Puget Sound Energy

Evaluation, Measurement & Verification (EM&V) Framework

In response to the September 28, 2010
Washington Utilities and Transportation Commission
DOCKETS UE-011570, UG-011571,
and UE-100177, Consolidated

August 19, 2011

PUGET SOUND ENERGY
The Energy To Do Great Things

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Acknowledgements

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Definitions

Unless otherwise noted in a specific Conservation Schedule Tariff Sheet, the following commonly-used terms, used throughout and applicable only to this document have the below noted meanings. Definitions or glossaries contained in other EES documents, policies or guidelines referring to specific processes or unique functions shall have the meanings noted in those documents, policies or guidelines. Several definitions below are taken directly from the National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide, Appendix B. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan.

Baseline: Conditions, including energy consumption and related emissions, that would have occurred without implementation of the subject project or program. Baseline conditions are sometimes referred to as "business-as-usual" conditions. Baselines are defined as either project-specific baselines or performance standard baselines.

Baseline period: The period of time selected as representative of facility operations before the energy efficiency activity takes place.

Bias: The extent to which a measurement or a sampling or analytic method systematically underestimates or overestimates a value

Calculated savings: An estimate of savings based on a standardized procedure for data collection and analysis that is applicable to many different end use sites. Standardization of data collection reduces cost by eliminating or minimizing the need for site-specific measurement planning. This method is appropriate when savings from a measure are widely varying but can be reliably estimated by a standardized protocol.

Confidence: An indication of how close a value is to the true value of the quantity in question. Confidence is the likelihood that the evaluation has captured the true value impacts of a program within a certain range of values.

Custom savings: Savings for measures that require site-specific data collection and analysis in order to develop a reliable estimate of savings. Highly skilled and experienced practitioners are required to design and implement custom protocols. Custom protocols require site-specific documentation of the data collected and how that data is used in estimating savings.

Deemed (UES) savings: An estimate of an energy savings or energy-demand gross savings outcome for a single unit of an installed energy efficiency measure that (a) has been developed from data sources and analytical methods that are widely considered acceptable for the measure and purpose and (b) is applicable to the situation being evaluated. Also known as Unit Energy Savings (UES).

Effective useful life (EUL): A term sometimes referred to as measure life and used to describe persistence. EUL is an estimate of the median number of years that the measures installed under a program are still in place and operable.

Energy Conservation Measure (ECM): See Measure.

Energy Efficiency Services: The department within Puget Sound Energy that administers the utility's energy efficiency programs.

Evaluation: The performance of studies and activities aimed at determining the effects of a program (and/or portfolio); any of a wide range of assessment activities associated with understanding or documenting program performance, assessing program or program-related markets and market operations; any of a wide range of evaluative

efforts including assessing program-induced changes in energy efficiency markets, levels of demand or energy savings, and program cost-effectiveness.

Evaluation, Measurement and Verification (EM&V): Catch-all term for evaluation activities at the measure, project, program and/or portfolio level; can include impact, process, market and/or planning evaluation. . EM&V is distinguishable from Measurement and Verification (M&V) defined below.

Evaluation Report Response (ERR): This report, prepared by designated program managers, documents pertinent adjustments in program metrics or processes, subsequent to an evaluation study, and is attached to the completed evaluation report.

Ex-ante savings estimate: Forecasted savings used for program planning; from Latin for "beforehand."

Ex-post evaluated estimated savings: Savings estimates reported by an evaluator after the energy impact evaluation has been completed. If only the term "ex-post savings" is used, it will be assumed that it is referring to the ex-post evaluation estimate, the most common usage; from Latin for "from something done afterward."

External Evaluators: Independent professional efficiency evaluators retained to conduct EM&V. Consideration will be made for those that are Certified Measurement and Verification Professionals (CMVPs) through the Association of Energy Engineers (AEE) and the Efficiency Evaluation Organization (EVO).

Free Rider: A term in the energy efficiency industry meaning a program participant who would have installed the efficient product or changed a behavior regardless of any program incentive or education received.

Free Driver: A non-participant who has adopted a particular efficiency measure or practice as a result of the evaluated program.

Gross savings: The change in energy consumption and/or demand that results directly from program- related actions taken by participants in an efficiency program, regardless of why they participated.

Implementation Team: Puget Sound Energy, EES employees who operate and work within the DSM program, whose responsibilities are directly related to implementation and administration of DSM programs, and who may have energy savings targets as part of their employee goals or incentives.

Impact Evaluation: A study to determine the impacts, energy or demand, and co-benefits such as avoided emissions, health benefits, job creation, energy security, transmission/distribution benefits and water savings, that directly result from a program.

Internal Evaluation Team: Puget Sound Energy, EES employees who perform analysis and reporting in Energy Efficiency Services but do not have energy savings targets as part of their goals or incentive structure.

Market Effect Evaluation: An evaluation of the change in the structure or functioning of the market, or the behavior of participants in a market, that results from one or more program efforts.

Market Evaluation: A study designed to assess ECM baselines, measure costs, market actor needs and preferences, free-ridership and spillover.

Measure (also Energy Conservation Measure or "ECM"): Installation of a single piece of equipment, subsystem or system, or single modification of equipment, subsystem,

system, or operation on the customer side of the meter, for the purpose of reducing energy and/or demand (and, hence, energy and/or demand costs) at a comparable level of service.

Measure Life: See Effective Useful Life (EUL)

Measure Metrics Database: Unique to PSE, an Access database and system network drive folders that allow Energy Efficiency Services (EES) to manage its entire suite of prescriptive (or Deemed (UES)) and some calculated ECMs. The system tracks the development, implementation, life cycle, sunset and retirement of these ECMs. Measure Metrics is the foundation of EES prescriptive ECM savings claims. It is EES's means of documentation for energy savings justifications for prescriptive ECMs. It also tracks an ECM's cost, life and history of revisions. One important distinction is that the system does not track cumulative savings and program costs; only the basis for prescriptive and some calculated measures.1

Measurement and Verification (M&V): Data collection, monitoring, and analysis associated with the calculation of gross energy and demand savings from individual measures or projects. M&V can be a subset of program impact evaluation. M&V is defined in the International Performance Measurement and Verification Protocol (IPMVP - available at http://www.evo-world.org).

Net Savings: The total change in load that is attributable to an energy efficiency program. This change in load may include, implicitly or explicitly, the effects of Free Drivers, Free Riders , energy efficiency standards, changes in the level of energy service, and other causes of changes in energy consumption or demand.

Net-to-Gross Ratio: An industry term for the adjustment factor to determine net savings from a gross savings estimate. The net-to-gross ratio for Puget Sound Energy is set to 1.0 for all cost effectiveness tests.

Precision: The indication of the closeness of the agreement among repeated measurements of the same physical quantity.

Portfolio: Collection of similar programs addressing the same market or the entire market.

Process Evaluation: A study to assess program delivery, from design to implementation, in order to identify bottlenecks, efficiencies, what worked, what did not work, constraints, and potential improvements.

Program: A group of projects, with similar characteristics and installed in similar applications. Examples are a program to install energy-efficient lighting in commercial buildings and residential energy efficiency weatherization program. Each program is defined by a unique combination of program strategy, market segment, marketing approach and energy efficiency measure(s) included.

Project: An activity or course of action involving one or multiple energy efficiency measures, at a single facility or site.

Protocol: A written procedural method for implementing processes. Protocols often include information on the calculation of results and reporting standards.

[1] See Attachments 5 – 8 for documents pertaining to Measure Metrics processes and standards.

Realization rate: Ratio of ex-post reported savings to ex-post evaluated estimated savings. When realization rates are reported, they are comparing ex-post gross reported savings to ex-post gross evaluated savings.

Reliability: When used in energy efficiency evaluation, this refers to the likelihood that the observations can be replicated.

Reported savings: Savings estimates reported by Puget Sound Energy for an annual period. These savings will be based on best available information.

Rigor: The level of expected Confidence and Precision. The higher the level of rigor, the more confident one is that the results of the evaluation are both accurate and precise.

Spillover: Reductions in energy consumption and/or demand caused by the presence of the energy efficiency program, beyond the program-related gross savings of the participants. There can be participant and/or non-participant spillover.

Unit Energy Savings (UES): An energy savings value for measures whose unitized savings, e.g., savings per lamp or motor, is stable (both the mean and variance) and can be reliably forecast through the period defined by the measure's sunset criteria.

Uncertainty: The range or interval of doubt surrounding a measured or calculated value within which the true value is expected to fall within some degree of confidence.

Verification: A component of overall evaluation efforts aimed at verifying installations of energy efficient measures and associated documentation through review of documentation, surveys and/or onsite inspections. It does not include primary research (e.g., billing analysis, metering) for the purpose of determining the energy use/savings of the installed measures. PSE also engages in programmatic Verification activities, including inspections, quality assurance reviews, and tracking checks and balances as part of routine program implementation.

Acronyms

CRAG – Conservation and Resource Advisory Group

ECM – Energy Conservation Measure

EES – Energy Efficiency Services, a department within Puget Sound Energy

EME – Energy Management Engineer

EM&V – Evaluation, Measurement & Verification

ERR – Evaluation Report Response

EUL – Effective Useful Life

IPMVP - International Performance Measurement and Verification Protocol

IRP – Integrated Resource Plan

kWh – Kilowatt hour

M&V – Measurement and Verification

M:M – Measure Metrics

NEEA – Northwest Energy Efficiency Association

NWRG – Northwest Research Group

PACT – Program Administrator Cost Test (also known as UC)

PCT – Participant Cost Test

RCW – Revised Code of Washington

RFP – Request for Proposal

RIM – Ratepayer Impact Measure Test

RTF – Regional Technical Forum of the Northwest Power and Conservation Council

TRC – Total Resource Cost Test

UC – Utility Cost Test (also known as PACT)

UES – Unit Energy Savings2

UTC – Washington Utilities and Transportation Commission

[2] UES (Unit Energy Savings) is now a termed used by the Regional Technical Forum in place of "Deemed" when referring to measures.

Executive Summary

The purpose of this document is to meet the interests and intentions of the September 2010 Conditions Agreement regarding EM&V interests. It describes the framework by which Puget Sound Energy ("PSE" or "the Company") will conduct evaluation, measurement and verification (EM&V) activities to estimate energy savings and other metrics associated with its Energy Efficiency Services (EES) programs. The Framework addresses PSE's EES programs funded by Schedules 120 and/or the current cost-recovery mechanisms approved by the Washington Utilities and Transportation Commission (UTC). Evaluations will be performed by independent, external evaluators and PSE's internal evaluation team to prospectively improve program delivery and program energy savings estimates derived from the Company's EES portfolio.

This framework document adopts industry best practices definitions of terms, principles of operation, and protocols that will be utilized by PSE or external evaluators to evaluate, verify and document the savings acquired from its efficiency programs and the processes used to acquire those savings. The intended audience for this Framework is the Company's management, PSE's EES staff, and external evaluators who will perform evaluations, the UTC, and interested parties. The framework guides development of annual EM&V plans for specific evaluation activities. It also provides a mechanism for the UTC and interested parties to understand and comment on The Company's overall program evaluation approach.

Multiple documents exist that can be provided upon request. Each year the Company will develop an Annual EM&V Plan, in consultation with the CRAG, which will contain evaluation schedule, budgets, and evaluation summaries for the upcoming year. In addition, contemplated evaluation activities up to three more years in the future will be included. Another resource is PSE's Annual Conservation Plan, which describes the relationship between Energy Efficiency Services program implementation, and portfolio, program and measure evaluation. PSE will provide the CRAG with an opportunity to review and advise the Company on the Annual Conservation Plan and the associated Annual EM&V Plan per the Conditions Agreement.

This EM&V Framework is intended to outline a comprehensive EM&V process that results in transparent and accessible documentation and reporting of PSE's energy efficiency program activities. Thus, the Framework provides an overarching approach to EM&V; principles, objectives, metrics, methods and reporting. It is anticipated that PSE will need to allow flexibility for evolving EM&V needs and requirements over time, and to allow stakeholder review of overarching EM&V processes, annual EM&V plans, and specific EM&V activities at appropriate junctures. Thus, this initial version of the Framework is very much a "living document" that may require modifications over time. See Figure 1, page 9.

Attachments to this Framework describe more detailed Processes and Protocols around planning, operational, programmatic M&V, and data management functions. As most of these documents are written as guidelines for day to day operations, and may be updated at unspecified intervals, they are not intended for incorporation in the body of the Framework.

Overview of Puget Sound Energy's EM&V Processes

This document describes PSE's approach to evaluations of DSM energy efficiency measures, programs, and portfolio funded by Schedule 120 as approved by the Washington Utilities and Transportation Commission (UTC).

Evaluations will be planned, conducted and reported in a transparent manner, affording opportunities for Commission and stakeholder review through the CRAG and reported to the UTC.

> An Annual EM&V Plan establishing priorities for evaluation activities, including budgets and schedules, will be prepared each year as part of PSE's Annual Conservation Plan and filed with the UTC as noted in Table 1 and Table 3. PSE will work with the RTF, NEEA and other regional parties that are conducting EM&V activities to assess the potential for coordination and collaboration in the preparation of the Annual EM&V Plan. These plans will include a summary of each scheduled evaluation activity, whether the activity will be performed by an external evaluator or the Company's internal evaluation team. They will also include details regarding the evaluation goals, scope, level of effort, and budgets, as well as the general approaches to be utilized for conducting impact, process, market and cost-effectiveness evaluations. The Company will work closely with the CRAG on the development of this annual EM&V Plan.
>
> Other documents including project scopes, requests for proposals, detailed research plans and draft and final reports will be prepared for each major EM&V activity. Any or all of these documents will be available for review by the CRAG, as desired. The detailed research plans will define and address issues related to evaluation metrics and the level of effort, budget, baselines, approaches, sample designs, and certainty and reporting expectations associated with individual evaluation activities.

All evaluations will be conducted using best-practice approaches and techniques including those outlined in the National Action Plan for Energy Efficiency (NAPEE) Program Impact Evaluation guide.[3]

PSE developed the Measure Metrics archival system in 2008 in order to have available all relevant measure information for deemed (UES) and calculated measures. Information includes, but is not limited to measure life and cost, engineering assumptions, incentive amount, calculation type and savings value. The system also archives historical information about that measure, enabling revision history queries. PSE maintains well-documented processes for measure creation and revision. The Measure Metrics system is routinely updated throughout the year. The system is specifically not used to track cumulative annual savings.[4]

For ECMs that are not prescriptive, PSE will use standard engineering protocols for ex-ante estimation of savings. See page 21 for a description of protocols used for Custom Measures.

Through the EM&V activities, key DSM impact metrics will be determined as follows:

[3] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan

[4] Guidelines for how and when the Measure Metrics Database is updated may be found in Attachments 4 through 7.

- PSE's implementation team will estimate energy and demand savings, document installations and prepare ex-ante savings estimates per measure, project and program, consistent with Measure Metrics and standard engineering protocols.
- PSE's implementation team will also conduct QA/QC activities and follow tracking checks and balances as programmatic M&V.[5]
- PSE's internal evaluation team and independent external evaluators will conduct evaluations as outlined in the annual EM&V plan.

EM&V activities, including impact, process, market, and cost-effectiveness analysis will be conducted by PSE's evaluation team or external evaluators, according to priorities established with stakeholder input and presented in PSE's Annual Conservation Plan and PSE's Annual EM&V Plan.

Reports from EM&V activities including evaluation of energy and demand savings and cost-effectiveness will be available to the CRAG, and the UTC, consistent with the reporting schedules required by the UTC.

[5] PSE will provide detailed descriptions of its programmatic M&V policies, protocols, guidelines and processes in accordance with Conditions Agreement K6 (f) (ii).

Background

The Company serves customers with broad energy efficiency services and aspires to best practices in all aspects of program offerings, customer outreach, and evaluation. PSE provides a financial incentive for most kWh and/or therm saving ECMs that have a simple payback of over one year for commercial and industrial customers. Similar offerings, through standard offer programs, are available to residential customers. Customers use the rebates and incentives to purchase energy efficiency equipment and weatherization, often provided through an extensive network of trade allies. Over 350 measures are offered to PSE customers though multiple electric and natural gas energy efficiency schedules, authorized by the UTC. Every PSE qualifying measure and program must have an objective analysis to describe how the kWh and therm savings are expected to be cost-effective, how they will be achieved, and how the expectations will be substantiated after installation.

The Company utilizes an external advisory group of stakeholders, the Conservation and Resource Advisory Group (CRAG) to advise the Company on, among other items; 1) development and modification of protocols to evaluate, measure, and verify energy and demand savings in PSE's EES programs, and 2) guidance to PSE regarding methodology inputs and calculations for updating cost-effectiveness. Consistent with condition K(3)(b), the CRAG meets four times per year (two in person) at a minimum and represents the non-binding external oversight of PSE's EM&V activities.

This document, the "EM&V Framework," was developed in response to the UTC Order No. 5 and Stipulation Agreement dated September 3, 2010, and is intended to provide overall guidelines including principles, objectives, responsibilities, methods and reporting requirements to direct PSE's energy efficiency EM&V activities. The roles for PSE, CRAG, External Evaluators, and Washington Utilities and Transportation Commission are listed in Figure 4, Page 29.

Evaluation Principles, Objectives and Metrics

Evaluation, Measurement and Verification (EM&V) is a catch-all term used in energy efficiency literature to represent the determination of both program and project impacts. Evaluation includes the performance of studies and activities aimed at determining the effects and improvement of a program.[6]

Measurement and verification refers to "Data collection, monitoring, and analysis associated with the calculation of gross energy and demand savings from individual sites or projects. This function resides in PSE's EES program delivery and tracking activities. M&V can also be a subset of program evaluations.[7]

There are two key objectives of evaluations[8]:

- To document and measure the effects of a program and determine whether it met its goals with respect to being a reliable energy resource.
- To help understand why those effects occurred and identify ways to improve or discontinue current programs, and develop future programs.

Energy efficiency evaluations will develop prospective estimates of energy savings attributable to a program in a manner that is defensible in regulatory proceedings that are conducted to ensure that funds are properly and effectively spent. In addition, evaluation should go beyond documenting savings to actually improving programs and providing a basis for future savings estimates.[9]

Thorough evaluations result in programs that are more cost-effective and better managed.

There are two basic categories of evaluations, Outcome and Formative. The Outcome category includes Impact Evaluation, Cost Effectiveness Analysis and Market Effects Evaluation. The Formative category includes Process Evaluation, and Market Evaluation as defined below:

- **Impact Evaluations** determine the impacts (e.g., energy and demand savings) and co-benefits (e.g., avoided emissions, health benefits, job creation, energy security, transmission/distribution benefits, and water savings) that directly result from a program. Impact evaluations also support cost-effectiveness analyses aimed at identifying relative program costs and benefits.
- **Cost Effectiveness Analysis** is the exercise to determine the cost effectiveness of programs and measures from various viewpoints including Utility Cost, Total Resource Cost, Ratepayer Impact Measure and Participant Cost.
- **Process Evaluations** assess program delivery, from design to implementation, in order to identify bottlenecks, efficiencies, what worked, what did not work, constraints, and potential improvements. Timeliness in identifying opportunities for improvement is essential to making corrections along the way.

[6] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide, Appendix B: Glossary. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan
[7] Id.
[8] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide, page 2-1. Prepared by Steven R. Schiller, Schiller Consulting, Inc.
[9] Id.

- **Market Evaluations** are studies designed to assess ECM baselines and costs, market actor needs and preferences, free-ridership and spillover.
- **Market Effects Evaluations** assess transformation, or estimate a program's influence on encouraging future energy efficiency projects because of changes in the energy marketplace.

This Framework, and the industry as a whole, focuses on evaluations and the measurement and verification of demand and energy savings associated with specific programs. The results of impact evaluations will follow through to cost-effective analysis which is typically an extension of evaluation activities. Process and market evaluations are very important for prudent program management and will be performed to create best practice portfolio planning, and implementation. Process and market evaluations will accompany impact evaluations in all cases where such studies add pertinent value. Program evaluations will be planned on a four year schedule or cycle. Occasionally, special evaluation projects that may arise from regional or other interests will be interspersed within the four year cycle. The CRAG will be consulted on the development of this four year plan.

Transparency

Sound evaluation of energy efficiency programs requires transparency and independence. This results in high quality information on which business/policy decisions can be made. Within customer confidentiality constraints, output from any EM&V activity is available to PSE's external stakeholders.

As a means of facilitating transparency in its internal processes, the Company develops and maintains thorough documentation of its processes and related activities. PSE also follows the International Performance Measurement and Verification Protocol (IPMVP)[10] for program evaluations.

Budget

The EM&V budget includes reasonable costs for market, process, and impact evaluations including evaluations conducted both by internal PSE staff and by external evaluators. Allocation of annual EM&V budgets between market, process and impact analyses (and internal and external activities) will be described in each year's Annual EM&V Plan.

A full report on EM&V expenditures and activities for the prior year will be part of the Annual Report on Energy Efficiency Acquisition. This information will include a description of the EM&V studies completed and/or underway during the reporting cycle with reporting of the type of evaluations, whether they were conducted by internal staff or external evaluators, the program or programs studied, and the evaluation budgets and scopes.

Initiative 937 (I-937), the Energy Independence Act, and subsequent Commission Order in Docket No. UE-100177 call for budget requirements for evaluation of programs. PSE is committed to evaluation spending consistent with condition K(6)(f)(i).

[10] The International Performance Measurement and Verification Protocol, Volume 1 is available at: http://www.evo-world.org/ .

PSE is also committed to Condition Agreement K(6)(f)(ii) in documenting Programmatic M&V activities regarding policies, protocols, guidelines, processes, costs and consistency with regional peers.[11]

Goals, Priorities and Guiding Principles

PSE has committed to evaluate all major programs over a multiple year cycle. Program evaluations are expected to follow in that prescribed schedule. There may be deviations from this schedule as a result of new or changing programs or regional influences such a code changes or the advent of new technologies that may need evaluation support in any given year. PSE will keep the CRAG informed of upcoming evaluation projects as changes to the schedule arise.

The goal of evaluation planning is to spend the least money necessary in order to adequately ascertain the best value savings estimates and mitigate the risk of either under or over-reporting savings. Evaluation planning identifies the types of evaluation information that is crucial to different stakeholders. The Company intends to prioritize EM&V resources based on consideration of the following issues:

- Size of the project or program: (e.g. a site-specific project with an incentive payment over $50,000.00 or a prescriptive program that provides more than 25% of the savings for a particular sector would increase the EM&V prioritization);
- Uncertainty regarding the results: Resource characteristics that are known within relatively tight confidence intervals are less of a priority for EM&V efforts than those that are relatively uncertain. For instance the certainty of a hard wired measure change may be high for the kW reduction effect but may be low for the hours of operation variable;
- Criticality of the resource characteristic: The sensitivity (or insensitivity) of a resource characteristic to particular factors like load, operating hours, operating time, weather, or seasonality of operation can be important considerations;
- Impact upon regulatory processes or regulatory oversight: Information necessary for regulatory oversight will receive a higher EM&V priority than information that is not necessary for that purpose, all else being equal;
- Timing: Information that would have value in improving an ongoing program would have higher precedence;
- Cost of measurement: Cost of EM&V should be optimized. Alternative approaches should be considered when the value of incrementally better data is less than the cost of that data; and,
- Timeliness is an important consideration for planning evaluations. EM&V should be undertaken in a manner that is designed to provide important information in a timely fashion for regulatory reporting, program planning and/or improvement, and other needs.

External evaluators will often be retained to perform impact evaluations. These evaluations will be performed such that, over a four year EM&V cycle, all major programs are covered as stipulated in Condition. K. 6 (f). External consultants may also be retained to evaluate PSE's EES program processes and market conditions.

[11] See Attachment 2: Energy Efficiency Services M&V Structure

In addition, when choosing and planning evaluations the following guiding principles will be taken into consideration:

- Leverage secondary research as appropriate with modifications as deemed (UES) necessary and useful;
- Expert review of evaluation design throughout the planning and implementation of these activities;
- All key assumptions used by program planners will be documented and eventually verified in evaluations;
- The procurement process used to select evaluation contractors is timely, flexible and transparent;
- Prioritize evaluation dollars and efforts on areas of largest savings and/or greatest uncertainty; and,
- Over time, evaluations are used to refine input assumptions used in savings estimation and resource analysis in order to improve program delivery.

Captured Data/Metrics

Critical portfolio metrics to be evaluated are as follows:

Annual energy acquisition, gross kWh and therms, to include, where possible and necessary, load shape, system and customer capacity, system coincident kW, measure life, non-energy benefits, energy savings degradation, existing conditions;

Costs and benefit data for cost-effectiveness analyses including total ECM cost, incremental ECM cost; and,

Other metrics or combinations as requested by the UTC, such as:

- Market characterization and transformation attributes for measures and programs that may include, but are not limited to, product price and availability, trade ally assessments, market saturation, customer satisfaction, customer participation, incremental costs, and the effects of codes, standards and prices; and,
- Other information necessary for portfolio management including technology assessments, measure persistence, lost opportunities, geographic equity, customer class equity, budget targets, targets per customer class, number of customers served, and information useful for system planning.

Evaluation Cycle

As described in this EM&V Framework, PSE will perform EM&V annually on a four year schedule of selected programs such that all major programs are covered appropriately over time, in accordance with condition K. 6 (f). Following on page 9 is the hierarchy of documents outlining planning steps for each evaluation cycle (see Figure 1, page 9).

- EM&V Framework – This document is designed to remain in place until superseded by regulatory modifications or changed by CRAG processes.

- The Annual Conservation Plan will include an "annual EM&V Plan" section[12] indicating which major evaluation activities (e.g., updating baselines, updating deemed (UES) savings values and describing planned program evaluations) will be conducted during the year, including the specific budget and allocation between programs, measures, segments, and jurisdictions as applicable, and a current 4-year evaluation schedule (See Appendix 1, the draft 2012 EM&V plan).
- The Annual EM&V Plan will include where feasible input from other regional parties such the RTF, NEEA and others that are conducting EM&V activities to coordinate and collaborate in evaluation activities.
- The annual EM&V Plan[13] ("Exhibit 6" in the Annual Conservation Plan) will include summaries of each scheduled evaluation activity, whether the activity will be performed by an external evaluator or PSE's internal evaluation team, and details regarding the evaluation goals, scope, level of effort, budgets as well as the general approaches to be utilized for conducting impact, process, market and cost-effectiveness evaluations. PSE will work closely with the CRAG on the development of the annual EM&V plan.
- Research Plans – Also referred to as Scopes of Work will be created for each EM&V project planned in a given cycle (impact, process and market effects evaluations). New DSM programs will include a research strategy at launch of the program. The research strategies will address issues related to evaluation metrics and the level of effort, budget, baselines, approaches, sample designs, certainty and reporting expectations associated with individual evaluation activities.

Figure 1 on the following page illustrates EM&V planning cycles and documents.

[12] In even-numbered years, the Evaluation Plan included with the Annual Conservation Plan will focus on a complete two-year cycle, with the addition of annual budgets. In odd-numbered years, the Annual Evaluation Plan will be a separate document and cover only the odd-numbered year, as evaluation priorities and needs are updated over time.

[13] The 2011 Annual Conservation Plan provided only the 2011 Evaluation Plan, as the EM&V Framework was in development at the time of the filing.

