EVERGREEN ECONOMICS

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# MEMORANDUM

August 29, 2012

**To:** Jim Flanagan, Chris Ann Dickerson

**From:** The Evergreen Economics Evaluation Team

**Re:** Hawaii Energy Program Year 2011 Final Work Plan

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This memorandum provides our final work plan and budget for the Hawaii Energy Program Year (PY) 2011 evaluation. Note that the required signature page is included at the very end of this document.

## 1. Context

Below we describe the PY2011 evaluation planning context by providing a description of the primary analysis activities.

### 1.1 Verification of Savings

The prior two evaluations have found very high rates of measure installation. We have the opportunity for PY2011 to reduce the scope of the verification based on the observed verification rates for PY2009 and PY2010.

There is an additional need at this time to convert savings for PY2011 using a 2009 baseline to ensure that PBFA derived savings that are being counted towards the state's long-term goal are appropriately scaled to the timing that the goal was developed.

### 1.2 Measurement of Savings Parameters

The evaluation team initiated a review of Hawaii Energy's behavioral pilot program that was launched in PY2010, Opower, earlier this year. This work will continue and a results memo will be produced this spring that will inform the next TRM review (for PY2012).

There are currently no additional high priority measure savings parameters that are uncertain that might require measurement. For PY2010, we conducted a billing analysis on solar water heaters and our analysis results were close to the prior evaluation results that had included robust on-site metering samples.

### 1.3 TRM Review

The evaluation team reviewed the PY2011 TRM earlier this year and provided a TRM review. We are doing a minor review of the final PY2011 TRM and may update the review if warranted. The team will review the PY2012 TRM later this year, which will be done within next year's scope of work and budget (for PY2012 EM&V).

### 1.4 Baseline Data

There is a need to collect baseline data on energy efficiency measures, characteristics and potential by sector and island – both to guide Hawaii Energy program design and to support Energy Efficiency Portfolio Standard (EEPS) efforts. The prior potential study used older primary source data that are becoming increasingly outdated, especially as new codes and standards related to compact and T8 fluorescent lamps are phasing in. The Commission is planning a potential study in the near-term that will require new primary data. In the interim while this study is being planned, the PY2011 evaluation provides an opportunity to provide timely energy efficiency baseline data to be used for program and EEPS planning for 2013.

### 1.5 Process Evaluation and NTG Analysis

The process evaluation will receive a lower emphasis in this evaluation year, with the primary task consisting of attending bi-monthly meetings with Hawaii Energy and the Contract Manager to ensure that the EM&V team is fully aware of program developments and implementation.

A separate task will be to re-examine the net-to-gross (NTG) ratios that are currently used for the Hawaii Energy programs. Based on evidence from the first two years of the Hawaii Energy evaluation, there may be a need to revise the NTG ratios for some programs and/or market sectors to reflect evolving market conditions. The information on potential revisions to the NTG ratios will be used to inform the next round of contracting for the Hawaii Energy program implementation.

Another task will examine the literature on non-energy benefits (NEB) associated with the installation of program measures, to identify the range of these benefits that are being accrued in conjunction with Hawaii Energy program participation.

## 2. Evaluation Objectives

The PY2011 evaluation objectives are to:

- ***Verification*** - independently verify program savings and produce a summary of cumulative program savings tied to an appropriate baseline

- ***Measurement*** – complete the analysis of Opower savings from the PY2010 pilot program
- ***Baseline study*** - Develop updated estimates of energy efficiency potential study by sector and island based on new primary data collection to support PY2013 and EEPS planning
- ***Process evaluation*** – Track PY2011 program activities by attending the bi-weekly Hawaii Energy team calls.
- ***NTG analysis*** **–** Examine secondary research and survey data from first two years of evaluation and recommend revisions to NTG ratios as needed for the next program cycle.
- ***NEB literature review*** - Review the literature on non-energy benefits (NEB) associated with the installation of program measures and identify the range of these benefits that are being accrued in conjunction with Hawaii Energy program participation

# 3. Evaluation Approach

Our approach to addressing each evaluation objective is described below.

## Task 1 EM&V Planning

This document presents the results of planning efforts that have been underway for several months, including discussions with our contract manager and evaluation team.

