precision for key measures, Programs and/or Portfolio elements. The various types of primary data collection planned for the PY2012 Evaluation are described below.



Participant Phone Surveys

Phone surveys of Program participants will be a major data collection task. While the final survey design will depend on a variety of factors (e.g., segment, program, project type and measures installed), we anticipate that these surveys will be 15 to 20 minutes long and will be fielded by SMS.

We will leverage our prior customer survey experience and build from prior Hawaii Energy evaluation survey instruments. We plan to target 350 residential and 50 business participants. These surveys will include participants in Hawaii Energy's small business direct install program.

Program Staff and Market Actor In-Depth Interviews

We will conduct in-depth interviews with Hawaii Energy staff and contractors involved with the Transformational Programs to gain a more complete understanding of how these programs are designed and implemented and obtain feedback on successes and challenges.

Senior Evaluation Team staff will conduct the majority of these interviews, and all will be done by team members experienced in conducting similar in-depth interviews. Most interviews will be conducted by phone and are expected to last 30 to 60 minutes.

We may also conduct up to 20 in-depth interviews with food service business customers if we determine that they have significant untapped energy efficiency potential, based on review of the baseline data.

On-Site Verifications and Surveys

We anticipate conducting a series of on-site visits in order to verify that measures listed as installed in the participant database have actually been installed. A larger sample of measure verification will be completed as part of the participant phone surveys, with a sub-sample recruited for on-site verifications. We will attempt to use local staff wherever possible for simple measure installation verification.

We plan to target 50 residential and 45 business participants for on-site verifications. Twenty-five of the business participants will be from the prescriptive measure participant category and 20 from the large commercial and custom measure categories. We will build from our prior evaluation approach, using the same auditors and site visit protocols. We will also conduct an additional 10 engineering desk reviews of large commercial/custom projects. These surveys will include participants in Hawaii Energy's small business direct install program.



The PY2012 Evaluation will also include resources to augment the large commercial and industrial customer baseline survey effort that was launched during the PY2011 evaluation. The 90 large business customer on-site surveys across the islands of Oahu, Maui and Hawaii conducted for the baseline study will be leveraged for the PY2012 Evaluation. Data collected through them will be analyzed expressly for the PY2012 efforts and will be used to support the Hawaii Energy Efficiency Potential Study.¹⁶

The survey instrument will be very similar to that used for the PY2011 evaluation on-site surveys of small and medium business customers. We will coordinate with each utility's account representatives and managers to recruit customers, with Evaluation Team engineers scheduling site visits to accommodate the unique nature of most of the target customers (e.g., varying length of time to complete a survey, unique customer needs and requests with respect to the survey).

Each customer who receives a baseline on-site survey will also be provided with a site report, including information obtained during the audit about energy efficiency opportunities and energy usage data from HECO. Customers can opt to share the site report data with Hawaii Energy and request a follow-up from Hawaii Energy staff to receive help in pursuing identified energy efficiency opportunities. For those customers who opt-in, Evergreen will facilitate the transfer of data to Hawaii Energy.

6. Scope of Work

The following tasks are designed to complete the evaluation and meet the objectives described above. It should be noted that the task numbers listed in this Scope of Work are distinct from those in the PY2012 Evaluation contract. Cross references are included for clarity.

Task 1: Research Plan Initiation Meetings (Contract Task 1)

The Evaluation Team has participated in a series of weekly research planning meetings with the Contract Manager from January 2013 through March 2013. We have produced various internal planning documents based on review of the budget and discussions with the Contract Manager.

¹⁶ Case studies of related water/wastewater and military sectors will be developed as deliverables for the PY2012 Evaluation, and will also be leveraged for the baseline study. The large commercial and industrial customer baseline survey data analysis effort will be similar to the PY2011 baseline study effort, with the exception of the case studies. The case study reports will include information gathered from secondary sources (including interviews) and characterization of energy usage associated with the water/wastewater and military sectors.



Task 2: Program Document Review / Interviews (Contract Task 1)

The first research task will involve reviewing all available Program and Transformational Program documents and current participation data (many background documents have already been provided to the Evaluation Team by the Contract Manager). Additionally, we will be conducting telephone interviews with Program staff and other market actors involved with the Transformational Programs in order to become familiar with how they are being implemented. These interviews will also be used to identify important issues and/or research questions that the PY2012 Evaluation may be able to address.

Task 3: Work Plan (Contract Task 1)

This document is the draft workplan. We will address comments from the Contract Manager and provide a final workplan.