Figure 1: EM&V Planning Cycles and Documents

	EM&V Framework*	Annual EM&V Plan	Planning and Oversight Documents for Specific EM&V Activities
Document(s)	EM&V Framework	Included as a section in PSE's Annual Conservation Plan	Program Performance Reports Measure Metrics Database Work scopes Research Plans Key issues requiring oversight Draft and Final Reports EM&V Protocols
Contents	The overall structure and process for EM&V Objectives and Principles Baseline Definition Evaluation Approaches Certainty External Evaluation	EM&V activities proposed for a given cycle: High level description of each major scheduled activity summarizing: Scale Scope Methodology Budgets Schedule Summary of EM&V-based program changes	Details regarding specific EM&V projects or activities including impact, process, market and planning studies. Measure Metrics will provide current and historical savings, measure costs and measure life values. Custom and the majority of calculated measure values will be individually calculated at a project-level basis and will be referenced as applicable.
Schedule	The Framework remains in place indefinitely, but may be updated as needed	Prepared annually, submitted with the Annual Conservation Plan by November 1 of each year.	Prepared for each significant EM&V activity and/or prepared as a resource document
Reviewers[14]	CRAG	CRAG	CRAG
Filed with Commission[15]	Yes	Yes	No

[14] of the above listed document
[15] See Figure 4 on page 25 for more details on roles and responsibilities

Impact Evaluation Methods and Key Assumptions

An Impact Evaluation is designed to measure the directly induced changes in energy and/or demand usage attributable to an energy efficiency program. This section describes PSE's considerations when planning and conducting an impact evaluation.

Ex-Ante versus Ex-Post

Impact evaluations focus on estimating the amount of energy and demand savings the program actually creates. Estimates of actual savings are ex-post[16] savings, program savings that can be documented after program implementation. The initial design and review of prospective programs will be based upon ex-ante savings[17], the savings that are *expected* to be delivered by the program. After implementation of the program, annual savings are based on ex-post evaluations, the estimated energy savings that are actually caused by the program. These savings may change over time. Ex-post savings, documented via an impact evaluation, can vary significantly from projected ex-ante savings.

To capture ex-post savings estimates in the most consistent and informative way, PSE seeks to assess ex-post savings estimates based on conditions at the time of ex-ante savings calculations, as well as observed at the time of the evaluation. This methodology allows for best assessment of various factors affecting measure persistence. Over time, impact evaluations will help refine ex-ante savings estimates to improve their accuracy.

Evaluation Standards

The primary purpose of impact evaluations is to obtain the most accurate and unbiased estimate of energy and demand savings due to a program. The Company's specific evaluation methods will be founded on industry best practice, based on applicable industry reference documents (e.g., NAPEE Guide, IPMVP). PSE will observe the following principles in its oversight of impact evaluations:

- Evaluators should be impartial in their work and not have their compensation tied to evaluation results.
- Evaluators are expected to follow ethical guidelines (as documented in the American Evaluation Association's Guiding Principles for Evaluators, which call for: systematic inquiry, competence, integrity and honesty, respect for people, and responsibility for general and public welfare.)[18]
- Transparent methods to estimate savings and impacts will be reviewed in various forums to increase quality and reliability. These include: CRAG, RTF, NWRG, and similar forums which will be used to review methods and results.
- All key assumptions used by program planners are eventually verified in evaluations.
- Majority of evaluation dollars and efforts are in areas of greatest importance or uncertainty.

[16] ***Ex-post* evaluation estimated savings:** Savings estimates reported by an evaluator after the energy impact evaluation has been completed. (From Definitions section)
[17] ***Ex-ante* savings estimate:** Forecasted savings used for program and portfolio planning purposes. (From Definitions section)
[18] American Evaluation Association (AEA), Guiding Principles for Evaluators, http://www.eval.org.

Approaches for Estimating Savings

Impact savings will be estimated using one of the following approaches:

Measurement and verification (M&V) - Four IPMVP options, A, B, C and D are used to estimate savings from selected projects and the resulting savings may be applied to an entire population or program using statistical analyses.

Statistical analyses of large volumes of metered energy usage data. (e.g., billing analyses)

Deemed (UES) Savings – use of an estimate of savings developed by data sources and analytical methods that are widely considered acceptable in the industry (as documented for example by the Regional Technical Forum or in PSE's Measure Metrics Database. This approach is only valid for measures with fixed operating conditions and proven history of substantiated evaluations.

Irrespective of which of the above approaches are utilized for EM&V, all measures will be available for inspection by external evaluators to confirm their installation. In some cases measures will be inspected to confirm that they were not only installed, but also installed per specification and that they are properly operating. Also, in some cases, such as large-scale custom measures/projects, baseline inspections will also be conducted.

Baseline

Baseline is a reference to existing energy use conditions that would have occurred without implementation of an energy efficient project or program. This may include standard practice, business-as-usual or code conditions. Baseline energy use values are key to a reasonable quantification of energy savings during a particular period as both codes and standard practices evolve over time.

Gross savings are estimated by comparing energy use and demand after a program is implemented (the reporting period) with what would have occurred had the program not been implemented, i.e. the baseline. A common set of conditions (e.g., weather, operating hours, building occupancy) are used for estimating gross energy savings. These conditions are then adjusted so that only program effects are considered when determining savings.

Considerable care needs to be taken in determining the baseline used for impact evaluations. The baseline is key to estimating the savings achieved. Evaluators will use or determine baselines based on common practice, or codes and standards. Baselines can be defined as follows:

- Project-Specific Baseline: defined by specific technology or practice that would have been pursued, at the site of individual projects if the program had not been implemented which tends to be existing equipment for early replacement programs.
- Performance Standard Baseline: defined to avoid project specific determinations, and tends to be codes, standards, or common practice instead of trying to ensure the overall addition of quantified energy and demand savings, and/or avoided emissions.[19]

[19] Schiller Consulting

- PSE will include baseline information in the detailed impact evaluation research plans as well as for deemed (UES) savings values for prescriptive measures.
- PSE will follow the methodology outlined in the Guidelines for the Development and Maintenance of RTF-Approved Measure Savings Estimates as it relates to baseline for Deemed (UES) and Standard Protocol Measures.

Uncertainty

Uncertainty is defined for our purposes as the range or interval of doubt surrounding a measured or calculated value within which the true value is expected to fall within some degree of confidence.[20] EM&V resources will be deployed in a manner that provides the best value in terms of information that is required for oversight, market assessment, and program targeting, improvement, and planning. The level of investment put towards evaluation usually has a direct correlation to the amount of certainty achieved. One of the trade offs in evaluations is thus between the costs expended and the uncertainty level. Results from an evaluation will be reported with the level of uncertainly or error rate defined and explained. There are two types of errors, systematic and random, which are described below:

Systematic errors are those that are subject to decisions and procedures developed by the evaluator and are not subject to "chance." These include:

- Measurement errors, arising from meter inaccuracy or errors in recording an evaluator's observations;
- Non-coverage errors, which occur when the evaluator's choice of a sampling frame excludes part of the population;
- Non-response errors, which occur when some refuse to participate in the data collection effort; and,
- Modeling errors, due to the evaluator's selection of models and adjustments to the data to take into account differences between the baseline and the test period.

Random or Sampling errors[21], those occurring by chance, arise due to sampling rather than taking a census of the population. In other words, even if the systematic errors are all negligible, the fact that only a portion of the population is measured will lead to some amount of error. Random errors are sometimes called sampling errors.

Evaluators are expected to control for systematic error through best practices and control random error by striving for a 90/10 confidence and precision level (using a two-tailed test[22]) and requiring an 80/20 confidence level if sampling requirements can be shown to be unrealistic. Deviations from these specifications may be permitted with justification and review by the CRAG. The Evaluation report will discuss all aspects of uncertainty and the decision process that determined sample size and confidence/precision level achieved.

[20] Id
[21] Id
[22] Two-tailed tests require larger sample sizes than one-tailed tests as assessing two directions at the same time requires a greater investment. A one-tail test can be used only when there is strong proof that it is appropriate to do so, e.g., only ensuring that values of concern are not over estimated, versus under-estimated, is important.

Persistence

Persistence is how long the energy savings are expected to last once an energy efficiency activity has taken place.[23] A component of an impact evaluation should consider whether the savings from the project change over time. These changes can be attributable to retention and performance degradation.[24] Effective useful life (EUL) or Measure Life is a term often used to describe persistence. EUL is an estimate of the median number of years that the measures installed under a program are still in place and operable.[25]

In most cases, persistence of savings will be determined using historical and documented persistence data, such as manufacturer's studies or values contained in the Regional Technical Forum database. However, if deemed (UES) necessary, PSE may also utilize laboratory and field testing of the performance of energy-efficient and baseline equipment, field inspections over multiple years, and/or other various methods such as telephone surveys and interviews, analysis of consumption data, or use of other data (e.g., data from a facility's energy management system).

Net Savings

Net Savings is recognized in the industry as Gross Savings minus free-riders plus spillover. Free-riders are customers who would have installed the efficient measure or changed a behavior regardless of a program's incentive. Spillover is reduction of energy consumption caused by the presence of an energy efficiency program, beyond the program-related gross savings of participants influenced by incentives. There can be participant spillover and non-participant spillover. Non-participant spillover is defined as savings from efficiency projects implemented by those who did not directly participate in a program, but which nonetheless occurred due to the influence of the program. Non-participant spillover may be prohibitively costly to estimate. Participant spillover is defined as additional energy efficiency actions taken by program participants as a result of program influence, but actions that go beyond those directly subsidized or required by the program. Though spillover is a positive influence of a program, high levels of free-ridership in a program may not be desirable if incentives are not applied equitably.[26]

Consistent with condition K(10)(c), PSE does not estimate net savings for a program or portfolio since the Net-to-Gross ratio is set at 1.0 for cost effectiveness analysis. However, the Company will examine program spillover and free-ridership when it is feasible to do so, for program design purposes.

Free-ridership and spillover may be determined using one or more of the following approaches:

[23] Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan

[24] Market progression is when the rate of naturally occurring investment in efficiency increases and can be considered to erode the persistence of earlier first year savings. An example of a cause of market progression is energy price effects—higher energy costs resulting in higher levels of efficiency. Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan

[25] Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan

[26] There may be cases were a high rate of free-ridership may be warranted if the case can be made that the program is having a positive effect in transforming the market.

- Self-reporting surveys in which information is reported by participants or non-participants without external verification or review[27]
- Enhanced self-reporting surveys in which self-reporting surveys are combined with interviews and documentation review and analysis
- Statistical models that compare participants' and non-participants' energy and demand patterns
- Customer adoption models applied to specific markets

[27] Self-reporting surveys have been shown to be inaccurate in identifying Free-Ridership. Enhanced Self-Reporting Surveys are preferred.

Cost Effectiveness

PSE's cost-effectiveness evaluations compare program (and portfolio) benefits and costs, showing the relationship between the value of a program's outcomes and the costs incurred to achieve those benefits. The findings are used to help program manager's judge whether to retain, revise, or eliminate program elements and provide feedback on whether efficiency is a wise investment as compared to energy generation and/or procurement options. PSE cost-effectiveness calculations are consistent with conditions K(10)(a) and K(10)(b), including methodologies and definitions contained in the NAPEE document Understanding Cost Effectiveness of Energy Efficiency Programs[28].

A primary test for the UTC is the Total Resource Cost (TRC) test as modified for electric programs by the Northwest Power & Conservation Council. The TRC test measures the net costs of an EES program as a resource option based on the total costs of the program, including incremental measure cost[29] and the utility's non-incentive costs to deliver the program. The TRC ratio equals the benefits of the program, in terms of value of energy and demand saved plus non-energy benefits, divided by the costs to obtain the energy or demand savings. The Company calculates the ratio on a life-cycle basis considering savings and costs that accrue over the estimated lifetime of installed energy efficiency equipment and systems. PSE also calculates the Program Administrator Cost test (PACT), also known as the Utility Cost (UC) test, Participant Cost (PCT) test, and Ratepayer Impact Measure (RIM) test. The four tests are illustrated on the following page in Figure 2 with their costs and benefits listed.

[28] National Action Plan for Energy Efficiency (2008). Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers. Energy and Environmental Economics, Inc. and Regulatory Assistance Project.

[29] Other costs such as tax credits are transfer costs as are incentives, and not included the TRC test.

Figure 2: Cost-Effectiveness Tests

	TRC	PACT or UC	PCT	RIM
Avoided Costs	Benefit	Benefit		Benefit
Customer Bill Savings			Benefit	Cost
10% Power Act Credit	Benefit			
Quantified Non-Energy Benefits	Benefit			
Un-quantified Non-Energy Benefits	Benefit (some cases)			
Incremental Measure Cost	Cost		Cost	
Program Overhead Cost	Cost	Cost		Cost
Incentive Cost		Cost	Benefit	Cost

Source: NAPEE (2008), Understanding Cost-Effectiveness of Energy Efficiency Programs, Table 3-2, with addition of Power Act Credit for TRC

Process, Market and Market Effects Evaluations

Process, Market, and to a lesser extent Market Effects Evaluations may encompass all rider or tracker-funded programs and activities whether PSE claims energy savings or not. For example informational programs may need examination to determine and guide overall effectiveness, and ensure customer value and satisfaction.

Process Evaluations

Process evaluations of the Company's EES programs will involve systematic assessments of programs or internal operations for the purposes of documenting program operations at the time of the examination, and identifying and recommending improvements to increase the program's efficiency or effectiveness for acquiring energy resources while maintaining high levels of participant satisfaction. The primary mechanisms used for process evaluations are data collection via surveys, questionnaires, and interviews to gather information and feedback from administrators, designers, participants (e.g., facility operators or residential customers), implementation staff (including contractors, subcontractors, and field staff), and key policy makers. Other elements of a process evaluation can include creation or updating program theory and logic models, process mapping, workflow and productivity measurements, reviews, assessments, and testing of records, databases, program-related materials, and tools.

Market Evaluations

Market evaluations are systematic assessments of changes in the structure or functioning of a market, or the behavior of participants in a market, that result from one or more program efforts or due to other factors. Market evaluations will usually consist of surveys, reviews of market data, and analysis of the survey results and related data. These studies may focus on estimation of measure costs, assessment of baselines and market potentials, and requirements of market actors that are key to program delivery.

Market Effects Evaluations

Market Effects Evaluations are designed to assess market transformation, or estimate a program's influence on encouraging future energy efficiency projects because of changes in the energy marketplace. These studies may rely on surveys and interviews with upstream market actors, or track sales or retail stocking practices.

Deemed (UES) Measures

PSE developed the Measure Metrics archival system in 2008 in order to have available all relevant measure information for prescriptive or deemed (UES) and calculated measures in a central, easily-accessible location. Archived information includes, but is not limited to measure life and cost, engineering assumptions, incentive amount, calculation type and savings value. The system allows authorized EES staff to view a single measure's detail, a program's portfolio of measures, measures by fuel type or a complete list of EES prescriptive measures, also referred to as deemed (UES) measures.

The UES method is appropriate for measures whose unitized savings, e.g., savings per lamp or motor, is stable (both the mean and variance) and can be reliably forecast through the period defined by the measure's sunset criteria. The UES method reduces program delivery cost by simplifying the data that must be collected. Programs are only required to collect a verified count of delivered units, plus the information needed to assign a specific application of the measure, e.g., single family residence with forced air furnace west of the Cascades, to the correct UES. Delivery is defined by the specification of each measure and its specific applications. Total savings is the UES multiplied by the number of delivered units.[30]

There are clearly defined protocols for revising deemed (UES) measures, creating new deemed (UES) measures and retiring deemed (UES) measures. Each deemed (UES) measure must be accompanied by a business case, a source of savings outline, a complete analysis or substantiation of its savings value, its measure cost, and estimated life.[31]

Whether reviewing its electronic or hard-copy version, authorized staff will have access to the same set of information. When a user is viewing electronic files, the most up-to-date data is displayed. Hard copy files contain all information, going back as far as possible for the measure's existence.

Measure Metrics will contain two general categories of information:

- RTF Deemed (UES); prescriptive savings whose values have been evaluated and deemed (UES) by the Regional Technical Forum
- PSE Deemed (UES); Prescriptive savings who values may be based on:
    - RTF values and adjusted for specific PSE service territory characteristics based upon reliable data sources.
    - Engineering studies and impact evaluations
    - PSE impact evaluations

Specific predetermined ex-ante savings estimates – When such values can be defined with sufficient certainty, energy savings and demand reductions values and calculation assumptions for specific natural gas and electricity efficiency measures. Examples would be PSE's prescriptive residential gas furnace program or residential CFL indoor

[30] Guidelines for Development and Maintenance of RTF Savings Estimation Methods, Regional Technical Forum, June 1, 2011.

[31] See Attachments 4 through 7 for documents pertaining to Measure Metrics processes and standards. These attachments describe who is authorized and how the Measure Metrics Database is updated.

lamps. This category is further divided into RTF Deemed (UES) and PSE Deemed (UES) measures.

- RTF deemed (UES) measures are those that are substantiated by RTF calculations. Where applicable, PSE will utilize this measure category as the default for prescriptive measures.
- PSE deemed (UES) measures are those that are substantiated by Impact evaluation studies or engineering calculations that meet generally accepted industry standards. PSE deemed (UES) measures may have some basis in RTF deemed (UES) measure calculations. For instance, installation rates for showerheads, as determined through customer surveys, may be different in PSE's Service territory[32] than in other northwest states. Therefore, as appropriate PSE may elect to adjust an RTF value in order to develop a PSE deemed (UES) savings, based on an impact evaluation study or engineering calculation.
- Provisional status of a measure is recognized by the RTF to denote a measure for which the energy savings, though highly likely, is not known with confidence. PSE will recognize such measures and comply with RTF Guidelines regarding the qualification and requirements of provisional status.

Evaluation documents that support PSE assumptions. Documents include:

- Evaluation studies; either conducted by PSE evaluation staff or external evaluators.
- Evaluation Report Responses, which are used to ensure that evaluation studies result in some Measure Metrics notation; either an energy savings, incentive or delivery adjustment, or no adjustment at all.[33]

Measure data included in the Measure Metrics system may consist of:

- Descriptions of the base efficiencies, which may include engineering and/or industry-level engineering assumptions and applicability conditions;
- kWh or therm savings;
- Hours of operation;
- Measure life;
- Incentive level (as applicable) for which eligible customers may qualify;
- The measure's description as it appears in PSE's Exhibit 4; The EES List of Measures, Incentives and Eligibility;
- Information required for cost-effectiveness tests including incremental measure costs, simple payback period, etc.

External evaluators may review the data in the Measure Metrics system during the initial evaluation cycle covered by this EM&V Framework, and periodically thereafter as determined by EM&V priorities outlined in PSE's Annual EM&V Plans.

[32] "2008 Shower Head Installation Rate Report," Bobette Wilhelm, author.
[33] See Attachment 4: Guidelines for Evaluation Study Follow-up, Version 2.0

Standard Protocol Measures

A standard protocol method is appropriate when savings from a measure are widely varying but can be determined by a standardized procedure for data collection and analysis that is applicable to many different end-use sites. Standardization of data collection reduces cost by eliminating or minimizing the need for site-specific measurement planning. Standardization of the analysis procedure also reduces the planning burden and ensures uniform quality in the analysis product.

Standard protocols support estimation of savings for a measure at specific end user sites. The extent of data collection and analysis required by the protocol is the minimum level needed for reliable savings estimation. Standardization of data collection reduces cost by eliminating or minimizing the need for site-specific measurement planning. Standardization of the analysis procedure also reduces the planning burden and ensures uniform quality in the analysis product. Standardization reduces the skill level needed to reliably estimate savings.[34]

Provisional Measures

There is a fourth measure category referred to by the RTF as Provisional[35]. Rather than a measure category, it is more a transitory condition of a measure likely to become an active Deemed (UES) Measure or a Standard Protocol Measure. Provisional savings estimation methods are those which PSE approves with special conditions requiring the collection of data from all or a sample of specific measure applications. These data are used by PSE to improve the reliability of the savings estimation method. PSE may or may not claim savings from a measure under provisional conditions.

[34] Guidelines for Development and Maintenance of RTF Savings Estimation Methods, Regional Technical Forum, June 1, 2011.
[35] Id.

Custom Measures

Custom measures are those which do not fit the "deemed (UES)" or "calculated" measure categories. Ex-Ante savings estimates are based on rigorous engineering protocols. Custom measures are not currently documented in Measure Metrics.

Characteristics of Custom Measures

Custom protocols are appropriate for measures that require site-specific data collection and analysis in order to develop a reliable estimate of savings.[36] Site-specific conditions are unique to each site, and highly variable from site to site. Often Custom Measures are complex (e.g. includes multiple components of a system; a project may include multiple systems or may interact with other systems; a project may save both electricity and gas; etc.)

Developing a Site-Specific Business Case for Custom Measures (Project Scope)

The Project Description typically includes:

- General site information and background sufficient to put project into context
- Detailed proposal from customer and/or contractor
- Initial site inspection or audit collects relevant baseline data and/or verifies existing conditions represented by contractor and/or customer (e.g. observations, short-term measurements of loads, run-time, trend logs, sketches & photos, etc)
- Clear description of Baseline condition and Proposed Measure(s)
- Relevant discussions: e.g. custom calculation approach, Energy Code requirements, unique site-specific considerations, etc.
- Summary of key results and metrics (savings, incentive amount, measure life, load shape, measure cost, TRC, baseline energy use, % savings, payback)

Custom Ex-Ante (forecasted) Energy Calculations must use generally accepted engineering protocols. Project Cost is typically based on the contractor's bid. The business case must also include an incentive calculation and cost effectiveness discussion, and a custom M&V Plan. A QC Review by a senior-level engineer is required for all custom measures.

Available Documentation

Available documentation of Custom Measures and Projects includes:

- Scope of work (i.e. Business Case)
- Customer SYstem solutions (CSY) (or service provider equivalent) log sheet
- Incentive calculation
- Detailed energy calculations

[36] Guidelines for Development and Maintenance of RTF Savings Estimation Methods, Regional Technical Forum, June 1, 2011.

- Measure cost documentation
- Measure details (detailed contractor proposal, product specifications, etc.)
- Customer billing history
- Post construction verification of the installed measure, including re-calculated savings if actual project or equipment-related conditions are different than previous ex-ante savings assumptions
- Project invoices and payment request

Data Management[37]

EES employs a combination of proprietary and licensed software applications to accumulate, validate and report financial and energy savings figures with a high degree of integrity and accuracy. Some are used strictly for Residential Sector reporting, others are primarily Business Sector focused. The EES Residential tracking database also maintains information on some Business measures, used by multifamily projects. Corporate systems, such as SAP, are used for all financial activity within the department. All come into play, though, when EES presents data to its stakeholders.

The descriptions provided below and the diagram, Figure 3 on the page 25, provide background on what the systems do, how they assemble data and how the data is processed to the resulting reports. It is important to note that many business tools; spreadsheets, flowcharts, checklists, etc., utilized by individual programs or EES staff members which feed some of those listed here are not outlined in this document.

SAP (Systems, Applications, and Products in Data Processing) – SAP is a large multinational software development and consulting corporation located in Germany. The PSE SAP system is used mainly for HR, Contracting, inventory control and General Accounting. EES interacts with the system thru timesheets, contract/invoicing, and by assigning costs against order numbers. Program costs are tracked and reported from SAP.

CLX (Customer LinX) – A proprietary system used for managing customer billing information, meter data (meter readings, ID numbers, structure history, etc.) and tracking outages. The CLX data is saved in a business data warehouse to allow for information transfer to other systems. CSY and CMS pull customer usage data and basic account information (name, address, account number) from the data warehouse. CLX is the source for energy consumption data that is often used for evaluation of program energy savings.

CSY (Customer SYstems solutions) – A PSE-created system with two distinct functional areas: Custom Grant Programs and Customer Rebate Programs. The system is used to track the status of Custom Grant Projects (from initial estimates, Grant Agreement and Final Payment), and to send payment request information to SAP. Payment information includes custom grants and rebates; both prescriptive and calculated for both EES sectors (Residential and Business). Inherent in CSY are metrics such as project and measure energy savings claimed, measure costs and measure lives. Reports from CSY quantify energy savings, measures costs and measure lives of installed measures by program. Most of the commercial measures are tracked in CSY. Some residential measure rebates are tracked in CSY.

CMS (Customer Management System) – EES Customer Management System is the primary interface for fulfilling and tracking customers' interactions with EES residential programs and services. Modules include: Literature & Rebate Fulfillment, Contractor Referrals, Rebate qualifying and processing and EES Inventory Management. CMS is used to track and report the bulk of residential measures rebated by program as well as some commercial measures.

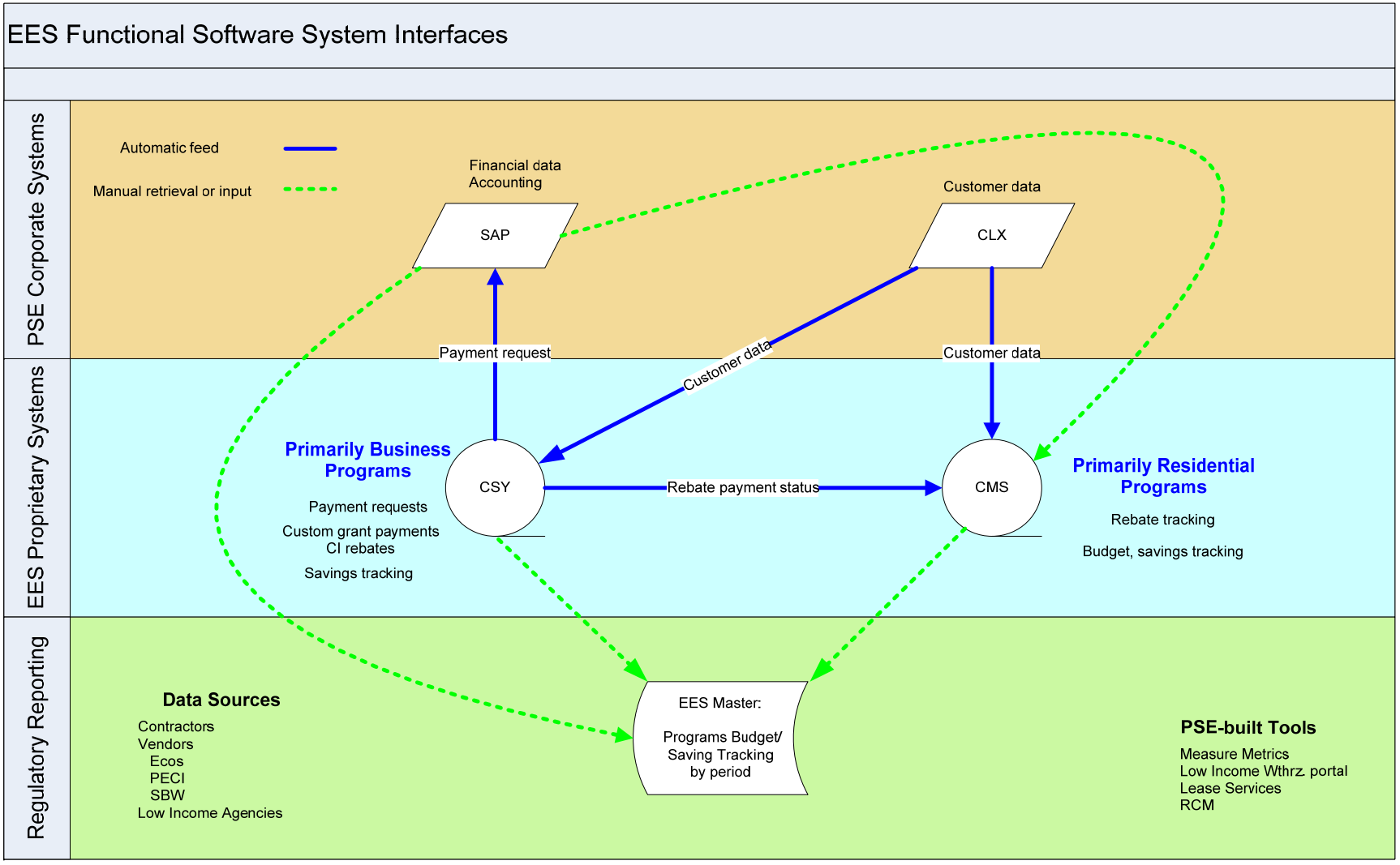
[37] For Guidelines for Ensuring the Accuracy of Electric and Gas Savings Claims see Attachment 8.

