

**Evaluation Plan  
Hawaii Energy Efficiency Programs  
Activities, Priorities and Schedule**

**15 July, 2009**

**James Flanagan Associates**

**1. Purpose**

This document presents an overview of the plan for determining the impacts of the Hawaii Energy Efficiency Program (HEEP). The plan also covers process evaluation and market assessments. The document summarizes roles and responsibilities, presents some of the evaluation issues considered in preparing the plan, and provides a general framework and schedule for evaluation activities and deliverables through January 31, 2011.<sup>1</sup>

**2. Background**

Pursuant to Hawaii Revised Statutes (HRS) sections 269-121 and 122, the State of Hawaii Public Utilities Commission (Commission), through Decision and Order No. 23258, filed on February 13, 2007:

- Established a Public Benefit Fund (PBF) for energy efficiency programs, and
- Selected a Contract Manager (CM), Fiscal Agent (FA) and third-party, HEEP Program Administrator (PA) for efficiency programs.

These actions thus transitioned the administration of the energy efficiency programs from the Hawaiian Electric Company, Inc. (HECO), and its subsidiaries, Maui Electric Company, Ltd. (MECO), and Hawaii Electric Light Company, Inc. (HELCO) (Collectively the HECO Companies) to the Commission and the selected contractors.

Through a competitive procurement process, the Commission selected Science Applications International Corporation, Inc. (SAIC) to serve as the PA and to offer energy efficiency programs (Programs) to the HECO Companies' customers beginning on July 1, 2009. Previously, James Flanagan Associates (JFA) was retained to serve as the CM for the Commission. The CM is responsible for: (a) administering the contract between the Commission and the PA; and (b) managing the independent measurement, verification and evaluation (EM&V<sup>2</sup>) of the energy efficiency programs administered by the PA through December 31, 2013 (which has an option, with

---

<sup>1</sup> The plan may be updated as circumstances and new information dictate. A second evaluation plan will be prepared on January 31, 2011 although this does not preclude the likelihood that evaluation activities underway in the initial period will continue beyond that date.

<sup>2</sup> Evaluation is a general term related to determining impacts, net and/or gross, at a program level or for the portfolio, and conducting other research or developing information (for example market studies) related to the programs. Measurement and verification relates to determining gross impacts at a project level.

mutual agreement. to extend for a three year period). In addition, Bank of Hawaii was selected as the FA for the HEEP and will be responsible for the financial management of the PBF.

This document constitutes the EM&V, market evaluation, and process evaluation plan for the initial two-year implementation contract that has been awarded to the PA. The initial two-year program period will run from July 1, 2009 through June 30, 2011, Program Years 1 and 2 (PY1 and 2).

### 3. Contract Manager Evaluation Responsibilities

In addition to facilitating the relationship between the Commission and the PA for program implementation, the CM is responsible for managing independent EM&V to support and monitor the HEEP Programs administered by the PA. The management of these evaluation functions includes the preparation of evaluation plans with input from the Technical Advisory Group (TAG), the preparation of evaluation RFP(s) to select the Evaluation Contractor(s) that will contract with the Commission to perform the various EM&V activities and process evaluation studies contained in the evaluation plan, and the management of those Evaluation Contractor contract(s). With respect to selection of the Evaluation Contractor(s) the CM is also responsible for, evaluating bids received (in conjunction with the TAG), making recommendations to the Commission regarding which firm(s) should be selected, and assisting the Commission with drafting the contracts between the winning bidder(s) and the Commission.