Task 4: TRM Review (Contract Task 2)

We will request the PY2012 TRM. Once we receive the TRM, we will begin our comprehensive review of it. This task also includes calculation of the TRB ratio. The basic steps for the TRM review are as follows:

- 1) **Initial review of all measures.** The first stage will involve a general desk review of all residential and business TRM measures, and their respective values and back-up documentation, to identify those that may need to be adjusted. This review will focus on the savings values (kWh, kW), equipment and installation costs, and other factors such as operating hours that will affect the deemed savings values. This initial review will be limited to one to two hours per measure.

The potential need for adjustment (and consequent need for additional analysis) will be signaled by a combination of uncertainty of key parameters, the impact the key parameter has on the savings estimate, and the anticipated potential savings of the respective measure. For example, duty cycle for a variable frequency drive has both a high level of uncertainty and a very high impact on the savings estimate. The potential savings for this measure is likely to be significant. The combination of these three would justify substantial scrutiny of the duty cycle.

- 2) **Identify measures for which adjustments may be needed.** Based on the first level review, a subset of measures will be identified that may need to have values adjusted (or further adjusted) to better reflect conditions in Hawaii.
- 3) **Prioritization and suggested future research.** The subset of measures identified in Step 2 will be prioritized based on the level of uncertainty surrounding the savings and cost values, and the likely contribution to overall Portfolio savings. This subset of measures will receive an additional level of review to determine the best approach for

updating the savings or cost values. For each measure identified, an approach for updating the value will be selected based on one of the following three categories:

- a) **Recommend new value.** For measures for which a better value has been identified from secondary sources, the evaluation team will develop a recommendation for a revised value, and provide appropriate documentation and discussion.
 - b) **Conduct additional research.** It may be beneficial to conduct additional research on some measures as part of the PY2012 Evaluation. For example, if installation costs for a measure seem to be inaccurate, the Evaluation Team can include questions to collect installation cost data as part of the participant phone surveys and contractor interviews already planned for this evaluation. The additional data would then be used to develop a new cost estimate for that measure.
 - c) **Propose extra-Evaluation research activities.** Other measures may require a broader research effort prior to updating the value. While some data can be collected during the normal course of the PY2012 Evaluation, larger research efforts are likely outside the scope of the current project. An example of this type of large research project would be conducting a statewide lighting logger study to develop a Hawaii-specific value for operating hours.
- 4) **Calculation of the TRB ratio.** Once the TRM review and *ex post* impact evaluation research are complete, we will recalculate the TRB using the updated *ex ante* savings assumptions and *ex post* evaluation adjustments.

Task 5: Data Collection (Contract Task 2)

After the workplan has been finalized, we will collect the data needed to support the various evaluation activities. Prior to use for phone surveys and interviews, survey instruments and interview guides will be drafted and submitted to the Contract Manager for review and approval.

Table 7 below presents a summary of the primary data collection for the PY2012 Evaluation.

Table 7: PY2012 Data Collection Sample Allocations

Data Collection Method	Sample
Participant Phone Surveys (Residential)	350
Participant Phone Surveys (Business)	50
In-depth Interviews	35
Residential On-site Inspections	50
Business On-site Inspections	45
Large C&I Baseline On-site Surveys	90
Engineering Desk Reviews (Custom projects)	10



Task 6: Verification of Program Activities (Contract Task 2)

Savings Accomplishments

This task will be initiated based on an extract of participant data representing three-quarters of PY2012. Once the program year has ended and the participant data have been finalized for the full year, we will apply the verification results to the full year's worth of data.

The verification will include several activities:

- 1) **Verification of measure installation.** The primary component of this task will be to verify the installation of reported measures for a sample of participants. All respondents to the phone survey will be asked a series of questions to verify installation of the equipment reported in the SAIC tracking database. For a subset of respondents, we will conduct on-site verification inspections.
- 2) **Savings calculation verification.** The savings verification will also include a review of the savings calculations to ensure accuracy. This includes confirming that the correct values from the TRM are being applied for each measure in the tracking data, as well as ensuring that savings amounts are being calculated correctly.
- 3) **Cost effectiveness calculation.** Part of the verification will also include a calculation of the cost effectiveness of each Program using the Total Resource Cost (TRC) test.

Non-Savings Accomplishments

The PY2012 Evaluation will also verify the non-savings accomplishments completed during the program year. Goals for non-savings accomplishments are included in SAIC's contract and help determine the overall compensation SAIC receives for implementing the Hawaii Energy Portfolio.