EES Master – Compiles all savings and all financial data relative to EES operations in both sectors (Residential and Business). It generates all periodic reports; internal and regulatory.

Measure Metrics Database – This database tracks the development, implementation, life cycle, sunset and retirement of Energy Conservation Measures (ECM). Measure Metrics is the foundation of EES Deemed (UES) ECM savings claims. It is EES's means of documentation for energy savings justifications for Deemed (UES) ECMs. It also tracks an ECM's cost, life and history of revisions. One important distinction is that the system does not track cumulative savings and program costs; only the basis for prescriptive and calculated measures.[38]

[38] See Attachments 4 – 7 for documents pertaining to Measure Metrics processes and standards.

Figure 3: EES Tracking and Reporting Interface



Roles and Responsibilities for Conducting and Managing EM&V

Overall EM&V work will be conducted both by the internal PSE evaluation team and external evaluators. External work is defined as work performed by entities outside of PSE. The implementation team is defined as anyone at PSE who has acquisition of energy efficiency targets incorporated into their performance appraisal or goals. The PSE evaluation team does not have the achievement of energy savings goals as part of their performance goals. The PSE evaluation team will normally engage external evaluators to perform program evaluations. Evaluation projects often involve scopes of work beyond what the Internal PSE evaluation team can reasonably perform in a timely manner. External evaluators may also provide specialized skills required to complete a project. Further, external evaluators may help alleviate perceived bias in assessing program performance.

Roles of External and PSE Evaluators, and PSE Implementation Staff

In general, work done for PSE EM&V falls into three categories:

PSE Implementation Team

- Ex-ante savings site estimates
- Reported savings estimates
- Process tracking
- Data management
- Redacting customer information from reporting
- Verification for purposes of incentive payments or program reporting
- Assessment of evaluation findings and documentation of resulting program changes in an Evaluation Report Response document that is attached to the evaluation report[39]

PSE Evaluation Team

- Impact evaluations to determine ex-post evaluated savings and prepare cost effectiveness analysis; determine realization rates
- Verification activities
- Review of EM&V plans
- Design of RFP's for external evaluators
- Preparation of evaluation reporting
- Internal process and market evaluations
- Project management of external evaluators
- Initiation of the Evaluation Report Response process at the completion of the evaluation report.[40]

[39] See Attachment 3 for Guidelines for Evaluation Study Follow-up.

External Evaluators

- Impact evaluations to determine ex-post evaluated savings and prepare cost effectiveness analysis; determine realization rates
- Verification activities
- External process and market evaluations
- Review of internal analysis and evaluations
- Program or Portfolio level energy savings verifications
- Establish and report realization rates
- Review of Measure Metrics (M:M) database and M:M updates as needed.

Optional Peer Review – Selected Regional Utilities, NEEA, RTF, ETO, NWRG, etc.

- Review of Evaluation methodologies
- Review of M&V Plans as necessary
- Review of RFP plans as necessary
- Review of M:M and M:M updates as needed.

Management of External Evaluators

The following processes will be used to select and manage external evaluators:

External evaluators may be chosen by the PSE Evaluation Team.

PSE's Evaluation Team may serve as the day-to-day project manager for external evaluators.

Members of the CRAG may express interest in decisions regarding particular EM&V projects, or may elect to receive updates at regular CRAG meetings. Members seeking involvement with certain EM&V activities must provide timely review and feedback in accordance with EM&V schedules and timelines.

Completed evaluation reports and their completed Evaluation Report Reponses (ERRs) will be available to the CRAG at any time. Evaluation Reports and ERR completed in each calendar year will be attached to the Annual Report for that year.

External Review and Oversight

External review serves to ensure that the EM&V process is thorough, transparent, and conducted according to the proper standards. PSE relies on the CRAG for external review, and will seek additional review from the RTF, Northwest Energy Efficiency Alliance (NEEA), the Northwest Research Group and other peer reviewers as appropriate. PSE's CRAG will advise the Company on the topics described below.

Development and modification of protocols to evaluate, measure, and verify energy savings in PSE's programs.

Guidance to PSE regarding savings estimates in the M:M, including methodology inputs and calculations for updating cost-effectiveness.

[40] See Attachment 3 for Guidelines for Evaluation Study Follow-up.

Consideration of the need for tariff modifications or mid-course program corrections.

Review appropriate level of and planning for:

- Marketing conservation programs.
- Incentives to customers for measures and services.

Consideration of issues related to conservation programs for customers with limited income.

Comparing program achievement results with annual and biennial targets.

Review of energy efficiency program budgets and review of actual expenditures compared to budgets.

The CRAG will meet “in-person” twice annually, and four times annually overall. Any member may request an additional meeting of the CRAG with reasonable notice. The CRAG will make recommendations to PSE concerning the Company’s specific EM&V plans, custom and prescriptive efficiency programs, including confidence and precision levels, sampling plans, timeline, and overall approach. The CRAG will review and advise PSE on deemed (UES) savings estimates and/or parameters and calculation methodologies included in Measure Metrics, and may review and comment upon savings claims and other EM&V results prepared by PSE and/or external evaluators..

Figure 4; Roles and Responsibilities

Roles and Responsibilities for PSE Staff, CRAG, External Evaluators, Washington Utilities and Transportation Commission, and Peer Reviewers

X - Responsible for party to do O – Optional for party to do per PSE request

Task and/or Deliverable	Puget Sound Energy	CRAG	External EM&V Evaluator	Peers (e.g. Avista, PacificCorp, Idaho Power, NEEA, ETO, NWRG, RTF)
EM&V Framework				
Prepare initial EM&V Framework	x			
Review initial EM&V Framework	x	x	x	o
Update EM&V Framework as needed	x			
Review updates to EM&V Framework as needed			o	
File EM&V Framework with WUTC	x			
EM&V Plans				
Prepare EM&V Annual Plan	x		o	
Review EM&V Annual Plan	x	x		
File EM&V Annual Plan with WUTC	x			
Measure Metrics Database				
Prepare initial extract of Measure Metrics data	x			
Review Measure Metrics as needed	x	x	x	o
Update Measure Metrics	x		o	
Review updated Measure Metrics data	x	x	o	o
EM&V Reports				
Process, Market & Impact reports	x		x	o
Review Summary Reports	x	x	x	
File Annual Conservation Report with WUTC	x			
EM&V Planning				
Internal Program Evaluation Scopes of Work	x	x		o
Process, Market, & Impact evaluations	x		x	o
Process, Market & Impact review	x	x		o

Reporting Cycles and Schedule

The program implementation cycle operates on a calendar year basis, from January 1-December 31 each year. Figure 5, below, indicates a preliminary reporting schedule. A final schedule with contents of each report will be reviewed with the CRAG as part of their review of the Annual Plan.

Figure 5: EM&V Reporting Schedule (as of August 9, 2011)

Report	Description	Distribution Date	Distribution List
Annual Conservation Action Plan	Forward looking. Program-level expected savings, adjustments, major changes, EM&V (PSE *ex-ante* forecast)	November 1: CRAG presentation December 1: UTC filing	CRAG, UTC,
Annual Conservation Report	Backward looking. Reported Program level savings, adjustments, changes, comprehensive report on EM&V activities of the prior year (PSE *ex-post* reported savings)	February 15: Filing	CRAG, UTC,
Tariff Changes	Request any Cost Recovery Tariff changes with an effective date of May 1st	March 1: Filing	CRAG, UTC
Semi-annual Conservation Acquisition Report	Midyear acquisition report comparing actual to budgeted savings values	August 15: Filing	CRAG, UTC
Biennial Conservation Plan	A Biennial Conservation Plan including revised program details and program tariffs, together with identification of the 10 year achievable conservation potential, by November 1, starting in 2011, requesting effective date of January 1, the following year.	August 1: 10-year potential, 2-year target, September 1: Program details & budgets, October 1: Draft tariffs, November 1: Filing Package draft	CRAG, UTC, Washington Dept of Commerce
Biennial Conservation Report	A report on conservation program achievement by June 1, filed every two years starting in 2012.	June 1	CRAG, UTC, Washington Dept of Commerce

Application of EM&V Results

Performance in EM&V activities will be reported on the basis of gross savings, and free-ridership and spillover will be used to understand program targeting and design. The granularity of the results will be determined in the portfolio, program, measure, and project specific EM&V or M&V research plans. Transmission and Distribution savings due to the effects of the DSM program may be counted toward goal. This Framework and the Annual EM&V Plan do not include T&D efficiency projects that are not retail metered.

As currently structured, following the close of each program year, PSE provides an annual report of program and portfolio accomplishments on February 15, per the schedule presented in Figure 5.

EM&V efforts that result in changes to predetermined *ex-ante* savings estimates, *ex-ante* savings calculations (for custom measures), and/or algorithms used to calculate savings for custom measures will in most cases be applied prospectively, taking effect in subsequent program implementation cycles (beginning January 1), as appropriate. Such changes will be documented as changes in the Measure Metrics database system.

Attachments

Attachment 1 – 2012-2013 Annual EM&V Plan

Attachment 2 – Energy Efficiency Portfolio M&V Structure

Attachment 3 – Guidelines for Evaluation Study Follow-up, Version 2.0

Attachment 4 – Guidelines for Ensuring the Accuracy of Electric and Gas Savings Claims, Version 4.5

Attachment 5 – Guidelines for Measure Revisions, Version 4.0

Attachment 6 – Guidelines for Measure Creation, Version 2.0

Attachment 7 – Guidelines for Retiring Measures, Version 2.5

Attachment 8 – NAPEE Model Energy Efficiency Program Impact Evaluation Guide Comparison to EM&V Framework

Energy Efficiency Services

EM&V Framework

Attachment 1
2012-2013 Evaluation Plan

January 1, 2012

PUGET SOUND ENERGY
The Energy To Do Great Things

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INTRODUCTION

This document outlines the *2012-2013 Evaluation Plan* developed by the evaluation team for Puget Sound Energy's portfolio of electric and gas energy efficiency programs. The overall role of the evaluation team at Puget Sound Energy (PSE) is to:

- Document and measure the effects of a program and determine whether it met its goals with respect to being a reliable energy resource.[1]
- Help understand why those effects occurred and identify ways to improve or discontinue current programs, and develop future programs.[2]

In preparing this plan, the evaluation team at PSE has developed a structured process that serves to:

- Assess the overall needs for program evaluation in a systematic manner, and
- Allocate limited financial and staff resources accordingly.

This plan summarizes the program evaluation prioritization strategy for 2012 and 2013. Specific evaluation plans for PSE's Energy Efficiency Services (EES) programs will be updated annually and refined with further clarification for the Conservation Resource Advisory Group (CRAG) and Washington Utility and Transportation Commission (WUTC) staff.

MANAGING PROGRAM EVALUATION

Consistent with our EM&V Framework, Puget Sound Energy has developed a four year cyclical plan. This plan is illustrated in Figure 1 on the following page. The order of these program evaluations is based on how recently each program was last evaluated by PSE and how recently regional organizations such as the RTF or other utilities have examined the program's measures.

Pilot and new programs and measures will be given high priority for evaluation so that empirical data may be used to establish source of savings documentation and fine tune program delivery. Also, the evaluation team will be coordinating with other bodies, such as other regional utilities, the Regional Technical Forum (RTF)[3], the Northwest Energy Efficiency Alliance (NEEA)[4] and the Northwest Research Group (NWRG)[5], to identify common evaluation objectives and pool resources as needed. These types of evaluation projects are recognized in the four year evaluation plan as the line items "Schedule 249: Pilots" and "Other Projects".

It is critical that the evaluation team take a systematic approach to the measurement and verification of savings and to providing real-time value to implementation teams.

[1] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide, Appendix B: Glossary. Prepared by Steven R. Schiller, Schiller Consulting, Inc. www.epa.gov/eeactionplan

[2] Id.

[3] The Regional Technical Forum (RTF) is a regional advisory committee established in 1999 to develop standards to verify and evaluate measure savings.

[4] The Northwest Energy Efficiency Alliance is a private non-profit organization funded by Northwest utilities, the Energy Trust of Oregon and the Bonneville Power Administration.

[5] NWRG is comprised of evaluation and research staff of the regions utilities, NEEA and BPA, seeking to find common evaluation and research needs, and opportunity to collaborate.

Figure 1: Four Year Plan for Program Evalauation

	Budget Type	2012	2013	2014	2015
Sch E201/G203: Low Income	Electric Budget	x			
	Gas Budget	x			
Sch E251/G251: Commercial New Construction	Electric Budget	x			
	Gas Budget	x			
Sch E214/G214 Single Family Existing	Electric Budget	x			
	Gas Budget	x			
SchE215/G215, E218/G218: SF & MF New Construction	Electric Budget		x		
	Gas Budget		x		
Sch E262/G262: C&I Rebates	Electric Budget		x		
	Gas Budget		x		
E217/G217: MF Existing	Electric Budget			x	
	Gas Budget			x	
Sch E253/G208: Resource Conservation Manager	Electric Budget			x	
	Gas Budget			x	
Sch E216: Gas Conversion	Electric Budget			x	
	Gas Budget			na	
Sch E250/G205, E258, E257: C&I Retrofit, Self Directed & Traffic Lights	Electric Budget				x
	Gas Budget				x
Sch 249: Pilots	Electric Budget	x	x	x	x
	Gas Budget	x	x	x	x
Other Projects	Electric Budget	x	x	x	x
	Gas Budget	x	x	x	x

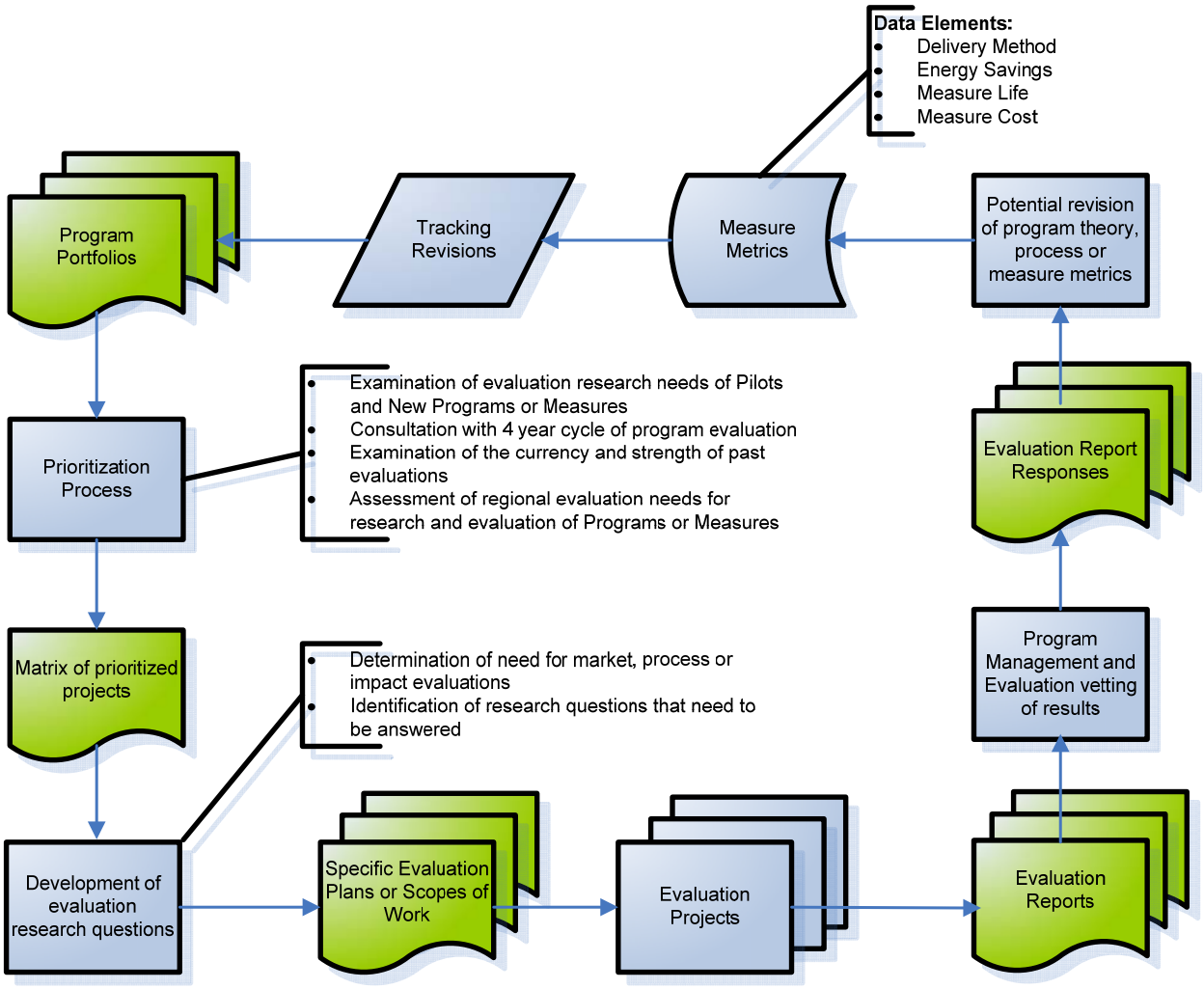
EVALUATION PROCESSES

The evaluation process at PSE starts with the company's portfolio of Energy Efficiency Services programs. From there a prioritization of evaluation activities or projects is developed. Then an exercise of identifying evaluation research questions drives the determination of impact, process, and market elements of a project. The PSE evaluation team develops Requests for Proposals and engages external evaluators to perform most program evaluations. Evaluation projects often involve scopes of work beyond what the internal PSE evaluation team can reasonably perform in a timely manner. External evaluators may also provide specialized skills required to complete a project. Further, external evaluators may help alleviate perceived bias in assessing program performance.

Throughout the evaluation project, evaluation staff will keep the implementation staff informed of key milestones and findings. Evaluation reports will be reviewed by evaluation staff and implementation staff. The implementation staff will then produce a Evaluation Report Response document that will serve as plan going forward regarding the study's findings and recommendations. Measure Metrics will be updated as necessary, which will lead to tracking revisions relative to the program portfolio.

This evaluation process is represented in Figure 2 on the following page.

FIGURE 2: PROGRAM EVALUATION PROCESS



STANDARDIZED APPROACH TO PROGRAM EVALUATIONS

Program-specific evaluation plans will be organized internally and will be reviewed and approved by Key program stakeholders. Each program evaluation project scope of work will include the following:

- **Review of Existing Program Data** – general program information including past and forecast budget, savings targets, and performance metrics
- **Identification of Key Program/Measure Considerations** – Any special considerations that assist in framing the history of the program or other evaluation scoping issues
- **Review of Key Performance Elements** – Identified Technical/Economic, Process, Market and Organizational elements
- **Determining Key Evaluation Research Questions** – Outstanding questions that arise from the identified risks that will drive the evaluation strategies
- **Defined Evaluation Strategy & Project Plan** – The strategies frame the near-term evaluation needs. These are articulated in a specific impact, process, and often market evaluation plans where appropriate.
- **Clearly Defined Outcomes –** Reporting, documentation, and dissemination of information

THE PROGRAM EVALUATION TOOLBOX

Scopes of work for evaluation projects will generally include one or more of the following research activities depending on what will best answer specific research questions and provide accurate and useful results:

- **Data Analysis/File Review** – Generally, program tracking, customer or market data is available to inform need for further data collection, or to form the basis of sampling methodology. It is often the first step in any impact or process evaluation.
- **Staff Interviews** – Along with Data Analysis/File Review, surveys or interviews with key PSE staff are often an initial step, and can help direct evaluation scopes of work by revealing what is known, and gaps in organizational knowledge. Outcomes often result in development of or updates of process flows and program logic models.
- **Tailored Best Practice Review** – A thorough review of regional, national or worldwide program and marketing practices can be useful to inform decisions regarding program strategies and planning.
- **Metering** – Specialized instrumentation used to monitor energy use or hours of operation is used to verify energy savings. Metering is often costly because it requires on-site installation and removal of metering equipment.
- **Billing and/or Econometric Analysis –** Analysis of weather adjusted energy use from billing or metered data, examining energy use in ex-anti and ex-post periods, often comparing a treatment group and a control group. This analysis may also statically compare billing data to engineering estimates. Econometric analysis is complimented by consumer survey data to assist in the control of exogenous variables such as changes in square footage of treated area, operational characteristics or tenant occupancy.
- **Customer Surveys** – To augment billing analysis, to assess customer satisfaction, or better understand customer or end-use characteristics, surveys of participating and non-participating customers may have a place in impact or process evaluation scopes of work.
- **Trade Ally Surveys** – Where a better understanding of market actors and business practices is needed for optimization of program delivery, surveys or key informant interviews with market actors such as contractors, distributors or manufacturers may be required.
- **Engineering Analysis** – New measures and programs often lack sufficient empirical data to verify and validate important assumptions. In this case, engineering analysis may be used to

develop interim assumptions that allow program staff a basis on which to build a program. Engineering analysis will be later followed up with empirical research when the data is available for collection.

2010-2011 EVALUATION BUDGET

The forecast Evaluation budget for electric programs in 2012 and 2013 is $3,775,758, and the natural gas evaluation budget is $949,209. Figure 3 shows the projected Electric and Natural Gas budgets for 2012-2013.

Figure 3: Program Evaluation Budget, 2012-2013

	Electric	Gas	Total
2012	$ 1,461,000	$ 757,000	$ 2,218,000
2013	$ 1,631,000	$ 511,000	$ 2,142,000
Total	$ 3,092,000	$ 1,268,000	$ 4,364,000

Energy Efficiency Services

EM&V Framework

Attachment 2

Measurement & Verification

Policies, Guidelines, Protocols & Processes

2011

Version 1.0

January 1, 2012

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Definitions

The following definitions are consistent with current and proposed operating practices by PSE EES staff. Similarly, they are consistent with definitions in the EM&V Framework:

- **EM&V** -- A catch-all term for evaluation activities at the measure, program or portfolio level; can include impact, process, market and cost effectiveness analysis. EM&V is distinguishable from M&V or programmatic M&V as described below. Please refer to the EM&V Framework for a complete description of EM&V activities as part of EES.
- **Evaluation** -- The performance of studies and activities aimed at determining the effects of a program and/or portfolio; any of a wide range of assessment activities associated with understanding or documenting program performance, assessing program or program-related markets and market operations; any of a wide range of evaluation efforts including assessing program-induced changes in energy efficiency markets, levels of demand or energy savings, and program cost effectiveness.
- **Measurement & Verification (M&V)** – The process of determining and validating savings. Per the International Performance Measurement and Verification Protocols (IPMVP), M&V activities are one of four options. However, in this document, the technical definition for developing individual measure savings is just a part of what is being considered as M&V. Here, M&V includes data collection, monitoring, and analysis associated with the calculation of gross energy and demand savings from individual sites or projects. These activities are reviewed and documented to establish the due diligence in achieving accurate energy savings and not the actual savings analysis itself (which is what is outlined in the IPMVP). These set of activities can also be a part of EM&V.
- **Measurement** – Measurement is the activity of collecting energy consumption data over time for use in energy savings analysis. This may include primary research (e.g., billing analysis, metering) for the purpose of determining the energy use/savings of the installed measures.
- **Verification** – A component of overall M&V efforts aimed at verifying installations of energy efficient measures and associated documentation through review of documentation, surveys and/or onsite inspections. Verification activities are the compilation of the processes used to report the suitability of the savings documented for the measure. This may include invoice and/or calculation review as well as on-site inspection.
- **Quality Assurance (QA)** - The purpose of QA is to validate the integrity of the data via an overall management plan or process (such as checklists, audits, standards, and methodology development). QA is process oriented to prevent any errors and is built into the implementation process.
- **Quality Control (QC)** - QC is meant to assess the quality of the analytical data or the tools used for measurement to identify any errors. QC is a subset of QA. QC may include inspections, peer reviews, and tracking database reports that test the process (i.e., did the measure meet the requirements).

Introduction

The purpose of this document is to define EES Measurement and Verification (M&V) structure and to define M&V policies, guidelines, protocols and processes to be used by the Energy Efficiency Services (EES) division of Puget Sound Energy (PSE).

This document is created in response to the September 2010 settlement agreement, "Agreed Conditions for Approval of Puget Sound Energy, Inc.'s 2010-2011 Biennial Electric Conservation Targets under RCW 19.285, Docket No. UE-100177." PSE agreed to a number of conditions related to I-937 regarding functions within EES. The conditions agreement in section K6 (f) (ii) states:

> Measurement & Verification – PSE shall provide detailed descriptions of its measurement & verification (M&V) policies, protocols, guidelines, and processes to the CRAG for review and advice. Additionally, PSE shall provide to the CRAG an estimate of the costs associated with the detailed M&V plan and PSE will maintain activities at levels that are at least commensurate with regional peers.

This document provides detailed descriptions of PSE M&V policies, protocols, guidelines and processes.

Overview

Over the 30+ year history of Energy Efficiency Services functions at PSE, a cornerstone business practice has been developing and implementing tracking, reporting and quality assurance practices that enable program staff, management, regulators and other stakeholders to:

- Assess EES performance,
- Have confidence that PSE is a responsible custodian of rate-payer dollars, and
- Trust that PSE's efficiency gains are realized and accurately documented.

In recent years EES' savings targets have increased significantly, and its program portfolio has become larger and more complex. Concurrently, its planning, implementation, administrative and evaluation teams have adopted more sophisticated portfolio and program data tracking and reporting capabilities. EES management and staff have created, and are committed to maintaining, a culture of continuous improvement that addresses quality assurance, quality control and verification practices.

M&V Roles & Responsibilities

At a macro level, the following teams are responsible for overall quality assurance and continuous improvement in their associated functions.

EES Program Implementation teams (including third party program implementers):

- Estimate energy savings
- Document and verify installations

- Establish program policies and procedures
- Market programs and educate participants
- Advocate customer interests and manage contractor relations
- Document evaluation report response (ERR) plans to integrate evaluation results

EES Evaluation team (and independent external evaluators):

- Conduct impact and process evaluations (as outlined in the annual EM&V plan)
- Provide feedback to implementation teams in identifying gaps in QA/QC, customer and/or contractor satisfaction, and other evaluation findings
- Review the documentation prepared by the implementation team
- Retain external evaluators to conduct independent impact evaluations of PSE's savings claims
- Calculate program and portfolio cost-effectiveness

EES Verification Team

- Assists EES Program Implementation teams in on-site verification
- Ensure that customers and contractors have installed qualifying measures
- Communicate with customers and contractors regarding program specifications and provide customer service
- Document and report results of site visits
- Develop proper and consistent on-site verification practices

EES Budget & Administration

- Conduct thorough reviews of all projects with incentives greater than $100,000
- Conduct an accounting and eligibility review of programs when an issue has surfaced
- Audit program engineer's work
- Provide training to EES staff on various tools and accounting practices
- Quarterly review of tracking system to ensure reference to measure metrics is correct
- Audit third party program implementers

All these M&V functions support and inform the critical EES portfolio metrics.

EES M&V Policy

In its simplest form, EES M&V policy is as follows:

- Every measure and/or program has objective and documented analysis describing kWh and/or therm savings and can be verified following installation.
- EES program planning, implementation, verification and evaluation teams are engaged in on-going quality assurance, quality control, analysis and reporting of measure/program activities.
- All M&V functions are complementary to the overall EM&V Framework.
- Transparent M&V methods are subject to review to increase quality and reliability.
- M&V efforts focus on areas of highest risk or uncertainty.