**Deliverable**:

- EM&V planning memo, Final Evaluation Work Plan (this document) August 29, 2012

## Task 2 Verification of Savings

The verification effort will include both phone and on-site surveys. Different from the prior two years, we will conduct a small number of phone surveys only (and no on-site surveys) for residential and commercial prescriptive projects, which were associated with very high verification rates. The largest and custom commercial projects will evaluated based on on-site surveys and engineering analyses, consistent with our prior approach.

### Phone Verification Surveys

We will conduct a total of 400 telephone verification surveys for residential and commercial participants who receive prescriptive rebates during the first three quarters of PY2011.

### On-site Verification Surveys and Engineering Analyses

We will conduct on-site surveys with accompanying engineering analyses for 15 large commercial and custom projects for PY2011, attempting to include the fourth quarter in our sample frame.

### PBFA Conversion

We will develop a methodology and produce a summary of savings claims to-date for the PBFA program using a consistent baseline tied to savings assumptions that were in place at the time that the state's long-term energy savings goals were developed.

**Deliverables**:

- Draft participant telephone surveys (residential and commercial) June 1, 2012
- Telephone survey sampling memo June 8, 2012
- Telephone survey weekly disposition reports, large/custom commercial sampling memo July 1, 2012
- Large/custom onsite survey weekly disposition reports
- Ongoing results sharing Aug-Sept
- Draft verification memo November 16, 2012
- Final verification memo (two weeks after comments received) December 2012
- PBFA conversion methods memo October 1, 2012
- PBFA conversion results memo January 2013.

## Task 3 Opower Savings Estimation

We are presently conducting analysis on Opower participant and nonparticipant survey results and are preparing a billing analysis to inform an estimate of savings associated with the PY2010 pilot program. These results will be used to inform the PY2012 TRM review.

**Deliverable**:

- Results memo September 2012.

## Task 4 Baseline Study

We will conduct primary data collection to support PY2013 planning and to be used as inputs to the Commission's potential study for residential and commercial customers on Oahu, Maui and the island of Hawaii. We will conduct:

- Detailed observed equipment data collection via smaller samples of on-site surveys:
  - 500 commercial on-site surveys, likely to be split 300 on Oahu and 100 each on Maui and the island of Hawaii – around 80 with the largest

    - nonresidential customers, and the remainder with small to medium commercial customers
    - 400 residential on-site surveys, 100 with military sector residents, and likely the remainder split 150 on Oahu and 75 each on Maui and the island of Hawaii
- More basic self-reported equipment data collection via a large sample of commercial customers:
    - Approximately 2000 surveys with small to medium commercial customers, likely via a mail survey similar to the HECO 1994 CEUS

For small to medium commercial on-site surveys, we plan to spend between two and four hours at each site, collecting information on age, size, sector, ownership and energy-using equipment (e.g. lighting, water heating and cooling) characteristics that will be used in the potential study analyses.

The commercial self-report survey will likely be conducted via a mail survey, adapting the 1994 HECO CEUS instrument. We will conduct a pre-test that coincides with the commercial on-site survey, allowing an opportunity to refine the approach based on on-site confirmation of the ability of the respondent to fill out the mail survey accurately and completely.

For residential on-site surveys, we plan to spend up to two hours per home, collecting information on dwelling age, size, ownership and energy-using equipment (e.g. lighting, water heating and cooling) characteristics that will be used in the potential study analyses. We will use a combination of sources to develop a representative sample frame including electric utility billing data. We will leverage the HECO RASS survey instrument and ensure consistency where warranted.

**Deliverables – small to medium commercial and residential**:

- Draft scoping memo June 27, 2012
- Final scoping memo August 29, 2012
- Draft and final onsite survey instruments (August 29, 2012, September 2012)
- Draft and final sampling memos (July 13 and September 12, 2012)
- Self-report commercial survey overview memo (September 5, 2012) - additional self-report commercial survey deliverables to be identified in the overview memo and added to the ongoing evaluation schedule
- Onsite and self-report survey weekly disposition reports (October 2012 – February 2013)
- Final cleaned dataset and coded survey instruments (April 2013)

We will begin planning the large nonresidential customer baseline study in early 2013, with input from HECO on how to identify and recruit customers for the study. In some cases, we will work directly with HECO assigned account representatives to approach and conduct surveys with customers. In other cases, we may rely on qualitative discussions with experts where we are unable to access customers such as commercial and industrial military sites.