Specific activities listed in SAIC's original BPFA contract are listed below. Below each activity we discuss some anticipated performance metrics that will be measured as part of the PY2012 Evaluation verification effort (or we note that they were already confirmed during prior evaluations).

- 1) **Data system documentation / user manual.** We will review data system documentation and confirm these are being updated by SAIC. The evaluation team will also provide feedback to SAIC on its data collection and tracking procedures, as appropriate. We will build on our prior review of these resources.
- 2) **Required reports (monthly, quarterly, annual).** The Evaluation Team will confirm with the Contract Manager that all the required reports are being provided.



- 3) **Geographic and sector equity.** The evaluation team will identify the distribution of participants across islands and sectors. This will be done by number of participants as well as by amount of savings and share of incentive dollars.
- 4) **Quality assurance.** We will continue to monitor quality assurance procedures, building on prior reviews. Measuring participant and contracting satisfaction will also provide information on how well the quality assurance procedures are working. We will continue to track these procedures over time to identify any new issues and provide feedback on changes made to the Programs and Transformational Programs.
- 5) **Coordination with other efficiency programs (state and federal) and HECO programs (direct load control and other program-related activities).** We will stay informed about related efficiency programs and we may conduct interviews and/or review documentation to ensure effective coordination is occurring.
- 6) **Working with Hawaii service providers.** This includes:
 - a) Provision of training and education to build efficiency-related skills and knowledge including among less active or under served contractors;
 - b) Provision of project-specific technical assistance;
 - c) Provision of software, design guides, manuals and other technical resources;
 - d) Promotion to consumers of products and services offered by these providers; and
 - e) Financial incentives to these providers to overcome specific market barriers.

The evaluation team will continue reviewing program reports and conducting *ad hoc* meetings with SAIC to confirm that SAIC continues to develop and maintain effective working relationships with Hawaii service providers.

- 7) **Consumer Marketing and Education.** This includes:
 - a) Promote participation and awareness of Hawaii Energy services;
 - b) Increase awareness and understanding benefits of energy efficiency;
 - c) Increase demand for energy efficiency products and services; and
 - d) Affect consumer decision-making in consumer-driven energy efficiency choices

For Consumer Marketing and Education, SAIC's contract specifies that SAIC will provide the following (at a minimum):

- Toll-free number, web-page, effective participant response and referral procedures, system for tracking, addressing and resolving participant complaints promptly.



The evaluation team will check that each of these has been developed. The phone surveys will be used to collect information on how well these procedures are being implemented.

- Will develop and implement EE and technical training services and initiatives, including cooperative activities with Hawaii education institution, vocational training and continuing education.

The evaluation team will verify that these services and initiatives are being provided by SAIC. Additional interviews of people involved with these activities outside of SAIC may also be conducted.

- All marketing materials will contain a reference to its funding source as Hawaii Ratepayer funds, with specific language (either text in contract or similar language approved by the Contract Manager.)

The evaluation team will review marketing materials for each program to verify that this language has been included.

The evaluation team will continuously monitor the methods SAIC is using to market Hawaii Energy Portfolio offerings to customers and trade allies. For the PY2012 Evaluation, we will focus on marketing and outreach related to the Transformational Programs.

- 8) **Develop Independent Funding Sources (to the best of SAIC's ability).** Any efforts to secure independent funding sources will be documented as part of the PY2012 Evaluation.

Below are listed specific contractual activities from SAIC's supplemental contract for PY2011 and PY2012, which are in addition to the contractual activities listed above from the original PBFA contract. Below each activity are some anticipated performance metrics that will be measured as part of the verification effort.

- 1) **Funding for Non-Resource Programs.** We will assess the development of programs designed to build non-resource infrastructure, with a particular focus for PY2012 on the Transformational Programs. This could include programs that provided energy training for engineers, trades people, building operators and architects. Other new programs that would fall into this category might leverage schools and universities to promote and study energy efficiency or support benchmarking or energy scores for commercial buildings.
- 2) **Equity Within Rate Class.** Rather than just focusing on equity among islands and the importance of the low-income sector, we will determine the extent to which SAIC is reaching out to address issues for small businesses and split incentives for building owners/renters in the residential sector. For the PY2012 Evaluation, our research will focus specifically on how the Transformational Programs are addressing this metric.



- 3) Leveraged Partnerships.** SAIC must form partnerships with other agencies to further help meet statewide energy-savings goals. We will interview SAIC program staff and other partner agencies to determine if this coordination is occurring and how well these partnerships are working as part of the Transformational Program portfolio evaluation.