EES M&V Guidelines

The primary purpose of M&V functions is to obtain and secure the most reliable program savings and measure metric estimates while delivering high quality, cost-effective programs.

The EES division has adopted the following guidelines regarding M&V. EES will:

- Develop consistent protocols and processes for determining and verifying the measure and program metrics which include savings, cost, cost effectiveness and reliability of all energy efficiency programs and measures
- Use metrics accepted as industry best practices or adopt our own that are compatible with key objectives of the EM&V Framework
- Utilize M&V results for continuous improvement of existing programs

EES M&V Protocols & Processes

The following are the *overarching* M&V protocols used across EES functions. They also include examples of existing QA/QC processes that currently support the protocols.

Design or Modification of Program Rules, Policies and Measure Descriptions

Clear, consistent and well maintained program rules and measure requirements have a significant impact on the quality of program results. Such program rules and requirements are made to maximize consistency, minimize evaluation risk, and allow easy access for participation. Clear documentation of these rules and requirements is critical to the understanding of these programs for both internal and external program participants. Documentation is updated regularly as the programs grow and evolve. These documents serve as references to the program rules and an update process must be put in place to keep these documents current and relevant.

Process examples:

- Design of program rules, policies and measure eligibility criteria
- Design application approval and payment processes
- Develop and modify (as appropriate) program policies and procedures

Data Management & Process Tracking (collection, tracking & reporting)

PSE has systems in place that allow EES to effectively manage its data and accurately report program results. These systems assist in data collection, tracking of project and program milestones, and reporting of program results consistently and accurately across all departments within EES. Effective data management also includes built-in QA/QC functions that prevent or catch data entry errors. This category also includes the comprehensive documentation of the tracking and reporting systems to build a consistent process of managing data.

Process examples:

- Design, document, and use tracking and reporting tools
- Database training
- Confirm project/measure eligibility
- Project document/QC review

Energy Savings Verification

Measures within programs have documented procedures in place to fully verify savings in a manner that considers cost effectiveness and minimizes evaluation risk. Verification procedures may vary depending on measure, participant, or program type. Documentation of savings verification practices clarifies expectations for the implementation staff, evaluators, CRAG/WUTC, and program participants.

Process examples:

- Review equipment specifications
- Updates/refinements to deemed savings calculations and measure parameters
- Calculate energy savings (may include metering and/or modeling)
- Guidelines to custom savings calculations
- Peer review of application materials and calculations
- Pre and post-installation inspection & verification

Assessment & Verification of 3rd Party Programs

PSE has systems in place that require all of their third party program implementers to submit their verification plans for PSE approval. A set of requirements should be

outlined for the third party as a minimum to meeting PSE standards. Such efforts ensure that proper M&V is included in any program processes. Finally, PSE institutes independent energy savings verification and standard reporting requirements of third party program projects as part of an overall QA/QC plan.

Process examples:

- Training of 3rd party implementers re: program policies, compliance, reporting
- Creation of 3rd party tracking and reporting tools,
- Review of applications, calculations, reports
- Pre and post-installation inspection & verification

Contractor/Customer Training & Relations Management

Building and managing relationships between program implementers, customers and contractors increases the quality of applications submitted by program participants. It is important that the market has a clear and thorough understanding of EES programs and can provide regular feedback on the challenges that participants face. PSE takes into consideration the concerns of participants when determining policies and procedures and provides appropriate training resources to program stakeholders. These resources may include clear and concise language in program collateral on program expectations and/or holding seminars/webinars on program requirements.

Process examples:

- Design of customer/contractor training sessions
- Customer/contractor trainings
- Communication of program changes/adjustments

Documentation, Reporting & Optimization

The training and re-training of internal staff is a necessary element of consistently and accurately implementing program policies and procedures. PSE has a documented process for its portfolio to ensure that new staff is on-boarded in a comprehensive manner. This process helps to ensure that all staff whether new to the team or not, are working off the same guidelines and processes. The process includes methods of changing program policies so that implementation teams do not become disjointed as programs evolve. Internal training documentation must be properly catalogued and accessible to handle change management for all staff levels.

Process examples:

- Monthly, quarterly, annual program reporting
- Program/process optimization sessions
- Communication of program changes/adjustments

Energy Efficiency Services

EM&V Framework

Attachment 3

Guidelines for Evaluation Study Follow-up

Version 2.0

June 2011

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Glossary of Terms

Compliance Program Manager: A member of the Budget & Administration staff who maintains and manages the Measure Metrics database and files.

ERR: Evaluation Response Report. This report, prepared by designated program managers, documents pertinent adjustments in program metrics or processes, subsequent to an evaluation study, and provides a hyperlink to the evaluation report.

Evaluation Analyst: A member of the EES Evaluation Staff responsible for analysis or the coordination of an evaluation project.

Impact Evaluation: A study that verifies energy savings derived from energy efficiency programs and measures.

Market Effects Evaluation: These evaluation studies assess transformation, or estimate a program's influence on encouraging future energy efficiency projects because of changes in the energy marketplace.

Market Evaluation: These are studies designed to assess ECM baselines and costs, market actor needs and preferences, free-ridership and spillover.

Process Evaluation: A study that examines a program's delivery of services to the customer, to assess the program's ability to effectively and equitably reach the intended target segment of customers. These studies may also be described as Formative Evaluation, as results typically inform program adjustments to more effectively serve customers.

Program Evaluation Plan: The general plan articulated for the evaluation of a program. This will include suggested methodologies and types of evaluation studies that are warranted.

Program Manager: The manager responsible for an EES program and its delivery of energy savings measures or services to the consumer.

Document Scope

This document enumerates EES policies associated with the dissemination of information and recommended actions resulting from evaluation and research reports generated for or by the EES Evaluation Staff. This document focuses on the effect and relationship of Evaluation Staff work products as they relate to information archived in the Measure Metrics database.

EES Staff Roles

The Evaluation Staff's Role

In conjunction with PSE's Exhibit 6[1], EES Evaluation Plan, the EES evaluation staff manage or perform impact and process and market evaluation studies to:

- Provide program implementation stakeholders with the best available information on program and measure energy resource value.
- Evaluate program implementation processes and provide recommendations for improved delivery efficiency, customer value and customer equity.
- Support program planning, development and implementation functions, and related cost-effectiveness validation efforts, whenever appropriate and possible.

Reports produced by the evaluation staff may recommend program changes, including measure energy savings, measure cost adjustments, process adjustments or program delivery modifications. All reports, adjustments and modifications are archived in the Measure Metrics database.

The Evaluation Analyst's Role

The evaluation analyst is responsible for engaging the program manager in the course of developing the program evaluation plan and scope of work. The evaluation analyst will keep the program manager informed of evaluation study milestones and key findings as the study progresses. Typically, upon completion of the study, there will be a presentation to program staff and management of study findings.

At the completion of an impact, process or market evaluation study and its report, the evaluation analyst initiates an Evaluation Report Response (ERR). The ERR is forwarded to the program manager for completion. The program manager's manager, the manager, New Program Development & Evaluation, and the Compliance program manager are copied.

The Program Manger's Role

Throughout the evaluation process the program manager is responsible for working closely with the evaluation analyst to assist in the development of the program evaluation plan and the scope of work. Further, the program manager must remain engaged in the reporting of milestones and key findings.

[1] Effective with the 2011 Annual Conservation Plan, EES now refers to all supporting documents, such as the Evaluation Plan, as Exhibits.

Upon completion of the evaluation project, the program manager receives the ERR and documents in the ERR any actions to be taken as a result of the study for his or her program. Actions may include adjustment to deemed measure energy savings or savings calculation methodology, measure costs, program delivery modifications, or a request for further evaluation to clarify key unanswered questions. Any measure adjustments must comply with the EES Measure Revision Guidelines, which are located here:

> H:\Budget & Administration\Measure Metrics\Processes\Measure revision Guidelines_Ver4.0_05272011.docx

The guidelines are also available from the Compliance program manager.

The program manager is responsible for communicating the documented actions to the evaluation analyst, manager, Business Energy Management or manager, Residential Energy Management, and manager, New Program Development & Evaluation to obtain their approval. In some cases[2], it may be necessary to obtain the approval of the director, Customer Energy Management.

The program manager will complete the ERR within 10 business days of the date delivered to the program manager. If there is a disagreement between the program manager, and the evaluation analyst, or if their respective managers and Director, Customer Energy Management are not available to approve the ERR, 10 business days may not be enough time to resolve all issues. In such cases, the Director, Customer Energy Management must approve additional days for resolution of the conflict or approval to take place.

When adjustment to measure energy savings or measure costs are called for, the program manager will follow the EES Savings Claim Guidelines, Measure Revision Guidelines and Measure Creation Guidelines, as applicable.

The Compliance Program Manager's Role

The Compliance program manager updates and maintains the Measure Metrics database. He or she ensures that measure attributes are consistently applied and that EES tracking methodologies are uniform, accurate and defendable. The Compliance program manager also coordinates responses to regulatory inquiries and may support energy savings calculation rationale.

[2] Cases may included, but are not limited to, disagreement resolution, unique measures, measures requiring the approval of the CRAG, etc.

Management Oversight

The Director, Customer Energy Management typically meets with reporting managers weekly. During this meeting the ERR Aging Report will be reviewed as an agenda item to ensure that all ERRs are processed in a timely fashion and that Measure Metrics guidelines are followed.

Disagreement Resolution

There may be instances where the program manager disagrees with the findings of the evaluation study or the recommendations expressed in the evaluation report. Should there be disagreement of report findings and recommendations between the program manager and the evaluation analyst, the first step is for the program manager to enumerate the rationale that is counter to that expressed by the evaluation analyst and arrive at an agreement. If that step is unsuccessful in resolving the disputed findings, the discussion will be escalated to their respective managers for resolution.

Should their respective managers not come to an agreement, the disagreement is resolved by EES leadership; normally the Director, Customer Energy Management.

Tracking System Adjustment

Pursuant to the applicable of EES Savings Claim Guidelines, Measure Revision Guidelines and Measure Creation Guidelines, EES will only claim savings when a measure receives Director, Customer Energy Management approval. of the following attributes go into effect only after approval is made:

- Saving amount (kWh or Therm)
- Incentive amount
- Measure cost
- Installation or delivery method
- Eligibility qualifications
- Cost effectiveness

Until that time, only the then-current figure (for any or all of the above) remains in effect (for existing measures) in the applicable EES tracking system.

For example (savings figure is artificial--for illustration only):

> The current deemed kWh claim—as archived in the Measure Metrics database and claimed in the EES tracking systems and EES reporting—is 300 kWh for dishwashers. A new evaluation report indicates that EES should only claim 200 kWh. After the report has been published, the evaluation analyst initiates the ERR process.
>
> The Evaluation Staff reviews the report with Program Staff and agree that the claimed amount should be reduced to 200 kWh. The program manager completes the action plan portion of the ERR and submits the ERR for approval. Upon approval and in conjunction with EES Measure Revision Guidelines, the Compliance program manager will collaborate with the respective sector representatives to update the savings tracking systems[3].
>
> Throughout the process, the savings amount will remain 300 kWh until the 200 kWh amount is approved by EES leadership.

Evaluation Results Archiving

Impact and Process Evaluation Reports are archived in the Measure Metrics database and filing system upon completion. Studies that do not impact a measure's delivery method, incentive amount, savings figures, cost or life expectancy will not be archived in Measure Metrics.

When an ERR is completed by the program manager it is archived in the Measure Metrics database. The report resides in the EES primary network drive (Typically referred to as the "H:\Drive"), a hard copy is produced and filed in a central repository and is also referenced via hyperlink to the H:\Drive from the Measure Metrics database lookup forms.

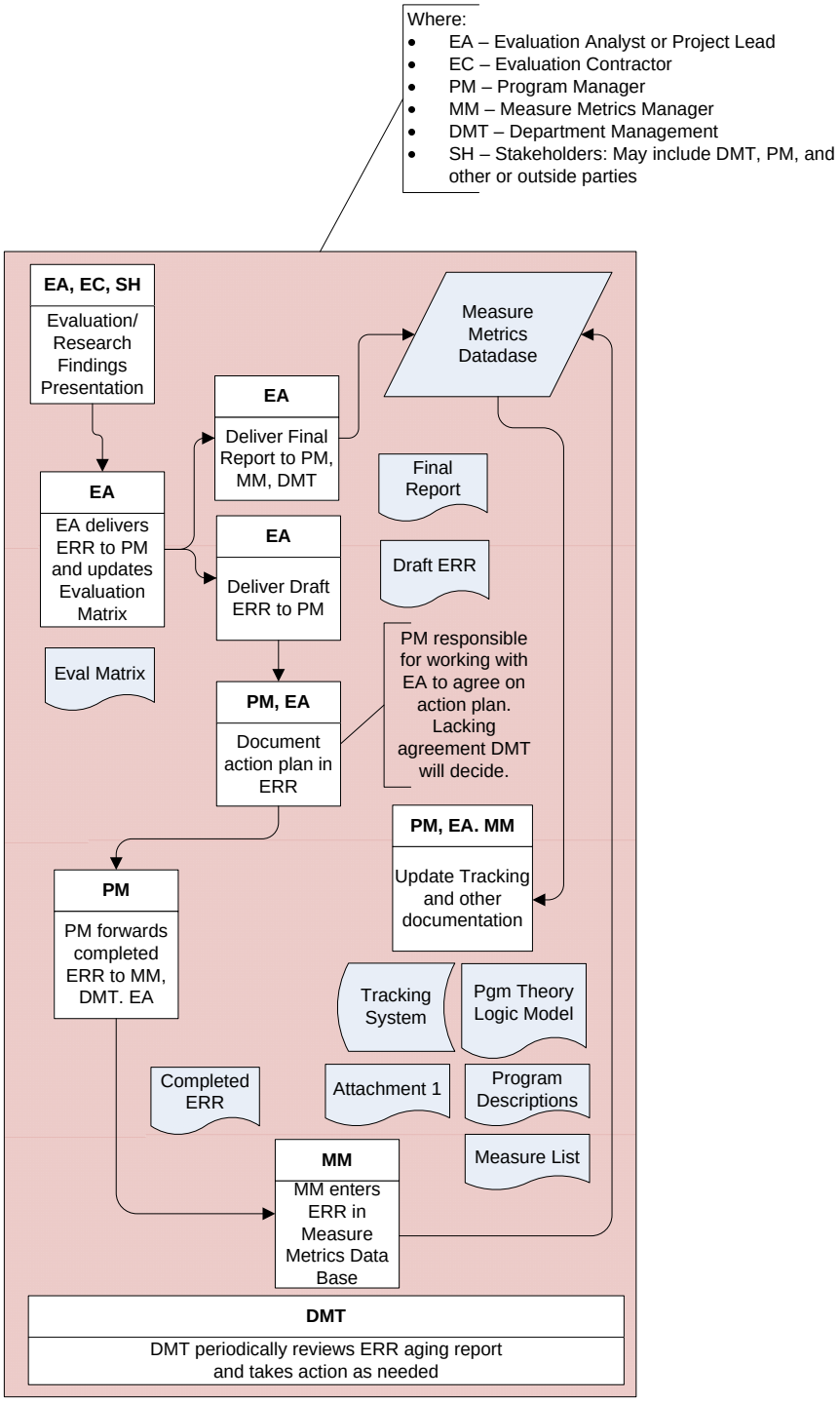
[3] It is important to distinguish between savings values that should be implemented at the beginning of the following year (an "adjustment") versus a one in which the new value is implemented immediately (a "correction") or an error, where the savings value is adjusted retroactively.

The ERR Process

An evaluation study may cover one or more programs as well as one or more measures. To facilitate archiving, an ERR should be completed for each program impacted by the evaluation study. If the study covers more than one measure per program, all the affected measures may be included in the same program's ERR. If a single ERR is provided for each of a single program's measures, those documents will be scanned together to form a single file on the H: drive.

ERR Process Flow

The following flow illustrates the ERR process:



Energy Efficiency Services

EM&V Framework

Attachment 4

Guidelines for Ensuring Accuracy of Electric and Gas Savings Claims

Policies and General Process Overviews

Version 4.5

July 2011

PUGET SOUND ENERGY

The Energy To Do Great Things

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Appendices

Document Scope

This document focuses on and outlines EES policies associated with energy (both electric kilowatt hours "kWh" and gas therms) savings claims and provides overview narratives of processes associated with how the claim data is input into the various EES tracking systems. These process narratives are provided as illustrations only to show how compiled data result in those savings claims and are not intended to be used as step-by-step process guides.

Detailed process outlines for rebate processing, grant payments, measure analyses/source of savings, etc. are maintained by the applicable departments.

Unless otherwise specified within the below sections, all comments apply equally to Residential and Business sectors.

2010 Settlement Agreement conditions:

- K(3)(a)(i)(1): Establishment of an EM&V framework
- K(3)(a)(i)(2): Consult with the CRAG when there are revisions
- K(6)(b): PSE must use RTF Deemed savings where possible
- K(6)(c): If PSE doesn't use RTF Deemed, must have verifiable calculations
- K(6)(f)(i): Documented M&V protocols and processes

are addressed—in whole or in part—through the publication of this document.

The document is organized accordingly:

- Guidelines that Apply to all Savings Types
- Specific guidelines-
  - Deemed
  - Calculated
  - Custom.

General Rules and Guidelines

1) Savings Values

EES states savings values in terms of FIRST YEAR savings. Each measure (CFL lamps, natural gas furnaces, water heaters, etc.) has a standard measure life, expressed in years (for instance, residential windows typically have a measure life of 30 years). EES tracks both first year energy savings values as well as cumulative savings, which is represented by multiplying the first year savings by the life of the measure[1].

EES takes the full year savings value regardless of the measure installation/implementation or invoice date. For example, if a CFL lamp—with a 2010 value of 24 kWh per year—is purchased from Costco[2] in November, EES will claim 24 kWh for that lamp, rather than only two month's worth or 4 kWh.

Similarly, if EES is representing the total savings for that lamp (whose measure life is five years), one would multiply 24 kWh by 5 for a total savings of 120 kWh over the life of the lamp.

All formal EES reports (for example quarterly CRAG recaps, annual and semi-annual WUTC reports) express savings claims in terms of first-year savings.

Value Rounding

With the wide variety of measures, measure types and applications in use, the precision for EES measures, must be consistent for reporting of savings values. For this reason, EES has established the below rules for rounding savings and measure values. The application of these rules has been validated through actual savings measurement and reporting since 2008.

Savings and measure values are entered and recorded in several systems; Measure Metrics, the Residential Tracking Database, CSY, EES Tracking, the Annual Report, etc. Measure Metrics and the Residential Tracking Database record measure values with a high degree of precision, sometimes in thousandths of therms or kWh. Once monthly savings are assimilated and reported, the aggregated total is rounded to the nearest whole number. The rules governing that rounding are described below.

[1] Cumulative savings history for both gas and electric are recorded on an ongoing basis; since 1978 for electric programs and 1997 for gas programs.
[2] It is assumed that the Costco in somewhere in the PSE territory.

Rounding in Practice

Generally, rounding is applied to prescriptive measure kWh or therm savings values that are archived in Measure Metrics or CSY. This includes RTF deemed (now UES) measures, which are indicated by whole numbers[3] or PSE deemed measure values, which may be expressed in whole numbers, two decimal places (Multifamily U-.22s windows; 23.97 kWh/ft^2) or three decimal places (Multifamily New Construction Condensing boiler with external tank; 0.015 therms).

For example, if a measure value calculation indicates that the savings is estimated to be 0.0149036 therms/ft^2, EES will apply the rounding tenants described in this section to achieve a value that is consistent with the measure application and savings type expectations; in the above case, 0.015 therms per ft^2.

Measure Application and Savings Types

EES strives to estimate, track and report savings with the highest degree of accuracy. This includes refraining from introducing artificial precision. For example, a value of 0.015 therms per ft^2 would not be applied to a residential furnace. EES doesn't have the resources to install data loggers or have an EME evaluate every home in order to determine that level of gas conservation precision. This would cause the residential furnace measure to become non-cost effective. Therefore, based upon evaluation studies, EES claims a standard 89 (Single Family Existing, 2010 value) therms per residential furnace. Similarly, when a residential customer purchases a CFL lamp, it isn't possible for PSE to know precisely when that lamp is going to be installed. Nor could we learn where it is installed and how many hours per day it will burn. Therefore, the RTF makes several assumptions and estimations of those and other factors to calculate an estimated savings per lamp of 24 kWh/yr (2010 value). It would be conversely imprecise to round to one therm per ft^2 for a boiler serving a 200,000 ft^2 building.

Additionally, many EES gas values are conversions of RTF electric values. For instance, 20 kWh/yr for a three-foot length of water heater pipe wrap converts to 0.57 therms for the same length of pipe wrap. Measures that are installed on a square or linear foot basis are rarely stated in whole number values.

Therefore, each value is rounded to the figure that is considered to be the most accurate and justifiable.

<u>Significant Digits versus Decimal Places</u>

Due to the wide variety of measure types, it isn't possible to state that EES rounds measure values to a standard number of significant digits.

To say that "EES rounds to two significant digits" would create considerable errors for new Manufactured Homes, whose values range from 3,000 to 5,000 kWh/yr each.

[3] In 2010, RTF began calculating therm savings for some measures. These values are expressed to a single decimal place; EG; MEF 2.46 clothes washers, gas water heat, electric dryer = 5.6 therms .

Rounding to four significant digits creates problems for residential CFL lamps (24 kWh/yr). If EES rounded to four significant digits, resulting in (hypothetically) 24.02 kWh/yr, we are again introducing artificial precision[4].

EES therefore rounds to a number of decimal places, depending on if the measure is electric or gas and its application, versus significant digits.

Rounding to whole numbers occurs when the individual savings values are multiplied by the number of measures installed, the amount of square footage of the measure installed, horsepower applied, etc. For instance:

1. 2,000 CFL residential directly-installed lamps at 37 kWh each,
2. 1,250 ft^2 of attic insulation installed in a residence heated by a forced air furnace at 3.41 kWh/ft^2,
3. 7,250 ft^2 of multifamily corridor lighting at 0.07 kWh/ft^2,
4. Etc.

Once the project/application total is rounded, further rounding is unnecessary at the Program/Channel/Sector/Portfolio level. For example:

Using case #2, 4,262.5 kWh for this specific project would round to 4,263 kWh. This total would be added to another (hypothetical) project which was rounded (2,341.37 actual kWh would be rounded to 2,341 kWh) and to another (3,004.6 actual kWh would be rounded to 3,005 kWh) and so on, until all projects completed for the particular month are accounted for. In the hypothetical example, the monthly total for the three enumerated projects would be reported as 9,069 kWh.

Rounding Rules

When aggregating total savings values for an applied measure, EES applies the generally held rule that a value that is equal to or greater than ½ (*n*.5, *n*.53, *n*.58, *n*.521, etc., where *n* is some number) rounds up to the next highest whole value, regardless of the number of digits to the right of the decimal. Therefore:

- 116.5 rounds to 117
- 603.52 rounds to 604
- 7,232.607 rounds to 7,233
- 101.502 rounds to 102
- Etc.

[4] While a value of 2 hundredths of a kWh may seem very small, it becomes significant when multiplying by 2,000,000 lamps.

Similarly, a value that is less than ½ (*n*.4, *n*.49, *n*.42, *n*.481, etc., where *n* is some number) rounds down to the next lowest whole value, regardless of the number of digits to the right of the decimal. To illustrate:

- 116.4 rounds to 116
- 603.49 rounds to 603
- 7,232.407 rounds to 7,232
- 101.102 rounds to 101
- Etc.

There are some savings values that are negative. For instance, when a package terminal heat pump is installed in a Multifamily New Construction application, there is sometimes increased use of electricity. This results in a negative savings. Rounding rules for negative savings values are the same as those described above. Thus:

- -107.5 rounds to -108
- -60.52 rounds to -601
- -1,200.607 rounds to -1,201
- -10.502 rounds to -11
- Etc.

And:

- -116.4 rounds to -116
- -603.49 rounds to -603
- -7,232.407 rounds to -7,232
- -101.102 rounds to -101
- Etc.

Special Circumstance

When rounding an electric or gas savings figure may result in a zero value, EES will use the nearest leftmost decimal place conservative figure rather than claim a zero value.

For instance, when a savings calculation indicates that one or two decimal places are appropriate, using the above rules may result in a zero value:

A. 0.004 kWh would round to 0.00 kWh,
   - If this particular measure savings value is archived to two decimal places; most probably a gas measure.

B. 0.3 kWh would round to 0 kWh
   - If this measure savings value is archived to whole numbers; usually an electric measure.

When this circumstance presents itself, EES will round the above illustration to 0.01 kWh versus 0.00 kWh in case A. and 1 in case B[5].

[5] Only if this was a measure that normally is stated in a whole number. If not, then the value would remain 0.3 kWh.

Rounding Measure Counts

The rules discussed in the above sections apply only to kWh or therm savings amounts. In this section, we will discuss the issue of rounding the number of a measure's units.

As discussed above, in most prescriptive and some calculated measures, the number of units is multiplied by the savings value to indicate the total savings. The majority of these measures are reported in whole numbers. An example would be an installation of 20 units[6] of pipe wrap in a gas account. 0.7 therms x 20 units installed = 14 therms total savings for that installation. For this measure, there would not be an instance of 20.*45* or some other odd number of units reported or claimed.

Some calculated measure totals (for measures such as insulation, windows, motors, etc.) can be odd numbers, however. These are rounded to the nearest first single decimal ("tenths") when there is a non-whole number quantity, whether the data is collected and compiled by PSE staff or PSE's vendor staff. This allows for standardized application of savings and payment of incentives. This rule applies only to the Residential Sector, as measures in the Sector are not evaluated on a case-by-case basis by an EME, as they are in the Business Sector.

For instance, assume on a particular project that the total square foot area of installed windows equals 421.75 ft^2, the incentive is $4.00 per ft^2 and PSE claims 15 kWh per ft^2. The window square footage figure should first be rounded to 422 ft^2. The resulting incentive payment would then be $1,688.00[7] (assuming there is no payment limit) and PSE would claim 6,330 kWh/yr. A different hypothetical window installation, with a total of 65.45 ft^2 would first be rounded to 65 ft^2.

Similarly, if a 10.35 horsepower motor was installed and the incentive was $100 per HP with a savings claim of 250 kWh/HP, PSE would first round the HP to 10.4. Horsepower ratings for motors are much more precise and have direct bearing on conservation and incentive payments. It is appropriate to round to a single decimal place (tenths) for this type of measure, versus building shell measures.

The motor incentive would then be $1,040 (again, assuming no payment limit) and PSE would claim 2,600 kWh/yr.

It is apparent then, that the overarching guideline for measure claims (not savings claims) is:

- Shell measure counts will be rounded to the nearest whole number
- All other measure counts will be rounded to the nearest decimal point (tenths)

[6] The RTF recognized units of three-foot pipe wrap and 10-foot pipe wrap as deemed savings values.
[7] Residential Sector incentives are paid in whole dollar amounts.

2) Timing of Savings Claims

PSE claims savings only when an incentive is paid in both the Residential and Business Sectors. The value of savings that PSE claims at the time of incentive payment may be subject to various timing issues. For instance:

1. "Payment lag": If an application, grant, coupon or other form of remuneration request is received in one reporting period but paid in the subsequent period, savings and payment should be recognized for the period in which the request was received.