**Deliverables – large nonresidential:**

- Survey guides/recruitment approach (February 2013)
- Onsite survey and other related research weekly disposition reports (March – April 2013)
- Final cleaned dataset and/or site reports (May 2013)

## Task 5 Process Evaluation, NTG Analysis and NEB Literature Review

The process evaluation will consist of attending bi-monthly meetings with Hawaii Energy and the Contract Manager to ensure that the EM&V team is fully aware of program developments and implementation.

The NTG analysis will consist of developing a scoping memo that outlines our proposed approach for researching and refining the NTG ratios. The Contract Manager will present this to the PUC for discussion and final approval. If the PUC concurs, the NTG analysis will proceed and will consist of reviewing existing evaluation reports for similar programs in other regions, combined with an analysis of the survey data collected during the first two years of the Hawaii Energy evaluation.

The NTG approach is expected to go beyond the basic NTG numbers provided by the evaluation team earlier this year to the Contract Manager (e.g., 0, 0.25, 0.5, 0.75, 1.0). While the new approach will also result in a general rating (possibly using "High, Medium, Low" categories), the ratings will be supported by the research methods described in the original scoping memo.

The non-energy benefits literature review is intended to provide the Commission with background information on how NEBs are estimated and reported by other energy efficiency program administrators nationwide. We will conduct a literature review and present the results via a memorandum.

**Deliverables**:

- Draft and final NTG methods memo (September 7 and September 21, 2012)
- Draft and final NTG results memo (November 15 and December 15, 2012)

- NEB literature review results memo (October 31, 2012)

### Task 6 Project Management and Reporting

A Final Evaluation Report will be produced that summarizes all of the activities conducted during the year. The PY2011 evaluation report shall follow the same general format of the PY2009 and PY2010 reports, including the impact analyses that supplement the verification memo (cumulative savings issues, lifecycle savings issues, comparison between program years, TRC, etc.), additional analysis of the portfolio accomplishments, etc. The NTG, NEB and PBFA Conversion memos shall become chapters of the final report. The Verification Memo shall be included as an appendix, similar to the 2009 and 2010 approach. The baseline study data will be summarized as a chapter (or chapters) of the report. We will work with the Contract Manager to develop the outlines and conventions for displaying results.

Draft and Final reports shall be edited before delivery to the Contract Manager for review. The evaluation report will involve using an editor to ensure consistent use of terms and acronyms, proper and complete references, readable tables and charts that are properly referenced and labeled, and editing of text so that it is written in one "voice" (i.e., chapters written my multiple authors are polished so that they are consistent).

In addition to the final written report, the key findings from the evaluation will be presented to the Commission, as we have done in prior years.

Throughout the study, we will conduct weekly meetings with the evaluation team and Contract Manager. We will provide project status updates and early review of evaluation methodologies, data collection instruments, sampling strategies, interim results and early drafts of all key deliverables.

**Deliverables**:

- Weekly meetings with evaluation team and contract manager
- Style guide, chapter outlines (February – May 2013)
- Draft and final report (June 2013 and TBD)
- Results presentation (TBD).

# 4. Budget

## 4.1 PY2011 Evaluation Budget

Table 1 below shows the PY2011 evaluation budget by research task. Table 2 shows the combined PY2011/PY2012 budget, with breakdowns for PY2011 and PY2012. Table 3 and Table 4 provide additional budget details by contract year and analysis subtasks.

**Table 1 - PY2011 Evaluation Budget**

| Task | PY2011 Budget |
|---|---|
| Task 1A - Develop Annual Workplan | $30,406 |
| Task 2A - Implement Workplan | $1,417,218 |
| Task 3A - Project Management and Reporting | $188,356 |
| Task 4A - Consulting, Regulatory, Analytic Support | $0 |
| Total | $1,635,980 |

**Notes:** The $400,000 in Task 4a is unallocated. $71,352 from Task 2a potential study will be charged to the PY2012 budget.