Task 7: *Ex Post* Impact Evaluation (Contract Task 2)

We will conduct the *ex post* impact evaluation analysis as described above, with different analysis methods assigned to various Programs, as appropriate. Some analysis methods, such as TRM review and verification research that support the gross analysis, will be used for all Programs. Other methods, such as free-ridership/net savings analysis, will only be used for select programs.

Task 8: Evaluation of Transformational Programs (Contract Task 2)

Sub-Task 8.1: Process Evaluation

As described earlier, the PY2012 process evaluation will focus on Transformational Programs, but we will also continue to track and analyze Program participant satisfaction and feedback. We will aim to provide feedback on the effectiveness of program implementation so that any needed mid-course corrections can be made in a timely fashion.

Sub-Task 8.2: Market Assessment

As discussed above, the PY2012 market assessment efforts will focus on understanding the markets being addressed by the Transformational Programs.

Based on a PY2010 evaluation recommendation, for the PY2012 Evaluation, we also plan to conduct research on food-related industries. The principal objective of this survey effort will be to develop a market characterization of the food-related sector. We will analyze the PY2011 evaluation baseline study and energy efficiency potential study for this sector to leverage results that will aid in identifying additional gaps in programs. If significant gaps are identified, we will conduct market research to provide information on market awareness and willingness to participate in future energy efficiency initiatives that address these gaps. The study will look at a sample of approximately 20 in-depth interviews with businesses to determine:

- Awareness of Hawaii Energy programs;
- Awareness of energy efficiency opportunities at their business;
- Barriers to implementation of energy efficiency;
- Access to information on energy efficiency options;
- Characteristics of trade allies and their ability to supply energy efficient options; and



- Suitability of possible program delivery options for their business.

Sub-Task 8.3: Portfolio-level Assessment

We will review the overall portfolio of Transformational Programs to examine the fit within the broader Hawaii Energy Portfolio. The team will examine potential magnitude of savings resulting from these efforts, as well as the likely timing of these savings, location (qualitative estimate of market segment where savings are likely to appear) and potential risks associated with reliance upon these savings. An important source of data for this review will be baseline data from the PY2011 baseline study and prior PY2009 baseline surveys. In this sub-task, we will map existing Transformational Program initiatives to sector needs and identify gaps, i.e., areas to improve linkages and better meet sector needs. This portfolio assessment will serve as the starting point for our program-specific reviews by providing context and rationale for the program theory.

Sub-Task 8.4: Program-Specific Reviews

Because of the large number of Transformational Programs, and the limited budget available for this task, the approach we will use for conducting the program-specific reviews will be structured and consistent across the Transformational Programs, and will include two elements. A program evaluability assessment, consisting of a structured review of basic elements for each Transformational Program to assess overall evaluability, will be followed by a detailed program review for select Transformational Programs that will dig deeper into key issues integral to program success. Tasks that we plan to undertake for the program-specific reviews are outlined below:

Sub-Task 8.4.1: Submit data request to Hawaii Energy. The Evaluation Team will formally request copies of key program design documentation and tracking tools related to each of the Transformational Programs, including current data on program activities.

Sub-Task 8.4.2: Collect and review available documentation on all Transformational Programs. We will collect, organize, and systematically review all information provided to the Evaluation Team, resulting in a standardized “inventory” that will support our evaluability assessment.

Sub-Task 8.4.3: Conduct interviews with Hawaii Energy staff and partners. Up to three one-hour interviews will be conducted for each Transformational Program. The objective of these interviews will be to understand program design and implementation approach, assess current implementation status and results to date, and identify any salient issues related to program design and/or implementation.



Sub-Task 8.4.4: Summarize program theory and prepare logic models. For each Transformational Program, the team will prepare an abbreviated summary of the program theory (maximum of two pages) and identify any potential gaps in the logic. The team will potentially develop a visual depiction of the program logic (one page).

Sub-Task 8.4.5: Complete program-specific evaluability assessments. The objective of our evaluability assessment will be to ensure that each Transformational Program investment is being set up and managed in a way that can, ultimately, be evaluated to document program-attributable impacts. The program theory and potential logic models, along with information gleaned from each of the above-outlined activities, will form the basis for our evaluability assessment. An evaluability checklist will be developed and used for this process. One area to be explored is the potential to document energy savings that provide resource value.