   In this illustrative hypothetical circumstance, a rebate application is received in December of 2010 when a clothes washer savings is 159 kWh. Due to a high volume of applications received, though, EES cannot process the application until January (when the hypothetical savings is now 149 kWh). EES will claim 159 kWh for that clothes washer, as it is possible to prove that, given optimal workloads, the rebate would have been paid in December.

2. Grace period for retired prescriptive measures: payment requests (rebate applications, internal requests—such as CSY requests to Accounts Payable, etc.) for measures that were active during the period in which the payment request was made may be honored for up to 90 days[8] following the retirement of that measure. The savings claims for these measures will be based on the value that was in effect at the time that the measure was retired.

   As a case in point, when Single Family New Construction dishwasher measures were retired at the end of 2010, some builders were not able to mail their rebate paperwork in until late January 2011. In this circumstance, the applications were received within the grace period. Therefore, EES claimed the savings values that were in effect at the end of 2010.

3. Exact measure match: applies only if the same measure, with the same qualifications, changes its savings value or incentive level from one period to the next. In these cases, the savings will be claimed are those that are in effect at the time of payment, regardless of the value's savings amount revision date. There is some implementation variability. For instance:

   a. When the RTF makes an annual adjustment to its savings calculations, PSE correspondingly adjusts its savings claims on the following January 1. For instance, when the RTF adjusts the "Tier 2" clothes washer savings value for electric water heater/electric dryer from 159 kWh/yr to 149 kWh/yr in October of 2010, PSE makes a corresponding adjustment to 149 kWh/yr in January 2011.

[8] Each program maintains different grace periods.

Therefore, if an eligible clothes washer was installed in December of 2010 (which equate to qualifying savings of 159 kWh/yr) but the rebate application was not mailed until January 2011 (when the savings are now 149 kWh/yr), PSE would claim 149 kWh/yr, rather than 159 kWh/yr, based upon the rebate payment date. (If, however, the customer mailed and PSE received the rebate application in December and it wasn't paid until January, then rule #1 above—Payment Lag—would apply.)

b. When RTF indicates in October 2010 that a "Tier 2" clothes washer is no longer cost effective and that the new minimum efficiency clothes washer is a "Tier 3" clothes washer (for instance, a 2.7 MEF with a <4.0 water factor), the "Tier 2" clothes washer is now retired on January 1, 2011 and will thus be governed by the "Retired Measures" rule, as outlined in Section 4 below.

   Thus, if an applicable clothes washer was installed in December 2010 but the rebate application was not mailed until January 2011, EES would first apply the Grace Period rule (Circumstance #2 above). If the rebate qualifies, EES would claim the savings value in effect at the time that the measure was retired.

3) EES Takes Conservative Values

When it isn't possible to determine from customer input or installation data whether a UES measure is eligible to claim the higher of two possible savings values, EES takes the more conservative amount.

It is extremely rare to encounter a case where it isn't possible to determine which measure value to apply to a particular incentive application. Today's application forms are designed to be easy for customers to complete. Additionally, when there is incomplete data provided, PSE staff or its vendors follow up with customers to ascertain the data necessary to apply the appropriate savings value to apply.

Additionally, when a Business Sector measure is based on an RTF savings value (2011 PC Power Management Software, for instance) and there is engineering data that indicates that a higher savings value is appropriate, PSE will take the lesser of the two values[9].

[9] In the 2011 PC Power Manager business case, a Cadmus Group impact evaluation indicated that an appropriate savings value would be 117 kWh per desktop unit. For the same time period, the RTF provisional value was 115 kWh per desktop. PSE elected to use the RTF value.

4) Savings Claims for Retired Measures

Please refer to the EES guideline: *Measure Retirement Guidelines: H:\Budget & Administration\Measure Metrics\Processes\Measure retirement policy_V2.5_03042010.doc.*

The savings value assigned to and reported for a retired measure will be the value that was in effect at the time that the measure was installed or committed to in a grant agreement.

In this hypothetical circumstance, a MEF 0.65 dishwasher (at 250 kWh/yr) was installed in December of 2009 and that particular dishwasher measure was retired December 31, 2009 because it was being replaced by a MEF 0.80 dishwasher (at 300 kWh/yr) on January 1, 2010 as the new minimum efficiency qualification.

In our illustration, the rebate application was received in late January 2010 for this dishwasher. Also for illustration, it's assumed that the grace period for dishwashers extends to February 15, 2010[10].

The customer is still eligible to receive a rebate and 250 kWh/yr will be entered in the 2010 EES Residential Tracking database. This is because the dishwasher was installed in 2009 and met the qualifications for MEF 0.65 dishwashers.

5) Savings Claims from Vendors

PSE expects vendors to have documented policies and processes relative to accounting for rebates processed, measures installed, customer interaction and privacy as a requirement of doing business with PSE. EES program managers using vendors to collect savings information have this documentation (usually included in the contractual documents, such as the RFP, contract or Statement of Work) on hand. EES program managers are expected to verify vendor data prior to entering monthly summary savings data into the applicable tracking system.

6) Prescriptive Measures

"Prescriptive Measures" and "Deemed Measures" are terms that are often used interchangeably. Prescriptive Measures can include either RTF Deemed or PSE Deemed measures.

RTF UES Values

In compliance with the 2010 Settlement Agreement conditions K(6)(b), EES uses RTF UES measure savings values whenever possible. Reference to RTF values are maintained in the EES Measure Metrics archive in each measure's Source of Savings (SoS) folder. Prior to 2010, most EES program managers relied on RTF data reported in tables maintained in the BPA's Reporting Tracking and Reporting (PTR) system:

https://www.ptr.nwcouncil.org/apps/home.asp

[10] Please note that in section 2.B, Grace Period, programs may extend application eligibility to 90 days. Single Family New Construction, in this illustration, set their grace period to 45 days.

Throughout 2010, however, EES transitioned to aligning savings values found in the RTF-specific website:

http://www.nwcouncil.org/energy/rtf/measures/Default.asp

Although the PTR site uses RTF data, the primary audience of the site are entities who may wish to avail themselves of BPA monetary credits. The RTF site tends to include the most current data. By January 1, 2012, all RTF deemed measures noted in the Measure Metrics source of savings files will only reference the RTF tables.

When necessary, measure savings value adjustments occur and are effective each January 1. Although the RTF may update certain measure savings values throughout the year, EES limits adjustments to align with RTF values to an annual basis. The only time that a value is adjusted mid-course (retroactively or on a going-forward basis) is when a savings value error is revealed. Complete process steps are outlined in the EES document *Measure Revision Guidelines*.

A step-by-step process outline of how to download values from the RTF website is located in Appendix A of the Measure Revision Guidelines.

PSE UES Values

Regional conditions may indicate that a modification of a certain RTF UES value[11] or the calculation of a new value is warranted[12]. In compliance with the 2010 Settlement Terms condition K(6)(c), EES will initiate an evaluation study or conduct engineering analyses that are consistent with Northwest Power and Conservation Council methodologies to determine an appropriate savings value.

Values for each deemed measure type are classified and archived in the EES Measure Metrics system.

Calculating Savings for UES Measures

Regardless of the UES measure type (RTF, PSE), aggregate savings for these measures are calculated by systems within EES. The number of specific measure units (for example, the number of CFL bulbs, the number of clothes washers, etc.) is entered into the applicable system. The system then multiplies the savings value for that measure and produces the resultant savings value.

A general rule for prescriptive measures is: (# of units * UES savings value per unit = total savings claimed).

[11] For instance, according to EES's "2008 Low-Flow Showerhead Installation Rate Survey Results evaluation study, in the Puget Sound area there are downstream electric waste treatment savings of 4 kWh per unit. Therefore, PSE adds 4 kWh to the established RTF values for showerheads. EES maintains a protocol for these instances in its Measure Revision Guidelines.
[12] For instance, certain structure types used for heat pumps warranted a savings value that wasn't used by RTF.

Thus:

(*100* MEF 2.0 clothes washers at *100* kWh each = *10,000* kWh).

To a varying degree of steps and sequence, the systems will then aggregate the specific savings for each measure (eg, MEF 2.2 – 2.45, MEF 2.46 – 2.69) then sum the savings for all measures (clothes washers in this example)

Each month the responsible program manager validates the savings entries and affixes his or her initials, acknowledging the accuracy of savings claimed.

7) Calculated Measures

Applying primarily to the Business sector (an increasing number of residential programs also use calculated measures), a calculated measure uses a standard incentive value but includes an engineering calculation of site-specific savings. In the case of Small Business Lighting, for instance, the number of CFL fixtures is multiplied by the wattage use for those particular fixtures. The lighting engineer then applies the number of estimated hours of operation per fixture in order to calculate annual energy savings for the overall project.

8) Custom Measures

Savings estimates for custom measures are determined using strict engineering principles, many on-site observations and measurements and a series of verification reviews. Every project receives a QC review by a senior-level engineer. Savings are claimed only after the projected energy savings are validated when the project is completed. A complete flowchart of the custom grant process is attached to this guidelines document as Appendix C.

9) Audits of EES Programs

Formal savings and financial audits of selected EES programs are performed every quarter. Through this process, it is EES's goal to ensure that certain programs are audited at least once per year, typically based on the following criteria that are subject to change as suitable to business need.

EES Audit Objectives

The objectives of audits are to determine that EES programs have adequate controls; identify probable areas of improvement, and train and develop staff skills. In general, the following program areas are audited:

- Savings and source of savings are supported by proper documentation;
- Savings and source of savings are claimed in accordance with program guidelines;
- Dollars are spent in accordance with program guidelines;
- Program expenditures are supported by proper documentation;
- Program expenditures are approved and tracked;
- Program costs & savings are reported in a timely fashion and in accordance with regulatory policies and procedures.

Program Audit Selection Criteria

In addition to the overarching goal of review every EES programs that generates conservation savings, the Budget and Administration team uses the following criteria to determine audit priorities:

- Programs that contribute greater than 50% of annual EES savings;
- Programs whose expenditures are currently or projected to end the current year at 80% or 120% expenditures against their budget;
- Programs with multiple adjustments to their savings tracking with the year;
- Length of time between audits;
- New programs;
- Other reasons as determined by the Manager of EES Budget & Administration.

Audit Practice

The EES audit practice strives to be in keeping with GAAP, Federal Energy Regulatory Commission (FERC) and other imperative governance. As such, the Budget & Administration team—who conduct the audits—are independent of all program activities.

Randomly selected periods are audited. Selected program savings and financial information are studied by comparing program management's tracking with reported information. When possible, audits will trace all the way back to the individual customer record to validate savings and disbursement claims. If corrections are required for a particular period, all periods for that year will be reviewed by the audit team.

Peculiarity items are studied, but are not limited to the following:

- Negative units and costs (Vendor records, CSY and SAP).
- Duplicate customer names, rebates and jobs completed (CSY & SAP).
- Addresses beyond PSE service territory.
- Non-existence of customer records within PSE customer system (CLX).

It is EES's objective to ensure transparent and reliable savings and financial information. Additional preventative and detective procedures are in place throughout the year to offer internal and external parties reliable information. It is notable that improvements to existing procedures are an ongoing effort, namely:

1. Program managers are held accountable for accuracy of their savings and expenditures. Program managers are required to review and provide signature of authorization for their program savings and expenses on a monthly basis. Program managers and/or implementers scrutinize all PSE contractor invoices and savings claim on a daily basis.

2. Savings and financial tracking of all EES programs compared to budget & savings target are reported monthly. All staff, including management and VP of EES are kept abreast of all program activities.

3. Review of all EES expense by general ledger is conducted on a monthly basis. In addition to month by month expense comparison, prior year versus current year is also examined. Unusual items are researched and corrected as necessary in a timely manner while in compliance with all standards.

4. Quarterly CRAG updates, which provide actual versus target comparison program status comments.

Additionally, Business sector project records of grants greater than or equal to $100,000 are further reviewed by the manager of Budget and Administration each quarter for accuracy and signature compliance, per Sarbanes-Oxley requirements. Other random business projects are also included in this review.

10) Adjustments

This section pertains specifically to counting errors and their associated corrections. Adjustments that are required as a result of evaluation studies or RTF revisions are addressed in the EES document "Measure Revision Guidelines".

Although rare, savings claims adjustments are periodically necessary. For example, a vendor may mistakenly miss some clothes washers from a previous month and add them into the next month's total. Data entry errors also occur infrequently and are corrected as soon as they are found (E.G.; a total of 69 refrigerators were entered in the Residential Savings Tracking System when there were actually 96).

The EES Budget team manages a formal adjustment process, which is comprehensively documented in the EES Budget department.

An adjustment to savings figures can only be made once the program manager answers the following questions in writing:

- What happened ("savings were overstated by 10,000 kWh last month", etc.)?
- How was the issue identified?
- Why it happened ("10 manufactured home rebates were counted twice", etc.)?
- How it is corrected ("10,000 kWh will be subtracted from this month's claims, with a corresponding note in the Residential Savings Tracking System", etc.)?
- What will be done to prevent future errors ("all rebate forms will be marshaled in areas specific to their corresponding programs and receive a check mark when processed", etc.)?

Additionally, the program manager must complete the Savings Adjustment Table. An example is included as Appendix D of this document.

The document is then approved in writing by the Manager, Budget and Administration.

This document is archived within the EES tracking month to which it pertains; both in electronic and hard copy form.

It is important to note that once a reporting month is closed, it isn't possible to retroactively adjust its savings figure.

In the above example, assume that the "last month" noted was May 2009. Also assume that the adjustment document was completed July 21, 2009. Since the January through June period has now been reported to the CRAG and WUTC, it isn't possible to go back into May's report and subtract 10,000 kWh. If the actual savings figure for June 2009 is 20,000 kWh, then 10,000 kWh will be subtracted for a total of 10,000 kWh.

A note in the Residential Savings Tracking System will make it clear—when a future audit is performed and 20,000 kWh-worth of rebate forms are produced for June—where to look for the missing 10,000 kWh-worth of rebate forms.

11) Specific Savings Types

UES Measure Savings

A) Savings Claims from Rebate Application Forms

Although it isn't possible to determine with complete confidence the actual installation of a measure that results from the processing of a rebate application form, EES assumes that the customer or entity sending the application form has indeed installed the associated measure (equipment, process, etc.). The representative financial outlay associated with many of the measures makes it unlikely that the customer or requesting entity would not install and use the measure after the purchase. Furthermore, RTF deemed values (for those measures whose savings are based on RTF values) take into account that a proportion will be kept in customer storage, some are taken to locations that are outside of the PSE service territory, a certain number fail upon installation, etc. It is an accepted RTF practice to count savings in this manner.

PSE-Processed Rebate Forms

Residential

Policy

It is EES's policy that energy savings will be documented and tracked only when they can be verified by reference to a completed and authenticated rebate application form. Savings are claimed only after the information from the rebate application is entered into CSY. Specific rebate application processing procedures are outlined elsewhere in EES department guidelines.

It is important to note that savings values that are effective in the year in which the application is paid are those which are claimed. Hence, if a customer installs a clothes washer in December 2010 and doesn't send their rebate application in until January 2011, PSE will not claim the 2010 savings value. Rather, PSE will claim the 2011 value[13].

Process Overview

Rebate applications that are completed by customers, builders or any other eligible party (eligibility requirements are listed in the specific program documentation) are mailed into PSE for redemption. Rebate applications may be mailed, faxed, emailed or retrieved from a verifier's database.

[13] In the case of a "Tier 2" clothes washer, using electric water heat and electric dryer, the 2010 savings value was 159 kWh/yr. The 2011 value for the same configuration is now 149 kWh/yr.

Typically, builder rebates are compiled, verified and input into a database by a third-party verifier. PSE accesses verified rebate information for builders from this system.

Once received, all rebate applications are verified, logged into CSY and payment is requested. Rebate applications are then archived. A monthly report from CSY is generated and number of units is compiled to calculate savings claims. Detailed rebate processing steps are available from the Residential System staff.

Rebate forms used by the Residential sector include, but are not limited to and may be subject to change:

- Windows
- Manufactured Homes
- Fuel Conversion (convert from electric to gas)
- WashWise (appliances)
- Heating
- Weatherization
- Ductless Heat Pump

Selected rebate application forms are processed by authorized EES vendors (2009 and 2010 noted in **Appendix A** of this document). Rebate applications processed by vendors are addressed in the below section.

Business

Policy

It is EES's policy that energy savings will be claimed and tracked only when they can be verified by reference to a completed and authenticated rebate application form. Savings are claimed only after the information from the rebate application is entered into CSY.

Process Overview

In rebate programs, the data from the applications are entered into a "Cover Sheet", created and managed by the program manager. The cover sheet calculates the savings and rebate amounts that will correspond to customer purchase/installation before the summary information is entered into CSY. Other information from the actual application is also entered into CSY (customer information, account information, contact information, etc). Specific rebate application processing procedures are available from the Business staff.

Rebate forms exist in both electronic and hard copy form and are received from customers, contractors or vendors by email, fax and postal mail. The forms are forwarded to the corresponding market manager, program manager, energy management engineer(s) or program implementer of the Business Rebates section of the Business Energy Management Department.

Rebate forms used by the Business sector include, but are not limited to and may be subject to change:

- Commercial CFLs
- Commercial Clothes Washers
- Commercial Kitchen Equipment

- Electronically Commutated Motors
- Gas Boiler Tune-ups
- High Efficiency Air Conditioning and Heat Pumps
- HVAC Variable Speed Drive
- Portable Classroom Controls
- Premium Efficiency Motors
- Programmable Thermostats
- Small Business Lighting
- Vending Machine Controllers

Vendor-Processed Rebate Application Forms

Policy

It is EES's policy that authorized vendors process rebate applications with the same diligence that EES personnel apply. Vendors receive comprehensive training by PSE and are to provide the same level of follow-up and customer service. Authorized vendors are required to adhere to PSE customer privacy policies. PSE may rescind a vendor's participation authorization if they show an inability to follow procedures or engage in any questionable practice.

Process Overview

Some customer rebate forms are mailed to PSE's authorized vendors for processing. The vendor is expected to apply the same eligibility validation process as is used when a rebate form is received by the PSE office. Depending on the written agreement between the Company and the vendor, he vendor will supply the appropriate EES program manager all of the necessary backup documents associated with the application. In some cases, the vendor keeps the necessary backup documentation on file at their location and they provide it upon request. The package contains a summary and some level of stipulated detail on rebates paid to customers. The vendor is expected to archive the actual completed rebate application forms for a period of seven years.

The rebate count processed by authorized vendors is entered into the corresponding departmental tracking and processing system only when the vendor's information is received and verified by the applicable program manager. The program manager validates the summary information in the Residential Savings Tracking System and archive the file package for future reference. Specific vendor rebate application processing procedures are outlined elsewhere in EES department guidelines.

Please see **Appendix A** of this document for a list of EES vendors.

B) Vendor Direct Installation Savings Claims

Policy

EES authorized vendors, Low Income Weatherization agencies, and other entities selected by the Company (collectively, "vendors") to install a select number of prescriptive measures on behalf of the Company.

It is EES's policy that savings will only be claimed for those measures after a summary report of installed measures is received from the authorized vendor. It is clearly understood that all measures in this category are installed and being used.

Process Overview

Authorized vendors are required to maintain accurate records of measures installed, installation locations and customer information (they are required to adhere to PSE customer privacy policies). As a part of their invoicing process, vendors are expected to provide monthly activity reports, which include both summary and detail measure information to the EES program manager. When requested, vendors will provide specific measure detail for any given customer or customer account.

Residential

When the report is received, the program manager enters the summary information into the Residential Savings Tracking System and signs off on the entry, acknowledging that the information has been verified and is accurate. As an additional validation step, beginning in 2010, it is EES's goal to inspect, via random sampling, 10 percent of all weatherization jobs (weatherization services comprise a large part of contractor-installed measures) performed by PSE contractors per year.

Business

The program manager or program implementer enters the summary information into a tracking system very much like the prescriptive rebate measures, enumerated above. For many programs, there is a Cover Sheet created and managed by the program manager (or the staff member who created the measure). The summary numbers from the vendor are entered into this sheet which then calculates the necessary savings that are to be manually entered into CSY. The payment request is created by CSY at this time.

On a monthly basis, the Budget department business analyst extracts a summary report from CSY and enters that summary information into the EES tracking system. A certain percentage of prescriptive programs are audited and reviewed by subject matter experts. For instance, a licensed plumber inspects a percentage of pre-rinse spray heads replaced by a vendor's installer.

C) Retailers / Reseller Savings Claims

Policy

It is EES's policy that savings claims will be made only for those measures enumerated in retailers' or resellers' summary reports which are received and validated by EES program managers.

Process Overview

EES has steadily reduced rebate forms for high-volume/low value items (such as CFL bulbs). Instead, many retailers/resellers—such as McClendon or Costco—now provide an "instant rebate" to the customer; taking a specified dollar value off of the price at the register. They then provide an intermediary vendor a summary report, who then forwards this to EES.

On a routine basis, an EES vendor verifies Point of Sales (POS) data against manufacturer's invoices to validate sell-through of product for which mark-down claims are made. In many cases, the retailer/reseller will report a specific number of a particular part number; “CFLT01204”, where the “4” in the part number indicates that this unit is a four-pack of CFL lamps, therefore requiring the total to be multiplied by four.

These reports vary in the degree of detail and rarely provide customer-level specifics; large chains that are networked will report sales by week/by store and then summarize those figures into one monthly grand total.

Several lighting showrooms provide incentives to their sales staff (commonly referred to as “spiffs”). This activity is often associated with new construction (both Residential and Business) contractors. Reports from these entities will typically include the sales person’s name, number of units sold, the contractor name and the “spiff” amount to which they earned.

The retailer (or the retailer-appointed vendor) will create a monthly summary report as a part of their invoice for the associated amount (for instance, $2.00 per CFL bulb X 10,000 bulbs = $20,000 invoiced to EES). An EES program manager will validate the information and then initiate a payment request to the retailer through CSY.

Although it isn’t possible to say with certainty that all measures purchased in this manner are installed, RTF deemed values take into account that a proportion will be kept in customer storage, some are taken to locations that are outside of the PSE service territory, and a certain number fail upon installation. However, it is an accepted RTF practice to count savings in this manner.

Unit counts for these measures are only entered in the Residential Savings Tracking System after the program implementer or program manager for the applicable program reviews the retailer/reseller report to ensure consistency of the totals.

An example of Residential Retail lighting vendor assignments is also illustrated in **Appendix B** of this document.

Calculated Measures Savings

Policy

It is EES's policy to claim savings for calculated measure only when the installation of the applicable measure(s) is confirmed by an EME.

Process Overview

Rebate applications are typically received from contractors and are normally associated with small business or Multi-family projects. Applications are reviewed by EES staff for eligibility and to validate savings calculations. Upon verification, approval is provided to the contractor to proceed with the installation of the applicable measures. When the measure installation is verified by the EME, payment of the incentive is made via the standard CSY payment request process.

Upon verification, the payment is authorized and processed in CSY. This operation triggers an entry of the savings values (either a deemed value or a savings value entered by the EME). On a monthly basis, CSY summary savings reports are generated and their contents are entered into the EES Tracking System.

The complete custom grant process flowchart is attached to this guidelines document as Appendix C.

Custom Measures Savings

The majority of Business measures are of a custom nature. There are also some Residential programs, primarily Multi-family, that use custom measures.

Policy

It is EES's policy to claim savings for custom measures only when the installation of the applicable measure(s) and validation of the savings are confirmed by an EME, or in the case of Residential Multi-family projects, an authorized vendor and program manager.

Process Overview

Business

When a developer or contractor wishes to install conservation measures into a Commercial or Industrial structure, an EME is engaged to provide a savings estimate and a corresponding amount of remuneration (in Business terms, a "grant".) The estimate is then reviewed by a senior-level EME. This operation is called a QC Review.

A grant agreement is then generated and the construction proceeds. When the contractor notifies the EME that the project is complete, a review is made of the project to ensure that the agreed-to equipment or measures are installed and to validate savings assumptions.

In some cases, the savings value is adjusted to reflect actual savings achieved due to scope, equipment or other changes to the original plan. If this is the case, an additional QC review is required. EES will use billing history, among other methods, to confirm savings. When the project is completed and verified against the original grant agreement, the grant is then approved. In the case of prescriptive measures included as a part of the grant, the savings value in effect at the time that the grant was signed will be used.

Grant approval triggers a payment request to PSE Accounts Payable. This activity also triggers entry of the final savings value in CSY. On a monthly basis, CSY summary savings reports are generated and their contents are entered into the EES Tracking System.

Residential

There are typically several large Multi-family projects throughout the year which follow, to a great extent, the Business custom grant process. Many of these projects include prescriptive and custom measures.

Similar to the Business sector, it is EES's policy to claim savings for these projects only when the installation of the applicable measure(s) and validation of the savings are confirmed. Rather than confirmation by an EME, though, the Multi-family channel engages an authorized vendor to conduct a review of each project to validate measure installation. The Multi-family program manager then conducts an additional validation review, with the goal of reviewing ten percent of the completed projects per year.

Glossary of Terms

Unless otherwise noted in a specific Conservation Schedule, the following commonly-used terms, used throughout and applicable only to this document[14] have the below noted meanings. Definitions or glossaries contained in other EES documents, policies or guidelines referring to specific processes or unique functions shall have the meanings noted in those documents, policies or guidelines.

"The Company", "PSE", "EES"	All references herein apply to Energy Efficiency Services, a division of Puget Sound Energy
CMS	(Customer Management System) – EES Customer Management System is the primary interface for fulfilling and tracking customers' interactions with EES residential programs and services. Modules include: Literature & Rebate Fulfillment, Contractor Referrals, Rebate qualifying and processing and EES Inventory Management.
CSY	(Customer SYstems solutions) – A PSE-created system with two distinct functional areas: Custom Grant Programs and Customer Rebate Programs. The system is used to track the status of Custom Grant Projects (from initial estimates to Grant Agreement to Final Payment) and to send payment request information to SAP. Payment information includes custom grants and rebates; both prescriptive and calculated for both EES sectors (Residential and Business).
Custom Measure	These are specific to an individual project and require the analysis of an energy management engineer. The Business sector, and a very few number of residential programs – primarily Multi-family, employ custom measures.
EES Tracking	The compilation of EES savings and expenditures for both Residential and Business sectors.
EME	Energy Management Engineer

[14] Some acronyms, such as "ECM" have a different connotation outside the purview of PSE or conservation activities. Outside of EES, "ECM" may mean "Electric Conservation Measure". Within PSE, though, it means "Electronically Commutated Motor".

Glossary, Continued

GAAP	Generally Accepted Accounting Principles
Measure Value	Measure Value is typically associated with prescriptive measures, such as CFL lamps, windows, insulation, etc. In some instances, such as windows or insulation, it may be necessary to apply rounding rules, as these measures are usually not installed in whole number units.[15] The Measure Value is different from the Savings Value.
MEF	Manufacturer's Efficiency Factor
NWPPC	Northwest Power Planning Council
POS	Point Of Sale
PSE UES Measure	Similar to the RTF UES Measure, a PSE UES Measure has a specific per-unit savings value, although the source of that savings value has been developed, analyzed and vetted by engineers, evaluation staff or other experts within EES.
QC	Quality Control
Residential Savings Tracking System	The system; either in the form of an electronic spreadsheet, workbook or other electronic form that collects, compiles and summarizes all residential program savings data.
RTF	Region Technical Forum, a body of conservation experts, with a focus on the Idaho, Oregon, Wyoming and Washington region.
RTF Deemed Measure	An electric measure that has a specific per-unit energy savings value which has been analyzed and vetted by the RTF. RTF has re-designated this type of measure as UES; Unit Energy Savings. UES measure savings are stated in terms of customer meter kWh, rather than busbar kWh[16].
SAP	(Systems, Applications, and Products in Data Processing) – SAP is a large multinational software development and consulting corporation located in Germany. The PSE SAP system is used mainly for HR, Contracting, and General Accounting. EES interacts with the system thru timesheets, contract/invoicing, and by assigning costs against order numbers.