The CM is also responsible for periodically preparing evaluation plans, such as this one, with budgets, scopes of work, and prioritization of activities. The evaluation plans are due on June 30, 2009 and on January 31, 2011, and should be periodically updated as needed. As indicated in the CM's contract, in preparing the evaluation plan, the CM will assess the need for and propose the following types of studies:<sup>3</sup>

- a. Measure Savings Characterization Studies
  - Technical Reference Manual (TRM)/Workpaper Review
  - Fieldwork (as needed)
- b. Market Characterization and Baseline Studies
- c. Savings Verification
  - Verification
  - *Impact Evaluation and Cost-Effectiveness Analysis*
- d. *Process Evaluation*
  - *Program/Portfolio Implementation*
  - *Benchmarking.*

Using results of the Evaluation Contractor's efforts, the CM is also responsible for facilitating completion of: (a) an annual impact evaluation report that summarizes and analyzes the energy efficiency savings, total resource benefits and costs, and societal benefits of the HEEP Program portfolio, and (b) an annual impact savings verification report in conformance with the evaluation plan. Pursuant to HRS section 269-124(7), every three years the CM shall also provide for a separate verification by an independent auditor of the reported savings associated with the Programs. The first independent audit is due to the Hawaii State Legislature before January 2, 2011 and every three years thereafter.

---

<sup>3</sup> Items in italics are not directly enumerated in the contract but represent important evaluation functions.

#### 4. Evaluation Budget

The budget for evaluation studies conducted by Evaluation Contractor(s) is currently set at just under five percent of the overall Program budget (including customer incentives). The total evaluation budget for PY1 and PY 2 is thus approximately \$1,773,618, as described in Table 1 below.

**Table 1: Program and Evaluation Contractor Budgets for PY 1 and PY2<sup>4</sup>**

	<b>PY1 - 2009-2010</b>	<b>PY2 - 2010-2011</b>	<b>Total</b>
<b>Program Budget</b>	\$17,833,960	\$17,638,406	\$35,472,366
<b>EM&amp;V Contractor</b>	\$891,698	\$881,920	\$1,773,618
<b>EM&amp;V % of Program Budget</b>	5.0	5.0	5.0

The evaluation contractor budget for subsequent years will presumably remain at approximately 5 percent of the total Program budget for PY3-PY5.

#### 5. PA Evaluation Activities

In addition to the EM&V and process evaluations being conducted by the Evaluation Contractor(s), the PA has committed to provide market assessment and characterization as part of its ongoing work and for the Program development process. The PA will collect, compile and assess information on the residential, commercial, institutional and industrial markets in Hawaii in order to be responsive to market change and to new technologies that are introduced or existing technologies that become cost-effective. The PA, at its discretion, will collect, compile and assess information on: (1) the characteristics and current status of markets targeted by current strategies and markets that are potential targets for new strategies and service offerings; and (2) new technologies and market intervention strategies. The PA shall also provide data and information to support the Commission's obligation to conduct Program evaluation and evaluate the PA's performance, market conditions, and the available demand-side management potential.<sup>5</sup> The PA also plans to conduct targeted primary market research to better understand the markets and Programs. Key markets may include the water and wastewater industry and/or hotels/resorts.

The CM will collaborate with the PA in planning market research to be conducted by the PA to ensure that the full portfolio of evaluation activities remains coordinated and to avoid duplication of effort and cost.

The budget for evaluation studies conducted by PA is currently \$343,622 for PY 1 and PY2, as described in Table 2 below.

---

<sup>4</sup> These figures are for the Evaluation Contractor (or Contractors) hired to conduct evaluation, measurement and verification and do not include budgets for the CM or an independent audit to be conducted for the Legislature once every three years.

<sup>5</sup> Source: Attachment A, Item L of the SAIC Contract for Services, March 3, 2009. Discussion of responsibilities related to evaluation is included in, but not limited to this section of the Contract.

**Table 2: PA Program and Evaluation Budgets for PY 1 and PY2<sup>6</sup>**

	<b>PY1 - 2009-2010</b>	<b>PY2 - 2010-2011</b>	<b>Total</b>
<b>Program Budget</b>	\$17,833,960	\$17,638,406	\$35,472,366
<b>EM&amp;V (Residential)</b>	\$52,875	\$101,755	\$154,630
<b>EM&amp;V (C&amp;I)</b>	\$64,625	\$124,367	\$188,992
<b>EM&amp;V (Total)</b>	\$117,500	\$226,122	\$343,622
<b>EM&amp;V % of Program Budget</b>	0.66	1.28	0.97

Presumably, the PA evaluation budget will remain at approximately one percent of the annual Program budget on average throughout the implementation period.