Sub-Task 8.4.6: Prepare summary of findings. Based on the work completed for these program-specific reviews, the Evaluation Team will prepare a summary of findings across the portfolio of Transformational Programs. The objectives are to provide a cross-cutting look at the portfolio, highlighting where its programs appear to be well on track and identifying any important gaps that exist, and to recommend a prioritized list of up to five programs for the detailed program reviews. A draft summary will be prepared, documenting findings in tabular format whenever possible, and reviewed during a one-hour teleconference with the Contract Manager. Following this meeting, the document will be finalized and the Evaluation Team will then move on to complete the detailed program reviews.

Sub-Task 8.4.7: Prepare work plans for detailed program reviews. The Evaluation Team will prepare a very brief work plan for each detailed program review to be conducted. A maximum of five Transformational Programs will be given such a review. While program selection for the detailed program reviews will be based on analyses described above, using our knowledge of the PY2011 Transformational Programs and industry experience, we anticipate that the programs listed in Table 8 will be included in this sub-task. However, it should be noted that program selection and budget allocation may change based on findings.

Table 8: PY2012 Anticipated Detailed Program Reviews of Transformational Programs¹⁷

Transformational Program	Approach and Issues	Approx. Budget
Business		
Energy education for energy professionals (EEFG, CEM, BOC)	Interviews with partners/trainers; surveys with workshop attendees. Compare with similar training programs elsewhere, possibly provide estimates of amount and timing of energy savings	\$25,000
Energy Resource Center(s)	TBD if program activity has occurred. This program may just be launched in PY2012, in which case we will examine those elements that have been launched (e.g., tool lending): Interviews with partner organizations; review tool lending logs; surveys with tool recipients; visit ERC(s)	\$20,000
Residential / Education		
NEED Training - National Energy Education Development Project	Focus on how the program is being implemented, and compare to other programs nationwide (will not focus on evaluating the actual program design/content since NEED is an established entity)	\$20,000
Energy Efficiency Local Resident Experts (Energy Ambassador)	Interviews with Energy Ambassadors.	\$15,000
Residential		
Energy Education through Financial Literacy and Energy Efficiency	Interviews with trainers, review of attendee lists/information (at community level if not individual household) and determine if attendees are linked to Hawaii Energy Programs subsequently and/or if there are behavioral impacts No attendee interviews/surveys; could include GIS analysis	\$20,000

Sub-Task 8.4.8: Data Collection. Data collection will include interviews with Transformational Program stakeholders and/or participants, and may also include more detailed review of program implementation data.

Sub-Task 8.4.9: Analysis and Reporting. Analyses of collected data will be completed, and all results will be summarized in a summary report to the Contract Manager.

¹⁷ Note that the final selection of programs for highly detailed review will be completed following the initial portfolio overview and review with the contract manager, though all will receive a detailed assessment.

Task 8: Reporting (Contract Task 3)

All of the PY2012 Evaluation methods and analysis results will be documented in a final written report, which will follow the general report outline determined as part of the Final Evaluation Work Plan. The Evaluation Team will work with the Contract Manager to determine the exact format for the Final Report. While the Final Report will draw from memoranda prepared to summarize different components of the report, it will be prepared in a manner that summarizes the memoranda (included as appendices) in an easy-to-follow format that explains the overarching approach and synthesizes material from this and prior evaluations. At a minimum, the Final Evaluation Report will have the following sections:

- 1) **Executive Summary.** This will be written as a non-technical summary of all the major components of the study, including a description of the data collection and analysis methods and a summary of the study results and recommendations.
- 2) **Introduction.** The introductory section will provide background for the study and discuss the evaluation objectives. A description of the program design, implementation processes, and the measures covered will also be included in this section for each of the Programs and Transformational Programs.
- 3) **Evaluation Methodology.** This section will provide a detailed description of each of the major analysis components completed in this evaluation. The logic model and program theory will also be included in this section to provide the overall context for the evaluation activities. This section will also discuss the sample design and survey methods used for the evaluation and, in general, the discussion will follow closely the Final Evaluation Work Plan developed at the beginning of the evaluation.
- 4) **Results.** This section will contain all the PY2012 Evaluation analysis results and major evaluation findings. The results will be presented by the following evaluation component:
 - a) Program background
 - b) Process evaluation findings
 - c) Transformational Program evaluation findings
 - d) Impact evaluation findings (*ex ante* verification and *ex post* estimation)
- 5) **Conclusions and Recommendations.** This section will present evaluation conclusions and recommendations based on the findings presented in the report's Results section. Recommendations for both program implementation and future evaluations will be provided.