[15] For instance, it is unusual that a contractor would install 200 ft^2 of attic insulation. A more likely total might be 200.5 ft^2

[16] The RTF publishes both Busbar and Customer Meter kWh savings.

Glossary, Continued

Savings Value	The total number of units; either kWh or therms, applied to a specific measure or group of measure types that represent energy conserved by the installation or use of the noted measure. The Savings Value is different from the Measure Value.
UES	Unit Energy Savings. Formerly “deemed”, but updated by the RTF.

EES Implementation Vendors

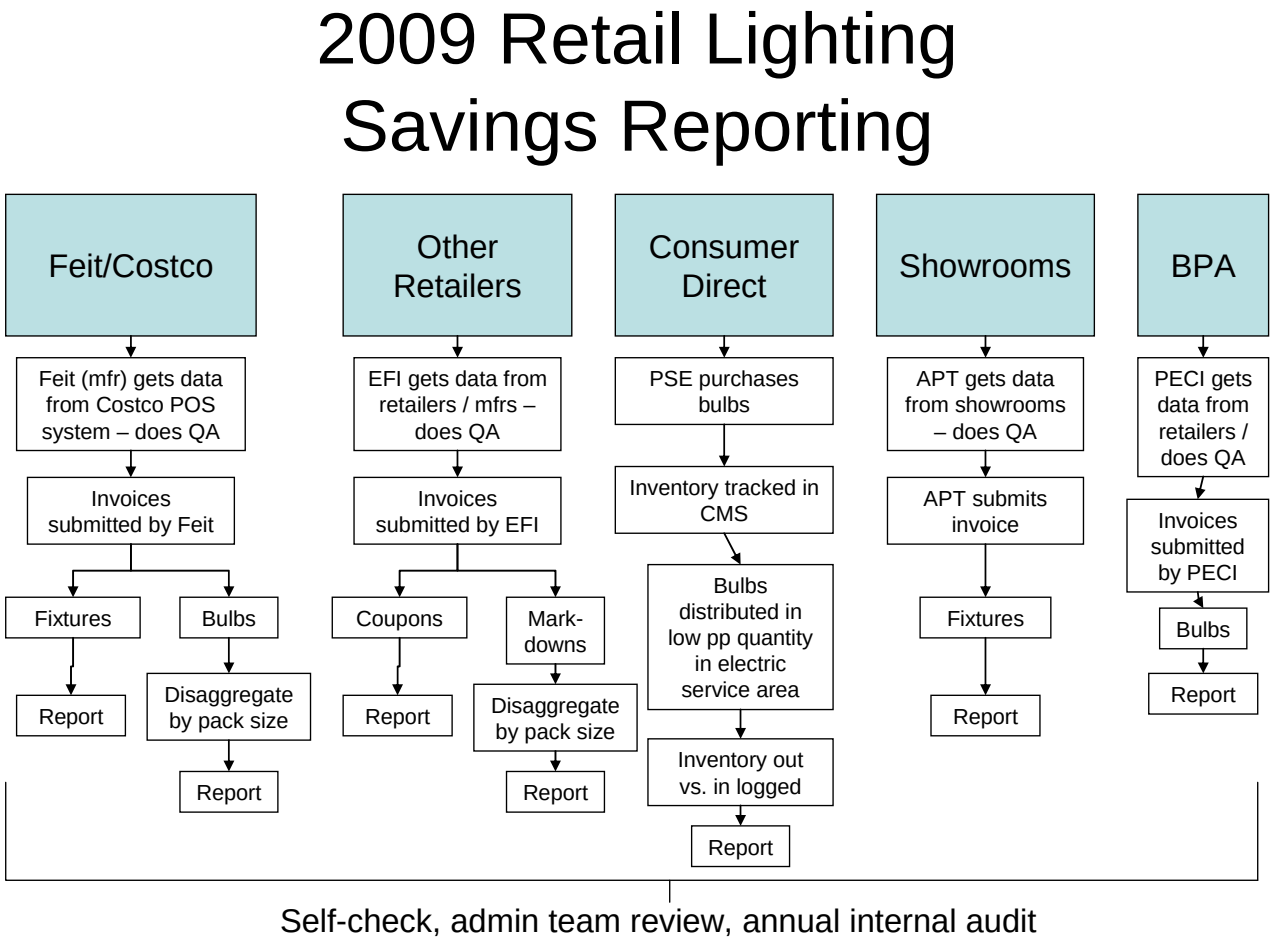
2009 – 2010 EES Vendors

Vendor	Program	Order
ENERGY FEDERATION INC	Lighting	18230440
FEIT ELECTRIC COMPANY	Lighting	18230440
ECOLIGHTS NORTHWEST LLC	Lighting	18230440
TECHNICAL CONSUMER PRODUCTS INC	Lighting	18230440
PORTLAND ENERGY CONSERVATION INC	Lighting	18230440
COLEHOUR & COHEN INC	Lighting	18230440
FLUID MARKET STRATEGIES INC	Lighting	18230440
ECOS IQ INC	Lighting	18230440
PORTLAND ENERGY CONSERVATION INC	Washers	18230434
FEIT ELECTRIC COMPANY	Washers	18230434
PORTLAND ENERGY CONSERVATION INC	Washers	18230434
ECOS IQ INC	Washers	18230434
CSY	Washers	18230434
JACO ENVIRONMENTAL INC	Refrigerator	18230432
APPLIANCE RECYCLING CENTERS OF	Refrigerator	18230432
ENERGY FEDERATION INC	Showerheads	18230435
LACY & PAR INC	Showerheads	18230435
UCONS LLC	Weatherization	18230627
ECOS IQ INC	Weatherization	18230627
CSY	Weatherization	18230627
ECOS IQ INC	MF Retrofit	18230407
OPOWER INC	Home Energy Reports	18230461
SBW	Spray Heads	18230457/18230449
AUTONETIC	LIW	18230611

Please note that EES engages far more vendors than the above list. Most, however, do not manage implementation of programs that directly result in energy savings.

Appendix B: EES Lighting Reporting Process

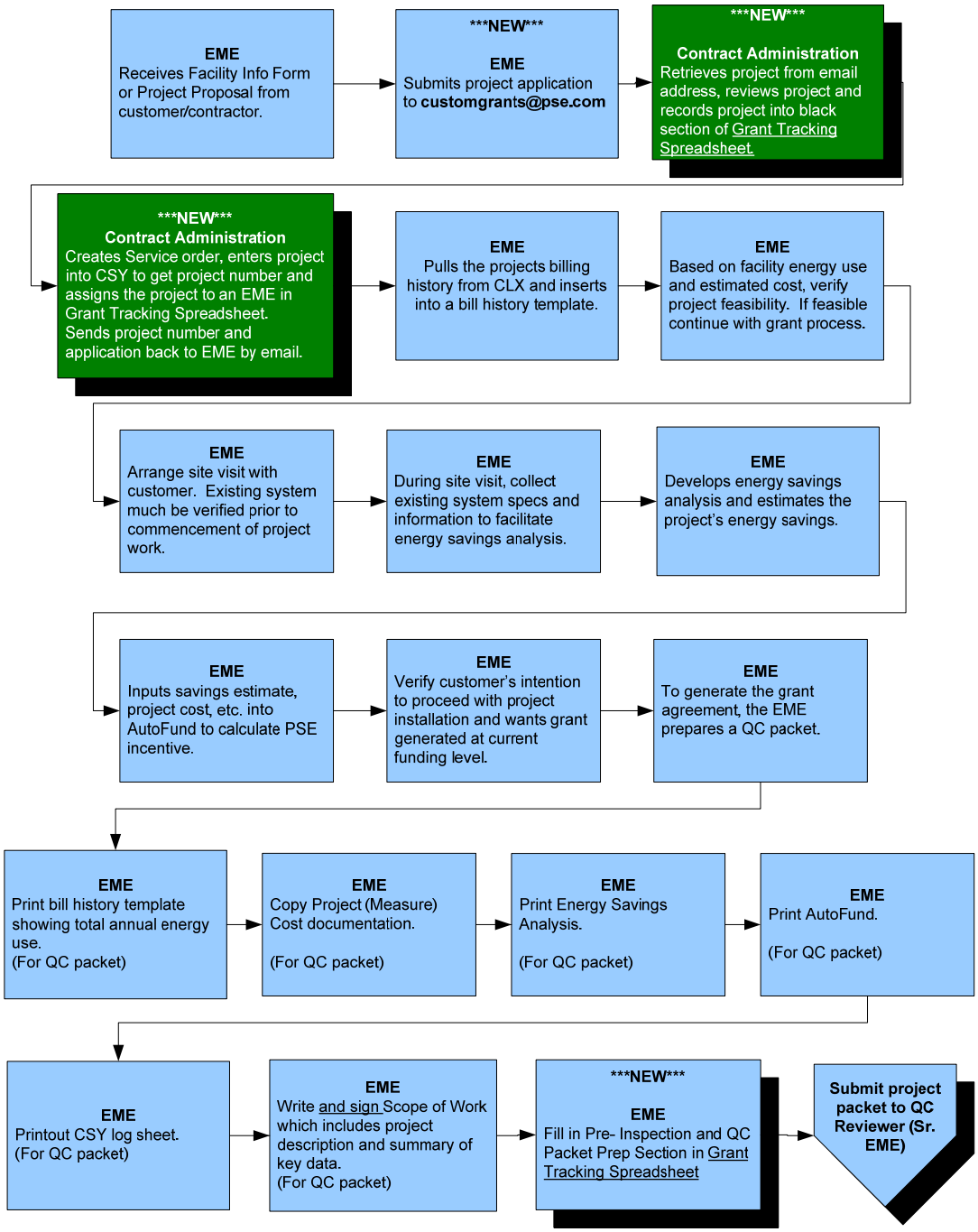
2009 – 2010 Residential Lighting Reporting Process



Appendix C: Custom Grant Process Flow

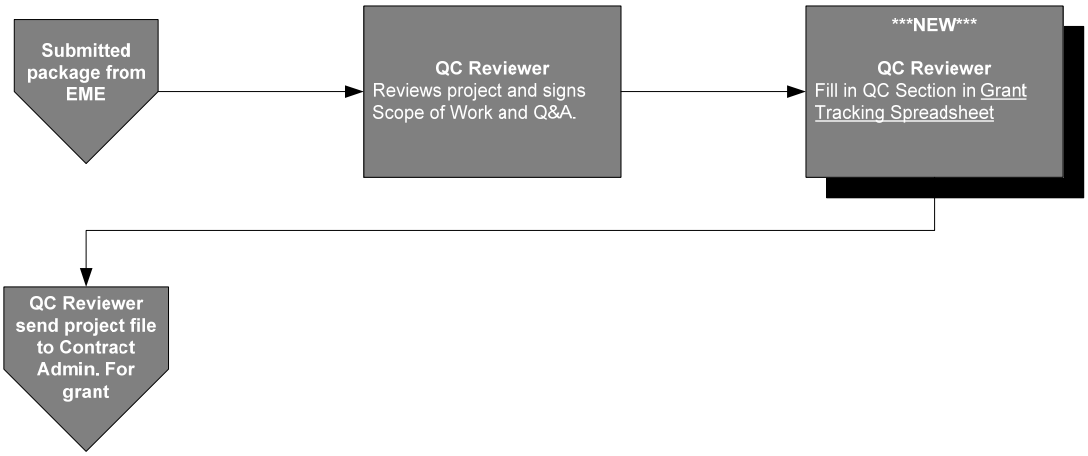
Revised C&I Grant Procedure

EME Receives Grant Request

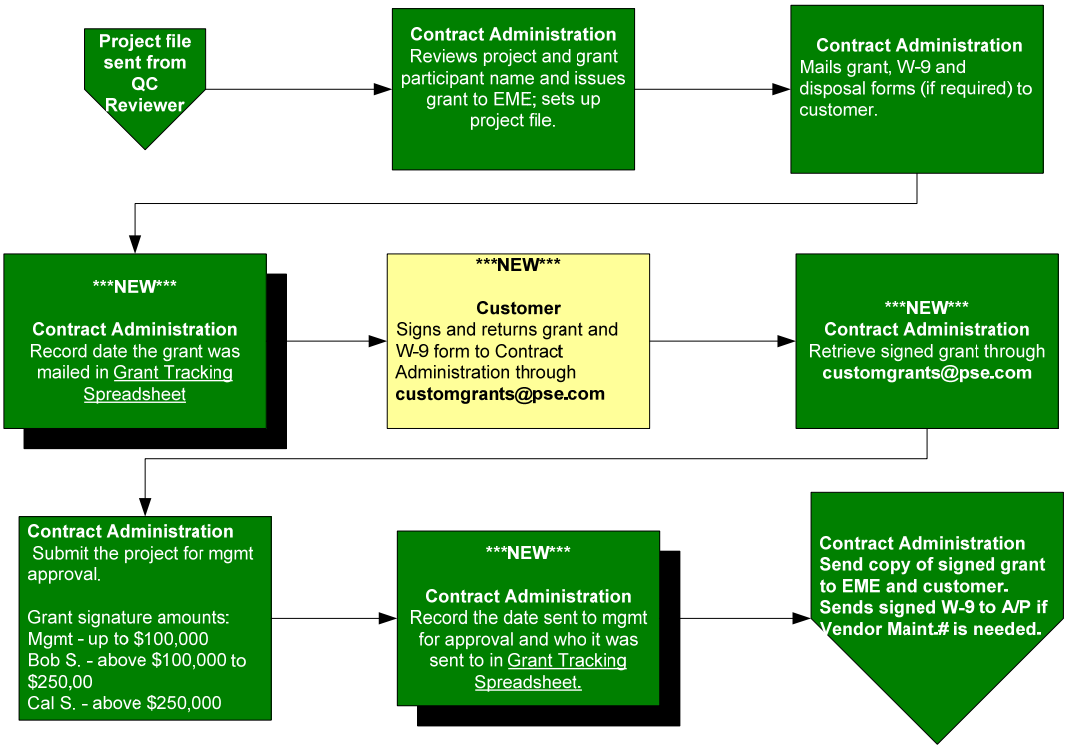


1/14/11 Procedure Update

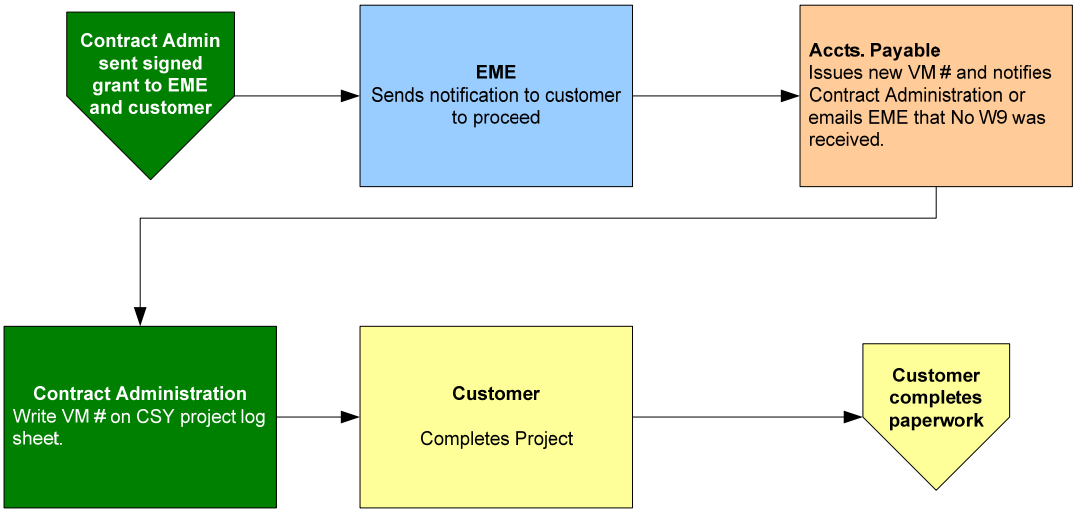
QC Review



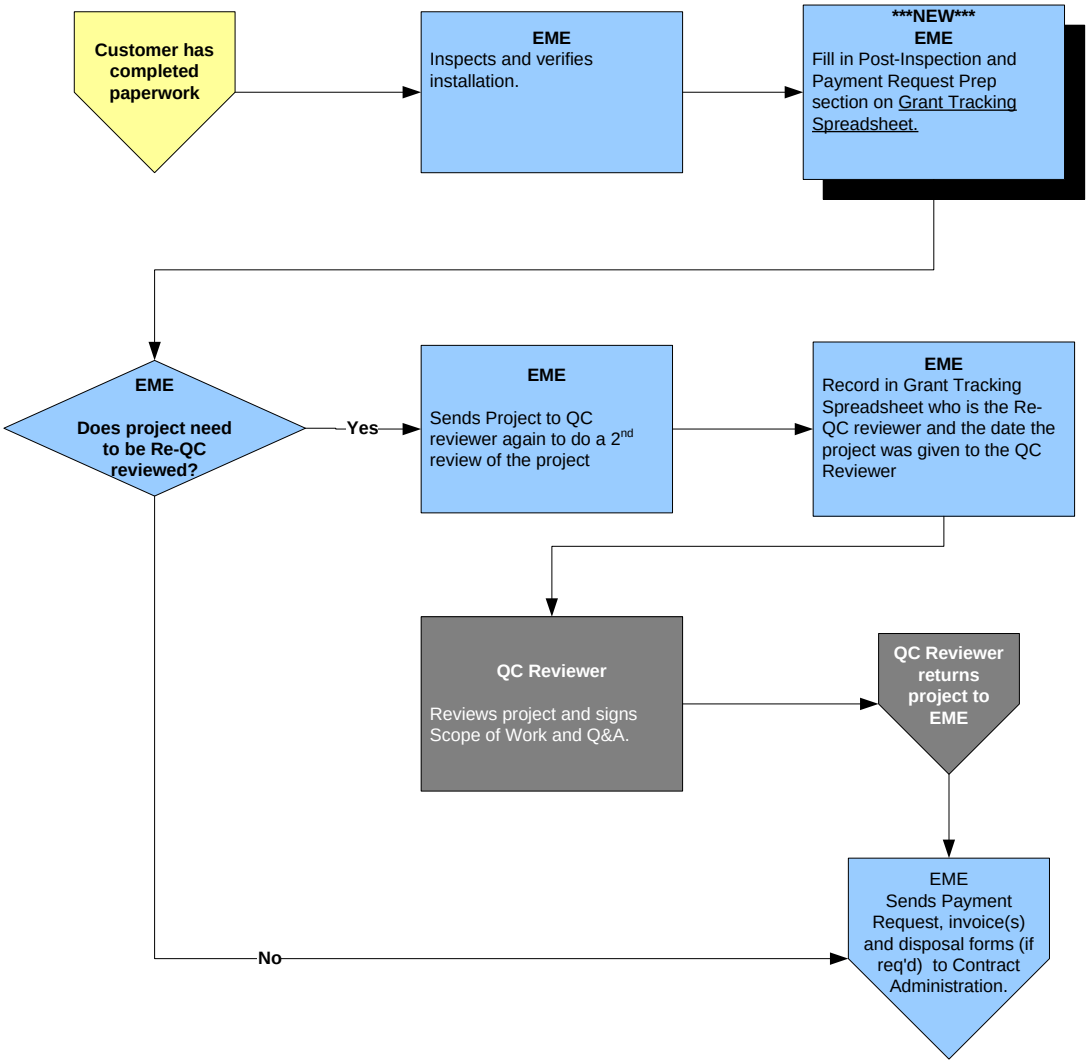
Project is sent to Contract Administrator



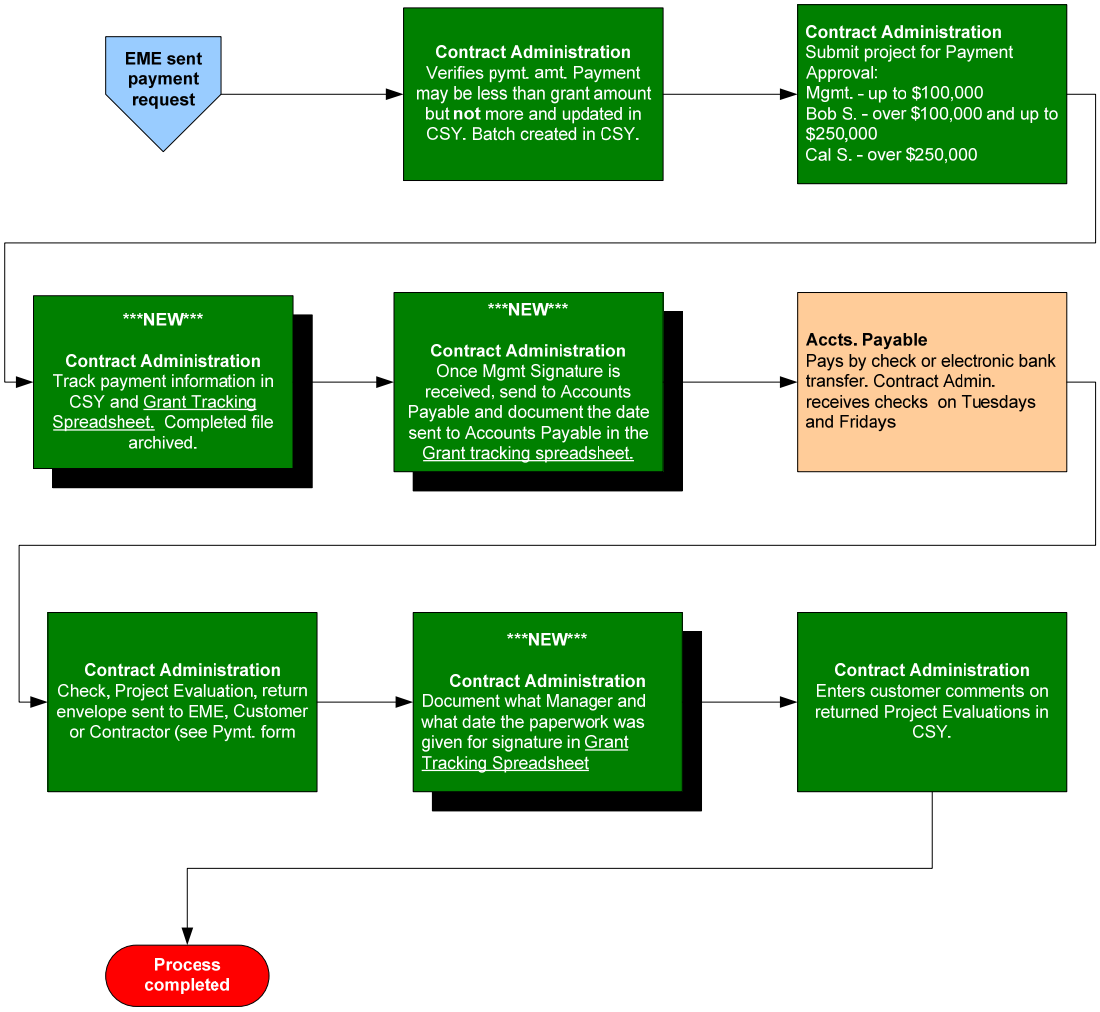
Signed Grant is Returned and Project Commences



Project is Verified and Payment Requested



Payment Requested, Records Archived



Appendix D: Savings Adjustment Table

Savings Adjustment Reconciliation Detail (Required for each adjustment request)

Order#:	
CSY Link:	

Please enter either the statement acct#, project#, etc. that would allow for cross-reference to CSY. (Please indicate which the number is.)

→Please double-click anywhere in the following tables to access Excel to enter adjustment figures.

→Use field with blue headers only if an incentive amount requires adjustment. If the count of a measure is the only adjustment required, these fields are not necessary.

Originally Reported Month

Corrected Month, Savings

(The month in which the need for adjustment is discovered. The unit count noted here [in column E] will almost certainly include some number of correctly-counted units. The adjusted amount from the original month is to be added to the correctly-counted unit total for the result in column F.)

Note: Cannot adjust gray cells!

		Savings	Incentive	Units			Savings			Incentive	Units			Savings			Incentive	Resulting Adjustment			Total Reconciliation	
Customer Name	Measure Name	Savings per unit (kWh or Therm)	Incentive Amount per unit	Month Originally Reported	Originally Reported Units	Should Have Reported	Difference	Original Savings	Should have been savings	Difference	Incentive Discrepancy per unit	Month Corrected	Original Total in Corrected Month	Adjusted Total Corrected Month Total	Difference	Original Savings, Corrected Month	Corrected Savings	Difference	Adjusted Incentive Amount	Savings	Incentive	Comment & #	Units	Savings
Hemstreet	Heat Pump - Tier 1	408	$ 200.00	March	1	0	-1	408	0	-408	$ (200.00)	August	0	-1	-1	0	-408	-408	$ -	-408	$ -	1	0	0
	Electric FAF to HP conversion	5,176	$1,000.00	March	0	1	1	0	5,176	5,176	$ 1,000.00	August	0	1	1	0	5,176	5,176	$ 800.00	5,176	$ 800.00		0	0
								0	0		#VALUE!					0	0				$ -		#VALUE!	#VALUE!
								0	0		#VALUE!					0	0				$ -		#VALUE!	#VALUE!
								0	0		#VALUE!					0	0				$ -		#VALUE!	#VALUE!
								0	0		#VALUE!					0	0				$ -		#VALUE!	#VALUE!
								0	0		#VALUE!					0	0				$ -		#VALUE!	#VALUE!
								0	0		#VALUE!					0	0				$ -		#VALUE!	#VALUE!
								0	0		#VALUE!					0	0				$ -		#VALUE!	#VALUE!
								0	0		#VALUE!					0	0				$ -		#VALUE!	#VALUE!
																				4,768	$ 800.00			
				A	B	C				D	E		F	G	H			I	J	K	L		M	N

Please use the actual count from the month in which the adjustment will occur.

This amount is the difference noted in column C plus the total in column E.

This is the incentive amount for the noted measure, multiplied by the amount in column C. Please note that a negative amount is for an overpayment and positive amount is for an underpayment.

This is a manual entry field. This it to accommodate the cases in which a customer incorrectly cashes a rebate check or returns a check for an incorrect amount. Please use the comment section to the left to provide adjustment detail.

This is the amount of the adjustment that is noted on the cover page of the adjustment request form.

This is the amount of the incentive per unit multiplied by the total in column G.

Sum of column (I, S) and (L, V) should each be zero.

Comment: 1) In March, when the rebate was originally processed, Hemstreet cashed the $200 rebate check and then realized that he should have received the higher amount, $1,000 for the FAC conversion. PSE will pay Hemstreet an additional $800 through a CSY payment request to equal the total due.

- Please use a separate sheet for different fuel types.
- Please use a separate sheet for different order numbers.
- Please use a separate sheet if more than 10 measures.
- Please reference the below example for correct data entry.

Energy Efficiency Services

EM&V Framework

Attachment 5

Guidelines for Measure Revisions

Version 4.5

August, 2011

PUGET SOUND ENERGY

TABLE OF CONTENTS

APPENDICES

Overview

This document provides guidelines for revising measure savings[1] figures; both gas and electric, in EES tracking systems, including Business and Residential tracking systems, Measure Metrics and CSY. It enumerates the corresponding approvals needed and the high-level reporting effects for both Residential and Commercial/Industrial prescriptive measures. Evaluation Staff members, the Residential Systems market manager and the Compliance program manager are the process owners. This document will guide EES compliance with the 2010 Settlement Agreement, conditions:

- K(6)(c): Non-RTF savings – present to CRAG for comment
- K(7)(c): Program design – incentives and implementation
- K(6)(e): EM&V – provide CRAG opportunities to review EM&V development.