## **6. Overarching Issues for Evaluation Framework**

In consultation with the Commission and TAG, the CM established this overall evaluation framework for the HEEP. The CM's recommendation is to provide a comprehensive evaluation approach that focuses evaluation resources on:

- a. Reviewing the PA's estimates and ensuring that the sound values and methodologies are used for estimating energy savings in the Hawaii Energy Efficiency Program Technical Reference Manual (TRM). The TRM is expected to include the following information:
  - Stipulated energy savings and demand reductions values and calculation assumptions for specific efficiency deemed measures and deemed calculated measures when such values can be defined with sufficient certainty, including applicability conditions.
  - Custom measure protocols consisting of standard engineering calculations and/or other methods that are used for determining energy savings and/or peak demand reductions for efficiency measures which do not have applicable stipulated savings values.

Specific items expected to be in the TRM are:

- Savings estimates for known and new measures, kW and annual kWh
- Standard calculation procedures for well-established measures
- Values, such as incremental measure costs, for use in calculating program cost-effectiveness
- Net-to-gross (NTG) and spillover – based on existing values, possibly updated based on primary or secondary research.

- b. Verification activities that validate a sample of the site-by-site, measure-by-measure savings reported by the PA. This will include both site inspections and “desk” reviews of PA project reports. Verified information is expected to include:

- Annual Electric Energy Savings
- Total Resource Benefits

---

<sup>6</sup> Source: Attachment F of the SAIC Contract for Services, March 3, 2009.

- Summer Peak Demand
- Review of Performance Award claims for:
  - Emerging Technologies Market Transformation
  - Ally Referrals
  - State Buildings
  - Retro-Commissioning Program Launch
  - Community Partnership
  - Island Equity
- c. *Ex post* impact evaluations of all Programs with an emphasis on measures and sites with high impact (and/or relatively low savings uncertainty) while allowing for expenditures on other useful evaluation activities.
- d. Ex-post cost-effectiveness program and portfolio analyses using the Total Resource Cost Test.
- e. Process evaluations of transition, program portfolio (emphasis on new activities) benchmarking, establishment of market penetration tracking priorities.
- f. Coordination with PA market research.
- g. Other evaluation priorities to be developed in conjunction with TAG and interaction with other energy efficiency research programs in Hawaii, in particular those related to the Hawaii Clean Energy Agreement of 2008, research proposed in SB 1173, residential and commercial saturation studies and other studies undertaken by the HECO Companies, the American Reinvestment and Recovery Act of 2009 (ARRA), and other related activities.

## Issues

The following issues have been considered in the development of this evaluation plan.

- a. The TRM should be reviewed, for completeness and accuracy, inclusion of new measures, and to prioritize measures for evaluation efforts according to uncertainty in values as a function of portfolio risk.
- b. The Evaluation Contractor(s) must coordinate with the PA in terms of its data tracking protocols for suitability regarding subsequent evaluation requirements, especially for new/non-standard activities.
- c. A process evaluation for first year or first cycle is important. A process evaluation will be conducted in order to provide recommendations regarding adjustments for PY2 and beyond, as well for continuous improvement. This will include some level of best practices benchmarking.
- d. Annual verification (document review, selected onsite and/or telephone verification of a sample of PA project applications and documentation reports) is of high importance.
- e. Current net to gross (NTG) savings ratios are from 1999, and thus may be no longer valid. The NTG ratio (which includes estimates of both free-ridership and spillover) will be reviewed in light of similar values in other areas of the country, taking Hawaii's special conditions into account.

- f. *Ex post* impact evaluation timeframe should be based on input from the TAG and expectations regarding the need for information prior to decision regarding extending the PA contract beyond PY2.
- g. A portion of the PY1-PY2 evaluation budget will be reserved for targeted market studies, in addition to those being conducted by the PA, as identified by TRM review and risk assessment, special focus on new programmatic issues and/or coordination with ongoing state and utility research (e.g., HECO residential and commercial saturation studies (if applicable), Hawaii Clean Energy Agreement activities, SB 1173, and federal ARRA funding).