**Table 2 - PY2011 and PY2012 Evaluation Budget**

| Task | PY2011 Budget | Remainder Budget | Total PY2011/PY2012 Budget |
|---|---|---|---|
| Task 1A - Develop Annual Workplan | $30,406 | $49,594 | $80,000 |
| Task 2A - Implement Workplan | $1,417,218 | $942,782 | $2,360,000 |
| Task 3A - Project Management and Reporting | $188,356 | $100,900 | $289,256 |
| Task 4A - Consulting, Regulatory, Analytic Support* (Still unallocated) | $0 | $400,000 | $400,000 |
| Total | $1,635,980 | $1,493,276 | $3,129,256 |

**Notes:** The $400,000 in Task 4a is unallocated. $71,352 from Task 2a potential study will be charged to the PY2012 budget.

**Table 3 – PY2011 Evaluation Budget by Contract Task and Year**

| Contract Task | PY2011 Budget | PY2012 Budget | Total Budget |
|---|---|---|---|
| Task 1A - Develop Annual Workplan | $30,406 | | $30,406 |
| Task 2A - Implement Workplan | $1,345,866 | $71,352 | $1,417,218 |
| Task 3A - Project Management and Reporting | $188,356 | | $188,356 |
| Task 4A - Consulting, Regulatory, Analytic Support | $0 | | $0 |
| Total | $1,564,628 | $71,352 | $1,635,980 |

**Notes:** The $400,000 in Task 4a is unallocated. $71,352 from Task 2a potential study will be charged to the PY2012 budget.

**Table 4 - PY2011 Evaluation Budget by Sub-Task**

| Contract Task | Sub-task | PY2011 Budget | PY2012 Budget | Total Budget |
|---|---|---|---|---|
| Task 1A - Develop Annual Workplan | Work plan | $30,406 | | $30,406 |
| Task 2A - Implement Workplan | Verification | $176,500 | | $176,500 |
| | Baseline study | $770,259 | $71,352 | $841,611 |
| | Process evaluation and Net to gross assessment | $95,000 | | $95,000 |
| | Training | $25,000 | | $25,000 |
| | Opower analysis | $64,307 | | $64,307 |
| | Implan economic analysis | $5,000 | | $5,000 |
| | PBFA conversion | $25,000 | | $25,000 |
| | Team calls and sub-contractor management | $124,800 | | $124,800 |
| | Non-energy benefits literature review | $40,000 | | $40,000 |
| | PY11 TRM review | $20,000 | | $20,000 |
| Task 3A - Project Management and Reporting | Reporting | $109,910 | | $109,910 |
| | Project management | $78,446 | | $78,446 |
| Total | | $1,564,628 | $71,352 | $1,635,980 |

**Notes:** The $400,000 in Task 4a is unallocated. $71,352 from Task 2a potential study will be charged to the PY2012 budget.

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# 5. Schedule

The schedule is shown below in Table 5, with deliverables and due dates at the far right.