These Measure Revision guidelines assist program managers with two categories of measure savings revisions: Corrections and Adjustments.

Corrections: These are considered either mathematical reporting errors, selection of the incorrect measure type, or measure savings claims made without complete validation in Measure Metrics[2].

Adjustments: These apply to measure savings with prior validation in Measure Metrics and are considered routine, occurring most often annually. Adjustments occur only when a routine review indicates that the source of savings (either an RTF revision or a PSE-commissioned evaluation) is revised and an adjustment is merited.

Adjustment categories include changes to:

- Incentive amount, measure cost, or measure life revision
- Measure delivery method revision[3]

And may result from:

- RTF Alignment
- Adjustments resulting from the findings of an Evaluation study (requires a completed ERR)

[1] Adding new measures is addressed in a separate EES document; New Measures Guidelines
[2] For example, a savings claim that either isn't archived in the Measure Metrics system or doesn't have supporting savings data noted.
[3] For example, revising a measure from a mail in rebate to that of direct install.

The following is a list of measure revision implementation timing options that were considered during development of these guidelines:

A: Adjust the savings claim at the time of error discovery and retroactively to January of the year in which the discovery was made.

B: Adjust the savings claim during the current month and forward.

C: Adjust the savings claim at the beginning of the next calendar year.

D: Adjust the savings claim at the start of the next biannual Tariff period.

When a savings correction is required, PSE will adjust the savings claim at the time of error discovery and retroactively to January of the year in which the discovery was made.

When a program's delivery method is revised, and it affects the savings value, the adjustment will occur at the time that the measure revision is approved by the Director, Customer Energy Management.

All other adjustments to savings values will be implemented the January of the following calendar year, regardless of when the new value was calculated or published.

All measure savings revisions require Director, CEM approval.

Glossary of Terms

Unless otherwise noted in a specific Conservation Schedule, the following commonly-used terms, used throughout and applicable only to this document[4] have the below noted meanings. Definitions or glossaries contained in other EES documents, policies or guidelines referring to specific processes or unique functions shall have the meanings noted in those documents, policies or guidelines.

ERR	Evaluation Report Response. Used to complete an evaluation cycle, it consists of an evaluation study result and corresponding action to be taken by program staff.
Exhibit 1	The EES Program Budgets. Referred to as Appendix B prior to 2011.
Exhibit 2	The EES Program Cost Effectiveness estimate. Formerly known as Appendix C.
Exhibit 3	The EES Program Details. Formerly known as Appendix A prior to 2011.
Exhibit 4	The EES List of Measures, Incentives and Eligibility. Known as Attachment 1 prior to 2011.
Exhibit 5	EES Prescriptive Measure Tables
Exhibit 6	Evaluation Plan or EM&V Plan. Known as Appendix D prior to 2011.
M&V Tools (Approved)	Approved Evaluation Tools include, but are not limited to Autofund (versions are regularly updated), the kWh-to-therm Evaluation conversion tool and the residential cost effectiveness workbook. It is necessary to obtain training and authorization to use these tools. Approval is based on standard EES signing authority tenants.

[4] Some acronyms, such as "ECM" have a different connotation outside the purview of PSE or conservation activities. Within many industry conservation publications,, "ECM" may mean "Electric Conservation Measure". Some EES Evaluation documents may also use the acronym ECM for "Electric Conservation Measure." Within this guideline, every effort will be made to clearly differential "measure" from other acronyms.

Glossary, continued

Savings Correction	A correction is required when a measure is non-compliant with Measure Metrics guidelines. Current measures would be considered non-compliant if there are insufficient source of savings, pertinent cost-effectiveness or evaluation documentation. Reference to a prior Tariff is not considered adequate justification for savings or cost-effectiveness claims. Similarly, if an RTF Deemed measure savings claim is based on the RTF *Busbar* value instead of Site Value[5], the measure would be considered non-compliant.
Savings Adjustment	A savings adjustment is necessary and common when a measure—for instance, based on a RTF Deemed site savings value—is out of alignment with the current fiscal year RTF site savings value. Similarly, an adjustment is appropriate if an impact evaluation study indicates a different site savings value for an approved PSE Deemed measure. In an adjustment, the savings value will adjust on January 1 of the next calendar year.
UES	With reference to prescriptive measures, Unit Energy Savings. Formerly “Deemed”.

[5] RTF savings calculation tables always include “Annual savings at site” and “Annual savings at busbar” columns.

Introduction

Per the 2010 Settlement Agreement, conditions K(6)(b) and K(6)(c):

- *Except as provided in Paragraph (6)(c) below, PSE must use the Council's Regional Technical Forum's ("RTF's") "deemed" savings for electricity measures. As of the date of this Agreement, the RTF maintains a Web site at http://www.nwcouncil.org/energy/rtf/.*
- *If PSE uses savings estimates that differ from those established by the RTF, such estimates must be based on generally accepted impact evaluation data and/or other reliable and relevant source data that has verified savings levels, and be presented to the CRAG for comment.*

EES will use RTF Deemed (2011-"UES" or Unit Energy Savings) values for its prescriptive measures where possible and thoroughly document all PSE Deemed values.EES will provide a summary of the measure revision(s) to the CRAG prior to filing its quarterly updates of Exhibit 4 (the EES List of Measures, Incentives and Eligibility)[6].

RTF Deemed ("UES") Measures

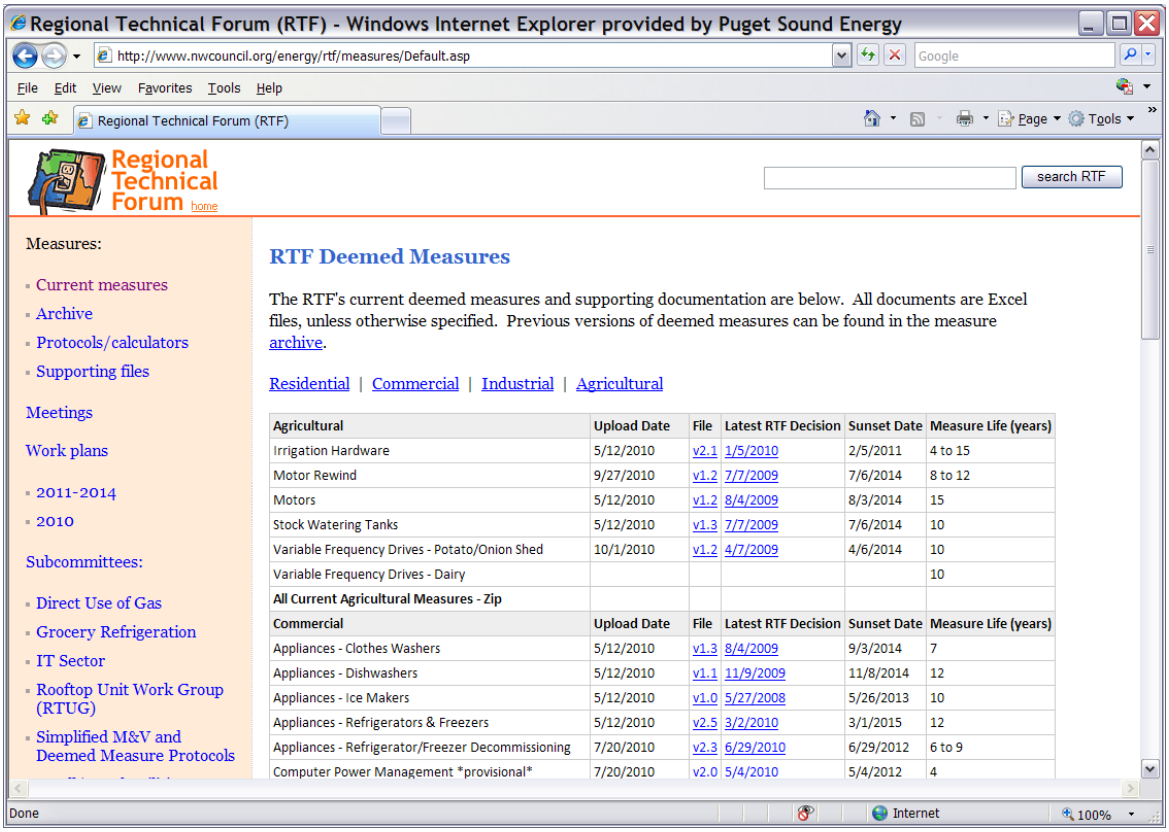
EES program managers will reference the RTF site savings (energy recorded at the customer meter) for all RTF Deemed (UES) measures. Each revision of RTF detail pages will be printed and archived in every applicable folder (corresponding to an individual measure) in the Measure Metrics system, so that the current figures are always available[7].

RTF Deemed (UES) measures should be reviewed annually to ensure alignment with the site values enumerated on the RTF website. RTF Deemed (UES) measuredocumentation should include a copy of the applicable RTF workbook, showing incremental measure cost, site savings value, measure reference code and any other pertinent attributes.

[6] PSE provides the CRAG a mark-up draft of the EES List of Measures, Incentives and Eligibility (also known as Exhibit 4) at least one week prior to filing its quarterly update and publishing the final draft on PSE.com.

[7] For instance, if an RTF value is revised in October 2010, then that RTF page will be printed and archived in the Measure Metrics system. If the same measure is not revised in October 2011, then the 2010 data will remain as the default value.

Below is a sample screen shot from the RTF website:



RTF Deemed (UES) measure values should be used as the default measure savings value, unless an approved and vetted EES evaluation document, engineering study or other similar justification indicates a more accurate savings claim is appropriate. In these cases, the measure becomes PSE Deemed. Since the RTF does not evaluate or report on gas measures, all gas measures used by EES are considered PSE Deemed.

Appendix A of this document outlines the process for accessing a specific measure, noting the correct savings and cost figures and archiving that information for Measure Metrics reconciliation.

PSE Deemed Measures

Where it is not possible to use RTF Deemed (UES) measure savings, (all gas programs, measures that have not been evaluated by RTF, many Commercial/Industrial prescriptive measures, etc.) EES will comply with Settlement Agreement condition K(6)(c):

- *If PSE uses savings estimates that differ from those established by the RTF, such estimates must be based on generally accepted impact evaluation data and/or other reliable and relevant source data that has verified savings levels, and be presented to the CRAG for comment.*

EES will provide source of savings documentation that includes but is not limited to engineering calculations, industry studies or EES Evaluation documentation[8] and cost effectiveness justification which has been reviewed and approved by the appropriate level of EES management.

The Compliance program manager shall assume responsibility for (1) ensuring that measure revision documents are approved by appropriate EES management (shown in examples below). Approved documentation is archived in the Measure Metrics database; and when an incentive amount changes or the measure offering changes; (2) in Exhibit 4: the *EES List of Measures, Incentives and Eligibility*. The Compliance program manager, will coordinate with all applicable reporting functions, including EES tracking, CSY and the Evaluation Staff to update EES savings reports.

Please note that savings values are NOT included in Exhibit 4. When a measure's savings change, there is no need to update Exhibit 4, unless the savings change drives a change in incentive funding or the measure offering.

In most cases, it will be necessary to re-evaluate a measure's cost effectiveness as a result of a savings revision. Program managers should engage an Evaluation staff member to perform or validate a cost effectiveness study (those program managers that are trained and authorized by the Evaluation staff may perform a cost effectiveness study themselves). Documented results of these studies are to be forwarded to the Compliance program manager as a part of the request to revise measure savings.

[8] Evaluation documentation can include but is not limited to: evaluations, ERRs or Adjustment Verification forms.

Measure Revision Steps

Corrections

Typically, a measure's savings value (either kWh or therms) is determined, approved and logged in all applicable archiving and tracking systems by the beginning of a calendar year. It is considered compliant when all documentation is present and it is clear how the savings value was calculated.

Throughout the year, the number of units of a particular measure are counted, verified and logged into the applicable tracking system. The vast majority of program maintenance requires no adjustment to the savings figures. In rare occurrences, though, a correction is made necessary for a number of reasons:

- The originally calculated savings value is incorrect
- The number of units is miss-counted
- The savings per unit is miss-applied
- The savings figure per unit was incorrectly entered into the tracking system
- The savings figure is incorrectly noted in Measure Metrics
- Etc.

Examples (all hypothetical):

a) Busbar savings referenced instead of site savings

- At the beginning of 2010, a Residential electric dishwasher (MEF 2.0) claim was 100 kWh/yr and was classified as "RTF Deemed" (now "UES"). Although referencing the RTF, the indicated savings value of 100 kWh/yr was based on RTF *Busbar* savings, rather than *Site* savings.
- During a routine program audit in August 2010, it was found that the RTF *site* value for this measure for the 2010 period was actually 80 kWh/yr.

Since the RTF value that was in place at the beginning of the year was different than the claimed value, this measure would be considered non-compliant and should be *corrected*, retroactively to the January of 2010. The Savings Correction Process in the *EES Guidelines for Ensuring Accuracy of Electric and Gas Savings Claims* document is to be followed and program manager, Compliance needs to be informed, so that the Measure Metrics system[9] can be updated and EES tracking systems can be adjusted.

b) Incomplete PSE Deemed source of savings justification

[9] The measure source of savings documentation *should* prevent this type of occurance, as the RTF spreadsheet—required for each measure—clearly differentiates between site and busbar savings.

- At the beginning of 2010, a residential electric water heater claim was 300 kWh/yr and was classified as "PSE Deemed". At some point in 2010, it was discovered that the source of savings was unclear or not documented.
- Following an unsuccessful extensive record search[10], an evaluation study was commissioned and in August 2010[11], revealed that the actual savings was 500 kWh/yr.
- The Program Staff, in consultation with the Evaluation Staff and using the ERR process, recommended that the savings claims should be adjusted to 500 kWh/yr.

Since the PSE Deemed value in place at the beginning of the year lacked sufficient documentation/justification, backup documentation was not located[12] and the subsequent study indicated that the originally claimed amount was incorrect, this measure would be considered non-compliant and should be *corrected*, retroactively to January 1 of the current year. In addition to completing the Adjustment Procedure, the program manager, Compliance needs to be informed, so that the Measure Metrics system can be updated and EES tracking systems can be adjusted.

c) RTF revises savings value

- A 2010 residential electric dishwasher claim was 100 kWh/yr and was classified as "RTF Deemed" (UES) and had all pertinent documentation in order
- During a routine program audit in January 2011, it was found that the RTF site value for this measure for the 2010 period was revised to 80 kWh/yr in October 2010. PSE learned that this adjustment was routine and not a result of an RTF error

Since the RTF value changed *after* the beginning of the year, this measure is compliant and should not be *adjusted* until January 1 of the next calendar year. The Compliance program manager is to be informed, so that the Measure Metrics database, file and H: drive is updated and EES tracking systems can be adjusted.

d) A savings error is discovered on the RTF website

- A 2010 residential electric dishwasher claim was 100 kWh/yr and was classified as "RTF Deemed" (UES) and had all pertinent documentation in order.
- During a routine program audit in August 2010, it was found that the RTF site value for this measure for the 2010 period was incorrectly noted and should have been 80 kWh/yr since the beginning of the year.

This measure is compliant, as the program staff referenced the RTF and had the RTF spreadsheet printed and archived in the Measure Metrics system. Since PSE discovered the inconsistency, however, and in the interest of prudence, it behooves PSE to adjust the savings value retroactively to January 2010. In addition to completing the savings adjustment process,

[10] As of March 2011, all source of savings documentation has been located when it is discovered that Measure Metrics background documents are incomplete.
[11] In almost all cases, commissioning an evaluation study on such short notice is highly unlikely.
[12] When source of savings documentation is located, an adjustment is not required.

the Compliance program manager needs to be informed, so that the Measure Metrics system can be updated and EES tracking systems can be adjusted.

Corrections include either claimed savings increases or decreases. Any exceptions to this guideline should be approved in writing by the manager, Budget and Administration. A correction form needs to be completed by the applicable program management representative, outlining:

- What happened?
- How was the need for correction discovered?
- How did it happen?
- What is the impact?
- What is being done to ensure that it doesn't happen again?

The form also includes a table, in which the Program staff will input the original claim, the corrected claim and the result. A hard copy of the adjustment will be archived in the applicable year's tracking folder. A summary of the adjustment will be logged in the adjustment table for that year and will be included in the Annual Report for that year as an exhibit.

Updates/Revisions

Appendix B is the form used when it is necessary for EES to create a PSE Deemed measure that is based on or also listed as an RTF Deemed measure.

Although it may not be necessary to update Exhibit 4 when savings values are revised; updates to this document are needed when the incentive amount or delivery methods change. Exhibit 4 is regularly updated each quarter. Unless it is an extraordinary circumstance, it is preferable to accumulate all revisions and publish them all in this routine timeframe. Because Exhibit 4 is a "living" document and is undergoing constant updating, please check with the program manager, Compliance for a link to the latest iteration.

When Exhibit 4 updates are needed, it is preferable for the requesting program manager to complete the document edits; this removes any uncertainty about content accuracy.

RTF Deemed ("UES") (Primarily Residential) Updates

RTF site values may be updated annually. If measures were in compliance/ aligned with RTF site values at the beginning of the calendar year, savings claims will not be adjusted until January of the following year. If a measure is non-compliant, (like example "**a**" above) it is considered a correction.

The RTF also updates savings values from time to time to take into account higher efficiency factors and new evaluation data. In some cases, like a residential clothes washer, an MEF 2.2 with electric water heat and electric dryer may have a 2010 value of 200 kWh/annually. In 2011[13], that same clothes washer may now have a value of 170 kWh/annually. This instance would be considered an adjustment and the EES savings claim value would be adjusted on January 1 of 2011.

However, there are also instances where the MEF 2.2 is no longer eligible; either for cost-effective, code standards, etc. reasons. In this case, the MEF 2.4 clothes washer now is considered the lowest efficiency eligible. In this case, the measure is to be retired (please see the Measure Retirement section below).

Program managers will be asked to review their RTF Deemed measures each year after the RTF publishes its updated list—typically in October—and note those that merit revision in January of the following year. After following the steps in Appendix A of this document, vetting the figures and obtaining revision approval, the program manager, Compliance will update the Measure Metrics database, hard copy file and H: drive with the revised claim.

The Compliance program manager will also ensure that EES tracking systems and measure databases are updated and reconcile.

PSE Deemed (Both Residential and Commercial/Industrial)

There are two circumstances under which a PSE Deemed measure is created.

1) Converting an RTF Deemed (UES) measure to PSE Deemed.

[13] That value may be update on the RTF website in October-December of 2010.

There are instances when an RTF Deemed (UES) measure is appropriate to use if a slight adjustment is made to the savings value to account for climate differences, water treatment costs or energy use, etc. Showerheads are an example.

The 2010 RTF Deemed (UES) value for a primary showerhead is 115 kWh annually. However, in the PSE territory, there are 4 kWh less used for downstream water treatment[14] than in the rest of the region. The adjusted result is 119 kWh annually. The adjustment, along with other pertinent facts, contributes the to the establishment of the PSE Deemed value.

In these cases, a form will be completed by the Evaluation or program staff, similar to an ERR[15]. This form, along with the RTF measure data spreadsheet (outlined in Appendix A of this document), source of savings and measure life-measure cost forms, are all needed for Director-Customer Energy Management approval. Please note that these are specific cases; it is necessary to collaborate with the Evaluation Staff to determine which measures can/will receive this treatment.

2) Revising PSE Deemed measures based on engineering analyses or evaluation study.

Quite a few measure savings in the Residential Sector and many in the Business Rebates program are based on engineering calculations (assembled from data collection, industry studies, Energy Star® updates, Washington State Energy Code updates[16], etc.) or an evaluation study. For instance, most weatherization[17] and some heat pump measures are PSE Deemed measures that did not have their basis on an RTF Deemed (UES) figure.

In instances 1) and 2) above, if a PSE Deemed measure is compliant at the beginning of the year, adjustments are appropriate only if an error is discoveredChanges in measure incentive amounts may be made without impacting savings claims. However, incentive amounts do affect cost effectiveness calculations, so it is necessary to use approved evaluation tools[18] and engage the Evaluation staff to perform a cost effectiveness analysis. A revised draft of Exhibit 4 is needed, as incentive amounts are listed there. The CRAG must also be notified and allowed to review and comment on the incentive levels, in accordance with the 2010 Settlement Agreement condition K(3)(a)(vi)(2)..

Revisions to measure incentives need to be documented (complete with justifying calculations) and a business case completed, with both being approved by the Director, CEM and forwarded to the Compliance program manager. The updated Exhibit 4 will be filed with the WUTC and reviewed with the CRAG on a quarterly basis. The Measure Metrics database, hard copy file and H: drive will be updated with the revised incentive. The Compliance program manager will also ensure that the EES tracking systems and measure databases are updated. Exhibit 4 will be published with the revision, following CRAG notification.

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[14] This data was combined with other installation survey data, leading to an electric savings value of 136 kWh in 2010.

[15] Please see Appendix B for a facsimile of this adjustment form.

[16] At the beginning of 2011, the 2009 WSEC was put into effect. The new code raised many efficiency standards, thus affecting incremental savings values and some measures' cost-effectiveness and their incentive levels.

[17] The 2009 Single Family and Multifamily Weatherization Studies are examples.

[18] As defined in the Glossary of Terms on page 1.

Changes in Measure Delivery Method

If program management wishes to adjust the method of delivery of a measure (for instance, from a mail-in rebate to a direct install), the measure costs are likely to change. It is necessary to use approved evaluation tools and engage the Evaluation staff to analyze the impact of such a change and make recommendations for necessary savings adjustment if warranted.

If the delivery method significantly changes the nature of the program, it also may be necessary to (a) file a tariff Schedule revision, (b) update the program description; both of which have timing and review requirements under the Settlement Agreement conditions. Please contact the Compliance program manager if there's any question about this. Exhibit 4 may also require revision, as the measure delivery method is quite often referenced.

Resultant savings revisions (if any) will become effective concurrent with the adjustment in delivery method.

After documenting and vetting the figures, these, along with a revised business case, source of saving, measure life-measure cost forms and revised Exhibit 4 should be forwarded to the Compliance program manager, who will review them with the Director, CEM and obtain revision approval. Following approval, the program manager will receive confirmation that the Measure Metrics database, hard copy file and H: drive will be updated with the revisions. The Compliance program manager will also ensure that the EES tracking systems and measure database is updated. Exhibit 4 will be published and filed with the WUTC with the revision in the following quarter, following CRAG notification.

Retired Measures

When Program Staff determine that a measure is no longer going to be offered, (for example, when the residential clothes washer levels are revised from MEF 2.0, 2.2 and 2.4 in 2010 to MEF 2.2, 2.4 and 2.7 in 2011) the measure needs to be retired (in this case, the MEF 2.0). EES does not delete measures, so as to maintain a history of that measure. There must be an affirmative acknowledgement that the measure is to be retired from the program staff before it can be deleted from Exhibit 4.

The applicable Program staff member needs to complete a Measure Retirement form, attached to the *Measure Retirement Guidelines* document as Appendix A. The form can be found here:

H:\Budget & Administration\Measure Metrics\Processes\Measure retirement policy_V2.5_03042010.doc

Once completed, the form should be forwarded to the Compliance program manager in order to be logged into the Measure Metrics database and removed from Exhibit 4.

APPENDIX A: RTF Deemed ("UES") Measures: logging savings and cost values

If this is a new measure for EES, the RTF access/logging process is the same. The approval documentation steps are slightly different, though. Please consult the NEW MEASURES GUIDELINES document.

Is this an existing EES program measure?

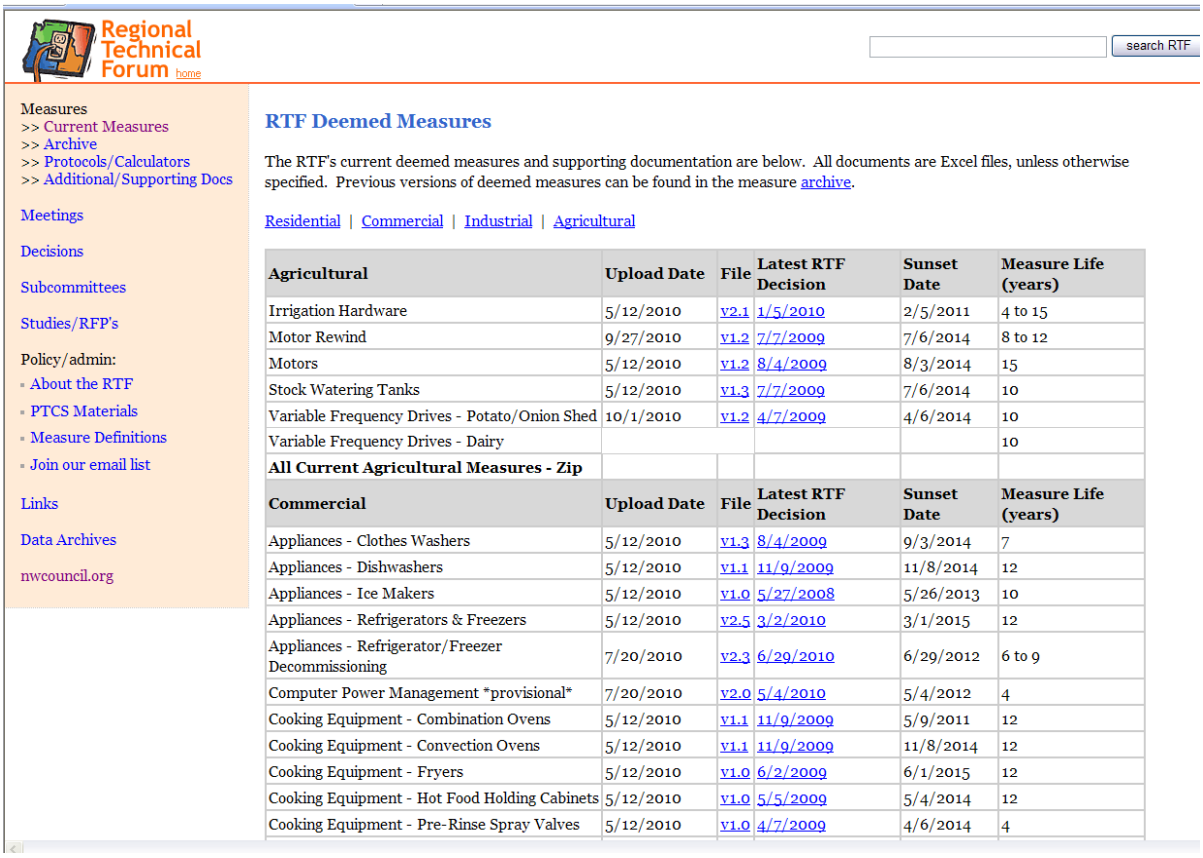
Check the current savings value in Measure Metrics against the RTF website. If it's the same, no adjustment, and no further steps are necessary.