- 6) **Appendices.** The appendices will contain all additional evaluation documentation and technical information (such as a bibliography, survey instruments, and survey result tabulations) that are not contained in the main body of the report.

Task 9: Project Management

Project management and regular communication of the evaluation is a key element of our approach, and we anticipate working closely with the Contract Manager throughout the evaluation period. Basic project coordination and reporting tasks will include weekly calls, monthly project status reports, *ad hoc* meetings, and emails and memos as needed throughout the evaluation period.

We will continue to make prior Hawaii Energy evaluation reports and other related public program documents available for posting to the Hawaii Energy evaluation documentation website. As the current evaluation progresses, we will post relevant documents to the site as they are completed (e.g., research plan, interim reports and final evaluation reports). This website will be valuable for future evaluations as all of the prior evaluation reports will be stored in one place and easily retrievable.

Finally, we have budgeted for two in-person trips annually to meet with the Contract Manager and the Hawaii PUC in Hawaii.

7. Timeline

Table 9 shows the timeline for the primary tasks discussed above along with the deliverables associated with each task.

Table 9: Timeline and Deliverables for PY2012 Evaluation Activities

PY2012 Evaluation Activity	Completion	Deliverables
Evaluation planning meetings	28-Feb-13	Internal planning documents
Workplan development	01-Apr-13	Draft workplan
	24-May-13	Final workplan
Receive extract of Q3 data from SAIC	19-Apr-13	
Receive final PY2012 data from SAIC	30-Sept-13	
Receive PY2012 Annual Report tables from SAIC	30-Sept-13	
PY13 TRM review	1-Sep-13	Results memorandum
PY13 TRM validation at close of PY2012	31-Oct-13	Results memorandum
Primary data collection	June 2013	Research instruments
	June 2013	Sample design memorandum
	Ongoing	Weekly disposition memoranda
Verification analysis	November 2013	Draft verification results memorandum
	December 2013	Final verification results memorandum
Comprehensive evaluation assessment	March 2013	Draft comprehensive evaluation report
	TBD	Results presentation
	Spring 2013	Final comprehensive evaluation report

8. Budget

Table 10 shows the total budget for the PY2012 Evaluation. The two-year budget for PY2011 and PY2012 evaluations was \$3,129,256. A total of \$1,635,980 was allocated to the PY2011 evaluation, and an additional \$400,000 is unallocated and reserved for consulting, regulatory and analytic support as requested by the Contract Manager. The remaining \$1,093,276 is the budget available for the PY2012 Evaluation.

Table 10: PY2012 Evaluation Budget

Task	PY2012 Budget
Task 1 - Develop Annual Work Plan	\$49,594
Task 2 - Implement Work Plan	\$942,782
Task 3 - Project Management and Reporting	\$100,900
Task 4 - Consulting, Regulatory, Analytic Support	\$400,000
Total	\$1,493,276

Notes: The \$400,000 in Task 4 is unallocated.



Table 11 shows the breakdown of the allocated PY2012 evaluation budget by sub-task.

Table 11: PY2012 Evaluation Budget by Sub-Task

Contract Task	Sub-task	PY2012 Budget
Task 1 - Develop Annual Work Plan	Work plan	\$49,594
Task 2 - Implement Work Plan	Verification	\$277,750
	Baseline study	\$168,750
	Transformational Program evaluation: Process evaluation and market assessment	\$315,000
	Team calls and sub-contractor management	\$81,282
	PY2012 TRM reviews	\$40,000
Task 3 - Project Management and Reporting	Reporting	\$50,000
	Project management	\$50,900
Total		\$1,093,276

9. Signature

This document may be executed in one or more counterparts, each of which shall be deemed to be an original, but all of which shall constitute one and the same instrument. The execution and delivery of this document by facsimile or electronic mail of the signature of a party or an officer of a party hereto shall constitute due execution and delivery by that party and shall bind that party to the terms and conditions contained herein.



IN VIEW OF THE FOREGOING, the parties execute this Work Plan by their signatures, on the dates below, to be effective as of April 1, 2013.

STATE

(Signature)

James A. Flanagan

(Print Name)

Contract Manager for Hawaii Energy and
Hawaii Energy Evaluation, Measurement
& Verification Contractor

(Print Title)

May 24, 2013

(Date)

CONTRACTOR

(Signature)

Stephen Grover

(Print Name)

Hawaii Energy EM&V Project Manager

(Print Title)

May 24, 2013

(Date)