## **7. Prior Hawaii Energy Efficiency Program Evaluations**

The following reports have been developed for prior energy efficiency programs in Hawaii and shall be reviewed and summarized in conjunction with Program evaluation activities.<sup>7</sup>

### **Impact Evaluations:**

- a. HECO Companies Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Side Management Programs, KEMA, December 2008.
- b. Impact Evaluation Report of the 2001-2003 Demand Side Management Programs prepared for Hawaiian Electric Company, Maui Electric Company, Hawaii Electric Light Company, KEMA, October 2004 (filed as an attachment to HECO's 2004 M&E Report).
- c. 1998-1999 Impact Evaluation Report.
- d. 1996-1997 Impact Evaluation.

### **Additional Reports:**

- a. HECO IRP- 4 Energy Efficiency Potential Study, Global Energy Partners, September 2008.
- b. Residential Customer Energy Awareness Program Evaluation, Ward Research Incorporated, September 2008 (Attachment B HECO M&E Report, October 2007; See also Attachment C).
- c. Others, TBD.

## **8. Key Dates for PY1 2009-2010 and-PY2 2010-2011 Verification Activity**

Preparation and approval of the PA's annual savings claim will proceed on an accelerated schedule following PY 1 2009-2010, in order to allow time for completion of the independent audit.<sup>8</sup> In years not subject to the independent audit, the verification activity will follow a slightly longer timeframe, as described in Table 3. Information contained in the table is drawn from the PA contract. The timeframes proposed for reviewing and preparing revisions to documents submitted by the PA are relatively short. This timeline will be reviewed by key stakeholders to ensure viability and completeness. In order to meet these timeframes it is anticipated that key documents will be

<sup>7</sup> Other reports may be added to this list.

<sup>8</sup> SAIC contract, p. A-5, March 3, 2009.

submitted to the CM by the PA well before the formal deadline, thus providing opportunities for review by the CM and the Evaluation Contractor on an ongoing basis, with final review and true-up to occur in time to meet the proposed schedule.

**Table 3: Key Verification Deadlines PY1 2009-2010 -PY2 2010-2011<sup>9</sup>**

	<b>Prepared By</b>	<b>Date</b>
<b>PY 1 2009-2010</b>		
Annual Impact Report	PA	September 1, 2010
Independent Verification of Reported Energy and Capacity Savings and Incremental Renewable Energy Production Savings for HEEP, pursuant to HRS § 269-124(7)	CM, Evaluation Consultant(s)	September 30, 2010
Legislative Annual Report (any changes to Impacts)	CM	November 1, 2010
Independent Audit by Independent Auditor (FA)	FA via CM	January 2, 2011
Final Determination of Savings	Commission	January 1, 2011
<b>PY 2 2010-2011</b>		
Annual Impact Report	PA	October 1, 2011
Annual Savings Verification Review Process	CM, Evaluation Consultant	November 30, 2011
Legislative Annual Report (any changes to Impacts)	CM	December 1, 2011
Final Determination of Savings	Commission	January 1, 2012

## 9. Preliminary 2009-2010 Schedule for Evaluation Activity

The following table proposes a general schedule for selecting Evaluation Contractor(s) for the initial program cycle. This information will be refined based on discussions with the TAG regarding timelines and priorities for evaluation activities (see Table 4).

**Table 4: Preliminary Evaluation Schedule for PY 1 2009-2010 and PY2 2010-2009**

<b>Activity</b>	<b>Date (2009-2010)</b>
Preliminary arrangements for evaluation RFP	July
Draft RFP	July/August
Final RFP	August
Release RFP	August
Receive proposals	September
Select evaluation contractor	September
Contract in place	October
Project initiation	November
Draft research plan	December
Final research plan	January

<sup>9</sup> SAIC Contract, p. C-2 and p. C-5, March 3, 2009.