## Table 5 – Project Schedule

| PY11 EM&V Schedule | Apr-12 | May-12 | Jun-12 | Jul-12 | Aug-12 | Sep-12 | Oct-12 | Nov-12 | Dec-12 | Jan-13 | Feb-13 | Mar-13 | Apr-13 | May-13 | Jun-13 | Jul-13 | Deliverable(s) | Due Dates | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0. PY11 TRM review** | | | | | | x | | | | | | | | | | | Updated PY11 TRM review | 7-Sep-12 | |
| **1. EM&V plan** | | | | | x | | | | | | | | | | | | Final memo | 31-Aug-12 | |
| **2. Verification** | | | | | | | | | | | | | | | | | | | |
| CATI survey instruments | | | x | | | | | | | | | | | | | | Draft instruments | 1-Jun-12 | |
| CATI sample frame memo | | | x | | | | | | | | | | | | | | Memo | 8-Jun-12 | |
| CATI survey implementation | | | | | x | | | | | | | | | | | | Disposition reports | weekly | |
| Large/custom sample design | | | | x | x | | | | | | | | | | | | Draft and final memos | 1-Jul-12 | 31-Aug-12 |
| Large/custom onsite surveys | | | | | | x | | | | | | | | | | | Disposition reports | weekly | |
| Program validation | | | | | | | | | | | | | | | | | | | |
| Verification memo | | | | | | | | x | x | | | | | | | | Draft, final memo | 16-Nov-12 | December |
| PBFA conversion | | | | | x | | | | | x | | | | | | | Methods, results memo | 24-Aug-12 | January |
| **3. Opower analysis** | | | | | | x | | | | | | | | | | | Results memo | 17-Sep-12 | |
| **4a. Baseline study excluding large C&I** | | | | | | | | | | | | | | | | | | | |
| Baseline study scoping | | | x | | x | | | | | | | | | | | | Draft and final memos | 27-Jun-12 | 29-Aug-12 |
| Onsite survey design | | | | | x | x | | | | | | | | | | | Draft instruments, cover memos | 29-Aug-12 (com); 7-Sept-12 (res) | |
| Baseline study sample design | | | | x | | x | | | | | | | | | | | Draft and revised sampling memos | 13-Jul-12 | 12-Sep-12 |
| Commercial self-report survey design | | | | | | | | | | | | | | | | | Overview memo, draft instrument | 14-Sep-12 | |
| Commercial self-report survey mail pre-test | | | | | | | | x | | | | | | | | | Pre-test results memo | end of November | |
| Commercial self-report survey planning | | | | | | | | | x | | | | | | | | Approach memo, updated instrument (if needed) | early December | |
| Onsite surveys (including recruitment), with mail pre-test overlap | | | | | | | | | | | x | | | | | | Disposition reports | weekly | |
| Onsite data cleaning and data entry | | | | | | | | | | | | x | | | | | Raw survey data | March | |
| Commercial self-report survey implementation | | | | | | | | | | | | | | | | | Disposition reports | weekly | |
| Data analysis and weights | | | | | | | | | | | | | x | | | | Database and coded survey instrument for potential study | April | |
| **4b. Baseline study large C&I** | | | | | | | | | | | | | | | | | | | |
| Planning sample and recruitment discussions with HECO | | | | | | | | | | | x | | | | | | Memo documenting outcomes from discussions and sampling/recruitment approach | early February | |
| Survey guides/recruitment approach | | | | | | | | | | | x | | | | | | Draft and final guides and protocols | mid-February | end of February |
| On-site surveys | | | | | | | | | | | | | | | | | Weekly disposition reports | Ongoing (March - April) | |
| Data analysis | | | | | | | | | | | | | | x | | | Database (and/or site reports) for potential study | 31-May-13 | |

**Table 5 – Project Schedule, continued**

| PY11 EM&V Schedule | Apr-12 | May-12 | Jun-12 | Jul-12 | Aug-12 | Sep-12 | Oct-12 | Nov-12 | Dec-12 | Jan-13 | Feb-13 | Mar-13 | Apr-13 | May-13 | Jun-13 | Jul-13 | Deliverable(s) | Due Dates | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **5. Process / NTG Analysis / NEB** | | | | | | | | | | | | | | | | | | | |
| Ongoing Program Monitoring | | | | | | | | | | | | | | | | | | Bi-weekly (Jul-Dec) | |
| NTG Approach Scoping | | | | | | | | | | | | | | | | | | | |
| NTG Approach Memo, draft and final | | | | | | x | | | | | | | | | | | Draft and final memo | 7-Sep-12 | 21-Sep-12 |
| NTG Analysis | | | | | | | | | | | | | | | | | | | |
| NTG Results Memo, Draft and Final | | | | | | | | x | x | | | | | | | | Draft and final memo | 15-Nov-12 | 15-Dec-12 |
| NEB Lit review and assessment | | | | | | | x | | | | | | | | | | Results memo | 31-Oct-12 | |
| | | | | | | | | | | | | | | | | | | | |
| **6. Evaluation Report** | | | | | | | | | | | | | | | | | | | |
| Results, report outline and content discussions | | | | | | | | | | | | x | x | x | | | Report outline, report section content bullet lists, figure conventions | Monthly (Feb-May) | |
| Report writing/editing | | | | | | | | | | | | | | | | | | | |
| Draft Report | | | | | | | | | | | | | | | x | | Draft Eval Report | Jun-13 | |
| Final Report | | | | | | | | | | | | | | | | x | Final Eval Report | Jul-13 | |
| Results Presentation | | | | | | | | | | | | | | | | | Presentation | TBD | |

## 6. 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 August 29, 2012.

***STATE***

*(Signature)*

***CONTRACTOR***

*(Signature)*

James A. Flanagan

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(Print Name)

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

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(Print Title)

August 29, 2012

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(Date)

Stephen Grover

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(Print Name)

Hawaii Energy EM&V Project Manager

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(Print Title)

August 29, 2012

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(Date)