## **Attachment A: Proposed Evaluation Activities**

### **1. Annual Savings Verification and Performance Indicator Review**

#### a. Savings Verification

Accurate savings estimates are an important element of the Commission's HEEP efforts. The CM in conjunction with the Evaluation Contractor(s) will conduct verification of HEEP's energy savings and total resource benefits on an annual basis. The annual savings verification process will be based on review of documents submitted by the PA, with targeted field verification (likely telephone surveys, onsite verification) of a sample of the projects and activities. Depending on determinations made in the final evaluation plan, some *ex post* verification (including telephone and onsite surveys, analysis of bills, engineering review and/or onsite metering) may be conducted prior to, during or in association with the annual review process (especially in the context of large and or custom sites), and will be undertaken with certainty for periodic review, including updates for the TRM.

In general, energy use and the associated savings have two components: the first stems from the amount of energy used when a device is in operation; the second arises from the usage patterns of the business or individual. In many cases, determining the savings when the device is in operation is a fairly straightforward calculation. In contrast, usage patterns can vary widely among participants as well as over time at a single business or residence. To establish reasonable savings estimates, both of these components must be considered as part of the verification, together with other parameters such as the amount of space affected.

Targeted verifications will be conducted by identifying specific measures and sites with a relatively high degree of impact and/or uncertainty regarding estimated savings and designing the analyses to investigate the underlying factors effecting measure performance. The evaluation activities will follow an approach that the need for sound savings estimates while allocating sufficient evaluation resources for achieving other purposes is recommended.

It is critical that HEEP savings be reasonably accurate and verifiable because this information serves a number of purposes. These include:

- Determining whether the PA has met, exceeded or underperformed relative to goals and whether it qualifies for its performance incentive.
- Providing information for load forecasting
- Assisting with distributed utility planning and transmission planning
- Providing information for published reports that are presented to interested parties, the legislature and the public.

A review will be performed every year following the PA submittal of its Annual Report (see schedule in Table 3 above). After this review, the Evaluation Contractor(s) will provide a report with recommendations to the CM. The CM will review this report and make a recommendation to the Commission regarding the appropriate savings and performance award the PA may claim for the reporting year.

In addition to this review process the CM, Evaluation Contractor(s), and the TAG will participate in an ongoing review of the PA's TRM, (savings assumptions for prescriptive measures). This review



process will establish savings levels for new measures and review savings assumptions for existing measures on a prospective basis.

The CM will engage the Evaluation Contractor(s) to review large and/or complex energy efficiency projects proposed by the PA on an as needed basis.

b. Assess Minimum Performance Standards and Performance Awards Indicators

The PA will earn incentives if specific performance targets are achieved. The CM in conjunction with the Evaluation Contractor(s) is responsible for determining whether the PA has met those targets using the information gained for the evaluation studies and review of documents discussed above. In addition to savings claims submitted by the PA, documents and milestones pertaining to market transformation, participation and other non-resource goals will be undertaken by the CM in conjunction with the Evaluation Contractor(s) (see Table 5 below).

**Table 5: Performance Indicators and Relative Awards HEEP PA PY1-PY2<sup>10</sup>**

Performance Indicator	Percent of Performance Pool	
	PY 1 2009-2010	PY2 2010-2011
Residential and Business Energy (kWh)	40%	40%
Peak Demand (KW)	15%	10%
Total Resource Benefits (\$)	30%	30%
Market Transformation	10%	10%
Broad Participation (Island Equity)	5%	10%

**2. Process and Market Opportunities Evaluation of the HEEP Program Portfolio and Transition**

A process and market opportunities evaluation will be conducted to determine how well the programs are working from an operational perspective and to recommend improvements in the structure of individual programs and the HEEP portfolio overall to best achieve available savings. Transition issues will also be addressed. As part of the process evaluation, customer satisfaction, participant and non-participant awareness and interest in the programs, success of the programs in market outreach and targeting will be assessed. The overarching evaluation will also investigate coordination of the program portfolio, include some program benchmarking for best practices, and development of recommendations for key market and performance tracking measures that are not already being captured in ongoing research by the PA. The scope of the project will strike a balance between focusing on established programs that account for most of the portfolio savings to ensure that they are running smoothly, while ensuring that sufficient attention is paid to program additions and innovative strategies that represent new offerings by the PA. The evaluation will also include a component addressing interactions between the Programs and ongoing statewide and utility research, including activities and research undertaken per the Hawaii Clean Energy Agreement, SB 1173, and ARRA activities.

<sup>10</sup> SAIC Contract, C-2, March 3, 2009.

### 3. Impact Evaluation and Cost-Effectiveness Analyses

Impact evaluation will be conducted to determine the energy and demand savings and identified co-benefits of interest that directly result from the Programs. Impact evaluations also support cost-effectiveness analyses that evaluate relative program costs and benefits. For each program a specific plan will be prepared and the evaluation conducting using the following steps:

- Setting the evaluation objectives in the context of the program policy objectives.
- Selecting an evaluation approach and preparing a program evaluation plan that takes into account the critical evaluation issues and available budget.
- Implementing the evaluation and determining program impact and co-benefits.
- Reporting the evaluation results and, as appropriate, working with the PA to implement recommendations for current or future program improvements.

The three impact evaluation results that will be reported are:

- *Estimates of gross savings.* Gross energy (or demand) savings are the change in energy consumption and/or demand that results directly from program-promoted actions taken by program participants (e.g., installing energy efficient lighting), regardless of the extent or nature of program influence on their actions.
- *Estimates of net savings.* Net energy savings refer to the portion of gross savings that is attributable to the program. This involves separating out the impacts that are a result of other influences, such as consumer self-motivation. Given the range of influences on consumers' energy consumption, attributing changes to one cause (i.e., a particular program) or another can be quite complex.
- *Estimates of co-benefits.* A co-benefit commonly documented and reported is avoided air emissions: the air pollution or greenhouse gases that would have been emitted if more energy had been consumed in the absence of the energy efficiency program.

The types of analyses conducted to establish savings levels will include:

- Initial review of the TRM; ongoing review and updates as needed
- Engineering review of custom projects
- Net-to-gross and spillover assessment to update prior values, as needed

and may include:

- Reviews of billing history prior, and subsequent, to the installation
- Surveys of participants to determine how specific devices are being used
- Detailed review of selected projects that with site inspections and on-site metering
- Measurements of life estimates.

#### **4. Market Baseline and Tracking Studies**

The purpose of this type of evaluation is to establish baseline conditions for certain markets and identify indicators to be used to measure the effectiveness of the Programs and HEEP services. Market studies can also be used to provide information to facilitate better program targeting. An example of a program indicator is the total number of residents or businesses purchasing selected energy efficient product within a period of time or the efficiency level in new construction. By tracking indicators it is sometimes possible measure the effectiveness of the energy efficiency programs that are trying to increase the distribution and sales of energy efficiency products. Indicators are effective for long-term tracking of activities that are expected to produce measurable market effects, attributable to the programs, over the course of time. However, market studies may not always provide the level of resolution necessary to determine whether observed changes were directly attributable to a specific program. Thus, it will be most useful to focus any market studies on those that provide information helpful to program design, and where tracking over time would be informative but not a *required* component for determining program achievements.

#### **5. Appliance and Equipment Saturation Research**

Research to quantify the amount and type of equipment operating in existing residential and commercial buildings can be extremely important for program planning purposes, and in the longer term, for tracking penetration of efficient equipment. Full-scale saturation studies are elaborate and expensive to conduct. Utilities tend to undertake the saturation studies for planning purposes, but often focus on parameters that do not include sufficient resolution regarding the efficiency of the existing equipment. Supplemental research on a smaller scale can be undertaken in the context of the Programs to focus on building and equipment characteristics important for energy efficiency, and/or it may be possible to coordinate with the utilities in their ongoing saturation studies, if such research is planned for the program period.