To access the RTF site:

1) Enter the RTF url:

http://www.nwcouncil.org/energy/rtf/measures/Default.asp

You should be at this screen:



Regional Technical Forum home

search RTF

Measures
>> Current Measures
>> Archive
>> Protocols/Calculators
>> Additional/Supporting Docs

Meetings

Decisions

Subcommittees

Studies/RFP's

Policy/admin:
- About the RTF
- PTCS Materials
- Measure Definitions
- Join our email list

Links

Data Archives

nwcouncil.org

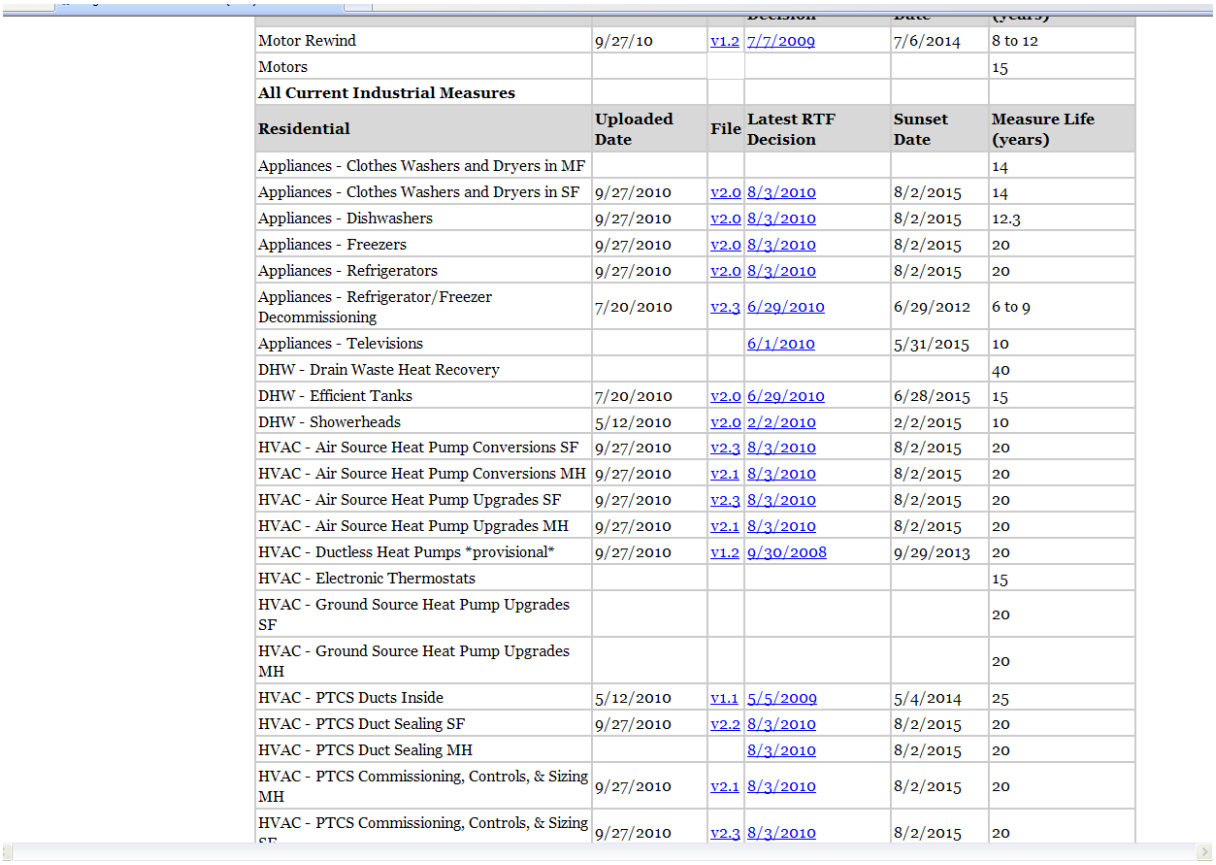
RTF Deemed Measures

The RTF's current deemed measures and supporting documentation are below. All documents are Excel files, unless otherwise specified. Previous versions of deemed measures can be found in the measure archive.

Residential | Commercial | Industrial | Agricultural

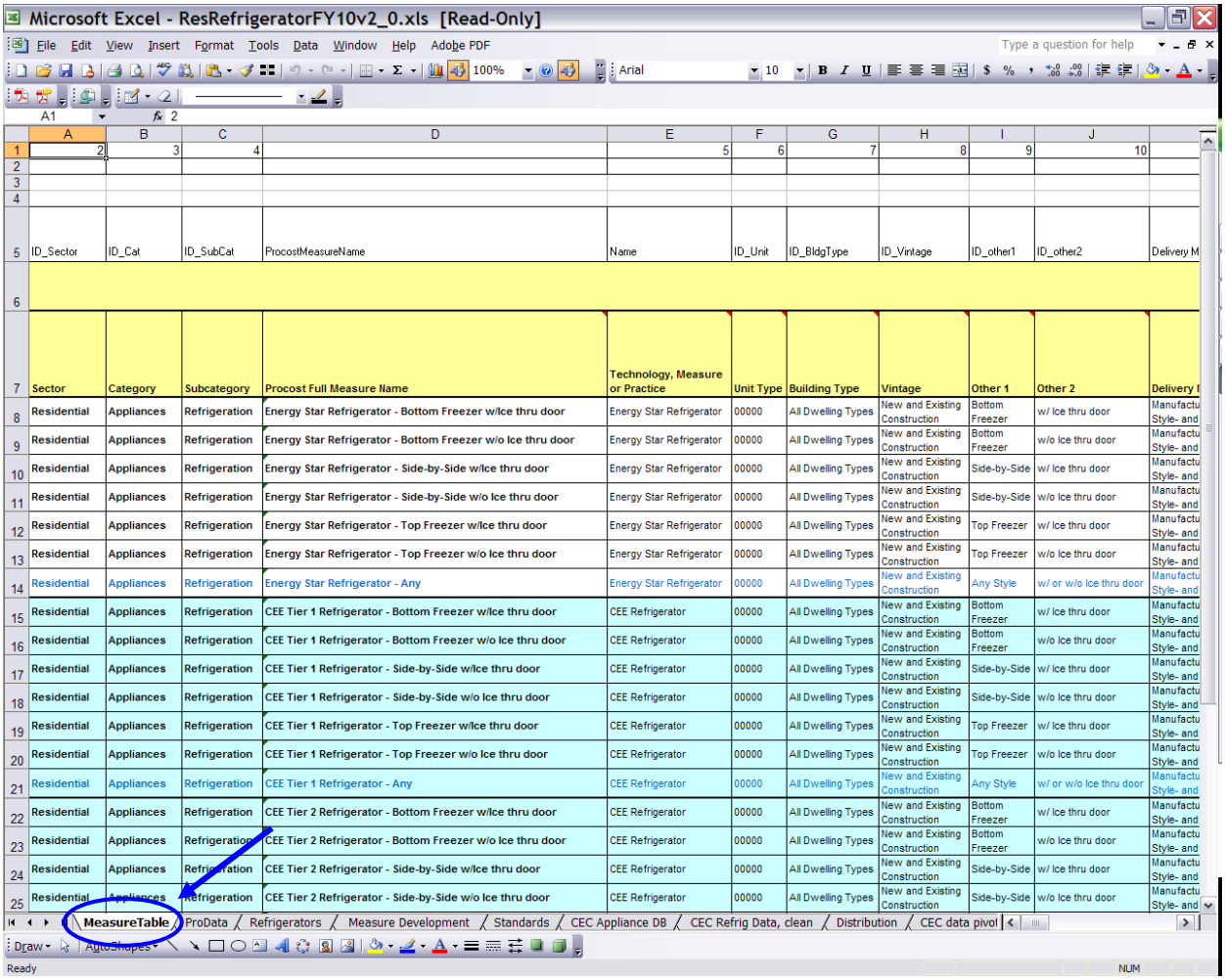
Agricultural	Upload Date	File	Latest RTF Decision	Sunset Date	Measure Life (years)
Irrigation Hardware	5/12/2010	v2.1	1/5/2010	2/5/2011	4 to 15
Motor Rewind	9/27/2010	v1.2	7/7/2009	7/6/2014	8 to 12
Motors	5/12/2010	v1.2	8/4/2009	8/3/2014	15
Stock Watering Tanks	5/12/2010	v1.3	7/7/2009	7/6/2014	10
Variable Frequency Drives - Potato/Onion Shed	10/1/2010	v1.2	4/7/2009	4/6/2014	10
Variable Frequency Drives - Dairy					10
All Current Agricultural Measures - Zip					
Commercial	**Upload Date**	**File**	**Latest RTF Decision**	**Sunset Date**	**Measure Life (years)**
Appliances - Clothes Washers	5/12/2010	v1.3	8/4/2009	9/3/2014	7
Appliances - Dishwashers	5/12/2010	v1.1	11/9/2009	11/8/2014	12
Appliances - Ice Makers	5/12/2010	v1.0	5/27/2008	5/26/2013	10
Appliances - Refrigerators & Freezers	5/12/2010	v2.5	3/2/2010	3/1/2015	12
Appliances - Refrigerator/Freezer Decommissioning	7/20/2010	v2.3	6/29/2010	6/29/2012	6 to 9
Computer Power Management *provisional*	7/20/2010	v2.0	5/4/2010	5/4/2012	4
Cooking Equipment - Combination Ovens	5/12/2010	v1.1	11/9/2009	5/9/2011	12
Cooking Equipment - Convection Ovens	5/12/2010	v1.1	11/9/2009	11/8/2014	12
Cooking Equipment - Fryers	5/12/2010	v1.0	6/2/2009	6/1/2015	12
Cooking Equipment - Hot Food Holding Cabinets	5/12/2010	v1.0	5/5/2009	5/4/2014	12
Cooking Equipment - Pre-Rinse Spray Valves	5/12/2010	v1.0	4/7/2009	4/6/2014	4

2) Select Residential, Commercial, or Industrial as applicable). You should now be at this screen:



Motor Rewind	9/27/10	v1.2	7/7/2009	7/6/2014	8 to 12
Motors					15
All Current Industrial Measures					
Residential	**Uploaded Date**	**File**	**Latest RTF Decision**	**Sunset Date**	**Measure Life (years)**
Appliances - Clothes Washers and Dryers in MF					14
Appliances - Clothes Washers and Dryers in SF	9/27/2010	v2.0	8/3/2010	8/2/2015	14
Appliances - Dishwashers	9/27/2010	v2.0	8/3/2010	8/2/2015	12.3
Appliances - Freezers	9/27/2010	v2.0	8/3/2010	8/2/2015	20
Appliances - Refrigerators	9/27/2010	v2.0	8/3/2010	8/2/2015	20
Appliances - Refrigerator/Freezer Decommissioning	7/20/2010	v2.3	6/29/2010	6/29/2012	6 to 9
Appliances - Televisions			6/1/2010	5/31/2015	10
DHW - Drain Waste Heat Recovery					40
DHW - Efficient Tanks	7/20/2010	v2.0	6/29/2010	6/28/2015	15
DHW - Showerheads	5/12/2010	v2.0	2/2/2010	2/2/2015	10
HVAC - Air Source Heat Pump Conversions SF	9/27/2010	v2.3	8/3/2010	8/2/2015	20
HVAC - Air Source Heat Pump Conversions MH	9/27/2010	v2.1	8/3/2010	8/2/2015	20
HVAC - Air Source Heat Pump Upgrades SF	9/27/2010	v2.3	8/3/2010	8/2/2015	20
HVAC - Air Source Heat Pump Upgrades MH	9/27/2010	v2.1	8/3/2010	8/2/2015	20
HVAC - Ductless Heat Pumps *provisional*	9/27/2010	v1.2	9/30/2008	9/29/2013	20
HVAC - Electronic Thermostats					15
HVAC - Ground Source Heat Pump Upgrades SF					20
HVAC - Ground Source Heat Pump Upgrades MH					20
HVAC - PTCS Ducts Inside	5/12/2010	v1.1	5/5/2009	5/4/2014	25
HVAC - PTCS Duct Sealing SF	9/27/2010	v2.2	8/3/2010	8/2/2015	20
HVAC - PTCS Duct Sealing MH			8/3/2010	8/2/2015	20
HVAC - PTCS Commissioning, Controls, & Sizing MH	9/27/2010	v2.1	8/3/2010	8/2/2015	20
HVAC - PTCS Commissioning, Controls, & Sizing SF	9/27/2010	v2.3	8/3/2010	8/2/2015	20

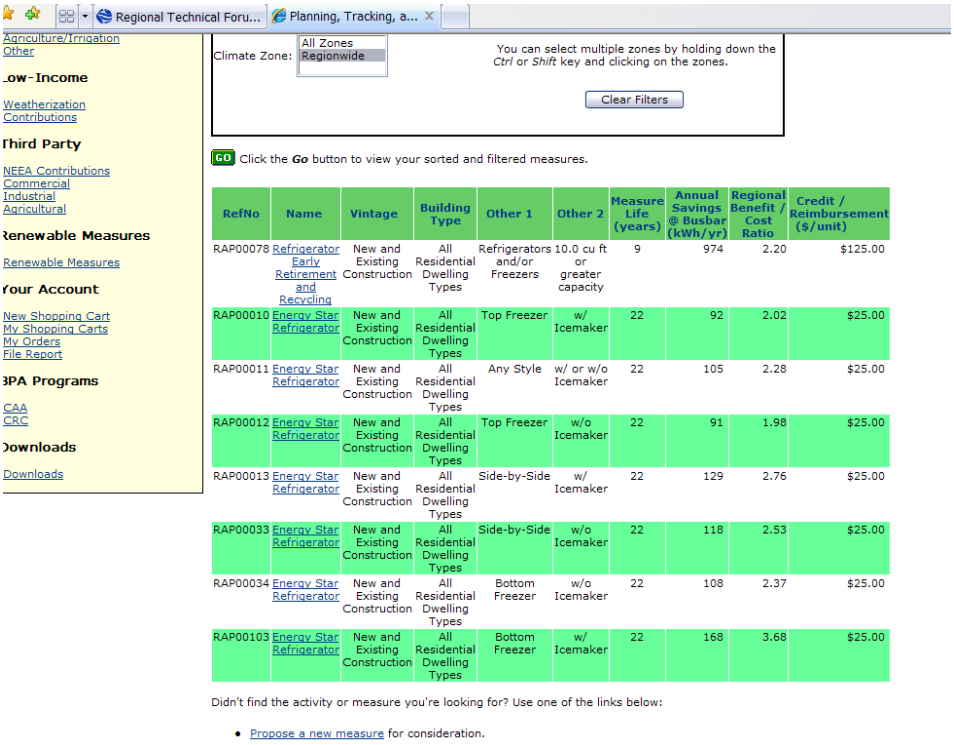
3) On the applicable measure type, select the **File** hyperlink. For this example if, **Appliances – Refrigerators** was selected). Select **Enable Macros**. There may also be a warning that the document contains links to other data sources. If so, select the **No** button. Expand the workbook when it launches. Depending on how it was saved, it may open to any of the tabs. Each workbook, though, contains a **MeasureTable** tab:



	A	B	C	D	E	F	G	H	I	J
1	2	3	4		5	6	7	8	9	10
5	ID_Sector	ID_Cat	ID_SubCat	ProcostMeasureName	Name	ID_Unit	ID_BldgType	ID_Vintage	ID_other1	ID_other2
7	Sector	Category	Subcategory	Procost Full Measure Name	Technology, Measure or Practice	Unit Type	Building Type	Vintage	Other 1	Other 2
8	Residential	Appliances	Refrigeration	Energy Star Refrigerator - Bottom Freezer w/Ice thru door	Energy Star Refrigerator	00000	All Dwelling Types	New and Existing Construction	Bottom Freezer	w/ Ice thru door
9	Residential	Appliances	Refrigeration	Energy Star Refrigerator - Bottom Freezer w/o Ice thru door	Energy Star Refrigerator	00000	All Dwelling Types	New and Existing Construction	Bottom Freezer	w/o Ice thru door
10	Residential	Appliances	Refrigeration	Energy Star Refrigerator - Side-by-Side w/Ice thru door	Energy Star Refrigerator	00000	All Dwelling Types	New and Existing Construction	Side-by-Side	w/ Ice thru door
11	Residential	Appliances	Refrigeration	Energy Star Refrigerator - Side-by-Side w/o Ice thru door	Energy Star Refrigerator	00000	All Dwelling Types	New and Existing Construction	Side-by-Side	w/o Ice thru door
12	Residential	Appliances	Refrigeration	Energy Star Refrigerator - Top Freezer w/Ice thru door	Energy Star Refrigerator	00000	All Dwelling Types	New and Existing Construction	Top Freezer	w/ Ice thru door
13	Residential	Appliances	Refrigeration	Energy Star Refrigerator - Top Freezer w/o Ice thru door	Energy Star Refrigerator	00000	All Dwelling Types	New and Existing Construction	Top Freezer	w/o Ice thru door
14	Residential	Appliances	Refrigeration	Energy Star Refrigerator - Any	Energy Star Refrigerator	00000	All Dwelling Types	New and Existing Construction	Any Style	w/ or w/o Ice thru door
15	Residential	Appliances	Refrigeration	CEE Tier 1 Refrigerator - Bottom Freezer w/Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Bottom Freezer	w/ Ice thru door
16	Residential	Appliances	Refrigeration	CEE Tier 1 Refrigerator - Bottom Freezer w/o Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Bottom Freezer	w/o Ice thru door
17	Residential	Appliances	Refrigeration	CEE Tier 1 Refrigerator - Side-by-Side w/Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Side-by-Side	w/ Ice thru door
18	Residential	Appliances	Refrigeration	CEE Tier 1 Refrigerator - Side-by-Side w/o Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Side-by-Side	w/o Ice thru door
19	Residential	Appliances	Refrigeration	CEE Tier 1 Refrigerator - Top Freezer w/Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Top Freezer	w/ Ice thru door
20	Residential	Appliances	Refrigeration	CEE Tier 1 Refrigerator - Top Freezer w/o Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Top Freezer	w/o Ice thru door
21	Residential	Appliances	Refrigeration	CEE Tier 1 Refrigerator - Any	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Any Style	w/ or w/o Ice thru door
22	Residential	Appliances	Refrigeration	CEE Tier 2 Refrigerator - Bottom Freezer w/Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Bottom Freezer	w/ Ice thru door
23	Residential	Appliances	Refrigeration	CEE Tier 2 Refrigerator - Bottom Freezer w/o Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Bottom Freezer	w/o Ice thru door
24	Residential	Appliances	Refrigeration	CEE Tier 2 Refrigerator - Side-by-Side w/Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Side-by-Side	w/ Ice thru door
25	Residential	Appliances	Refrigeration	CEE Tier 2 Refrigerator - Side-by-Side w/o Ice thru door	CEE Refrigerator	00000	All Dwelling Types	New and Existing Construction	Side-by-Side	w/o Ice thru door

Please be aware that you're in a *live* spreadsheet; please don't delete or adjust any information; please **do not select Save when closing**.

Now it gets interesting! In this example, you can see that there are a significant number of refrigerators that the RTF has performed analyses on. Fortunately, this table somewhat mimics those that are found on the PRT website:



Regional Technical Foru... | Planning, Tracking, a...

Agriculture/Irrigation
Other

Low-Income

Weatherization
Contributions

Third Party

NEEA Contributions
Commercial
Industrial
Agricultural

Renewable Measures

Renewable Measures

Your Account

New Shopping Cart
My Shopping Carts
My Orders
File Report

BPA Programs

CAA
CRC

Downloads

Downloads

Climate Zone: All Zones / Regionwide

You can select multiple zones by holding down the *Ctrl* or *Shift* key and clicking on the zones.

Clear Filters

GO Click the ***Go*** button to view your sorted and filtered measures.

RefNo	Name	Vintage	Building Type	Other 1	Other 2	Measure Life (years)	Annual Savings @ Busbar (kWh/yr)	Regional Benefit / Cost Ratio	Credit / Reimbursement ($/unit)
RAP00078	Refrigerator Early Retirement and Recycling	New and Existing Construction	All Residential Dwelling Types	Refrigerators and/or Freezers	10.0 cu ft or greater capacity	9	974	2.20	$125.00
RAP00010	Energy Star Refrigerator	New and Existing Construction	All Residential Dwelling Types	Top Freezer	w/ Icemaker	22	92	2.02	$25.00
RAP00011	Energy Star Refrigerator	New and Existing Construction	All Residential Dwelling Types	Any Style	w/ or w/o Icemaker	22	105	2.28	$25.00
RAP00012	Energy Star Refrigerator	New and Existing Construction	All Residential Dwelling Types	Top Freezer	w/o Icemaker	22	91	1.98	$25.00
RAP00013	Energy Star Refrigerator	New and Existing Construction	All Residential Dwelling Types	Side-by-Side	w/ Icemaker	22	129	2.76	$25.00
RAP00033	Energy Star Refrigerator	New and Existing Construction	All Residential Dwelling Types	Side-by-Side	w/o Icemaker	22	118	2.53	$25.00
RAP00034	Energy Star Refrigerator	New and Existing Construction	All Residential Dwelling Types	Bottom Freezer	w/o Icemaker	22	108	2.37	$25.00
RAP00103	Energy Star Refrigerator	New and Existing Construction	All Residential Dwelling Types	Bottom Freezer	w/ Icemaker	22	168	3.68	$25.00

Didn't find the activity or measure you're looking for? Use one of the links below:

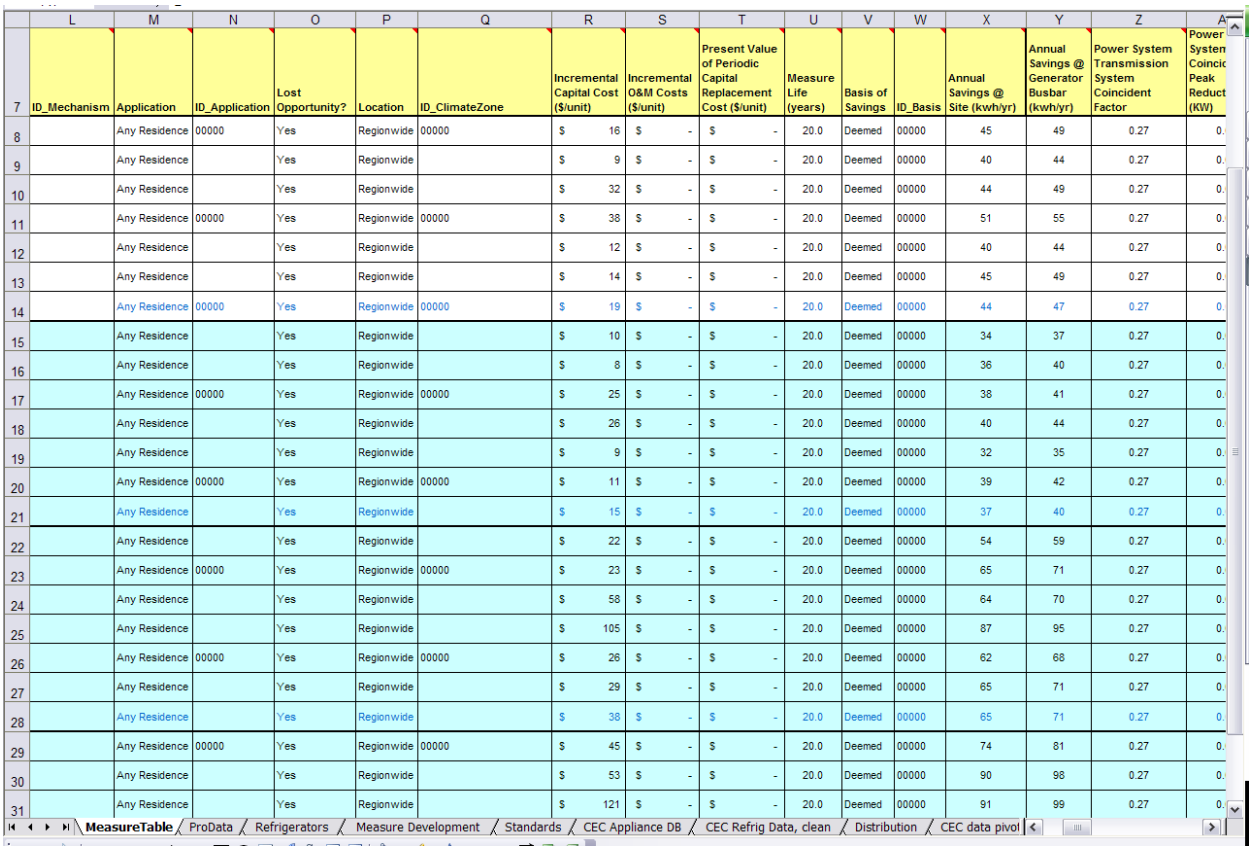
- Propose a new measure for consideration.

4) For purposes of providing irrefutable source of savings justification, (meeting the Settlement Agreement conditions) there are only a few fields that are absolutely necessary:

- Sector
- Category
- Subcategory
- Technology, Measure or Practice
- Building Type
- Vintage

In our example, note that there are two columns, “Other 1” and “Other 2”. These provide additional measure detail. If you are determining savings for refrigerators, you only need these details. It is very rare (Retail clothes washers are an exception) that customers or vendors can accurately provide this detail.

Scrolling to the right, many more fields are revealed:



	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
7	ID_Mechanism	Application	ID_Application	Lost Opportunity?	Location	ID_ClimateZone	Incremental Capital Cost ($/unit)	Incremental O&M Costs ($/unit)	Present Value of Periodic Capital Replacement Cost ($/unit)	Measure Life (years)	Basis of Savings	ID_Basis	Annual Savings @ Site (kwh/yr)	Annual Savings @ Generator Busbar (kwh/yr)	Power System Transmission System Coincident Factor	Power Systen Coincic Peak Reduct (KW)
8		Any Residence	00000	Yes	Regionwide	00000	$ 16	$ -	$ -	20.0	Deemed	00000	45	49	0.27	0.
9		Any Residence		Yes	Regionwide		$ 9	$ -	$ -	20.0	Deemed	00000	40	44	0.27	0.
10		Any Residence		Yes	Regionwide		$ 32	$ -	$ -	20.0	Deemed	00000	44	49	0.27	0.
11		Any Residence	00000	Yes	Regionwide	00000	$ 38	$ -	$ -	20.0	Deemed	00000	51	55	0.27	0.
12		Any Residence		Yes	Regionwide		$ 12	$ -	$ -	20.0	Deemed	00000	40	44	0.27	0.
13		Any Residence		Yes	Regionwide		$ 14	$ -	$ -	20.0	Deemed	00000	45	49	0.27	0.
14		Any Residence	00000	Yes	Regionwide	00000	$ 19	$ -	$ -	20.0	Deemed	00000	44	47	0.27	0.
15		Any Residence		Yes	Regionwide		$ 10	$ -	$ -	20.0	Deemed	00000	34	37	0.27	0.
16		Any Residence		Yes	Regionwide		$ 8	$ -	$ -	20.0	Deemed	00000	36	40	0.27	0.
17		Any Residence	00000	Yes	Regionwide	00000	$ 25	$ -	$ -	20.0	Deemed	00000	38	41	0.27	0.
18		Any Residence		Yes	Regionwide		$ 26	$ -	$ -	20.0	Deemed	00000	40	44	0.27	0.
19		Any Residence		Yes	Regionwide		$ 9	$ -	$ -	20.0	Deemed	00000	32	35	0.27	0.
20		Any Residence	00000	Yes	Regionwide	00000	$ 11	$ -	$ -	20.0	Deemed	00000	39	42	0.27	0.
21		Any Residence		Yes	Regionwide		$ 15	$ -	$ -	20.0	Deemed	00000	37	40	0.27	0.
22		Any Residence		Yes	Regionwide		$ 22	$ -	$ -	20.0	Deemed	00000	54	59	0.27	0.
23		Any Residence	00000	Yes	Regionwide	00000	$ 23	$ -	$ -	20.0	Deemed	00000	65	71	0.27	0.
24		Any Residence		Yes	Regionwide		$ 58	$ -	$ -	20.0	Deemed	00000	64	70	0.27	0.
25		Any Residence		Yes	Regionwide		$ 105	$ -	$ -	20.0	Deemed	00000	87	95	0.27	0.
26		Any Residence	00000	Yes	Regionwide	00000	$ 26	$ -	$ -	20.0	Deemed	00000	62	68	0.27	0.
27		Any Residence		Yes	Regionwide		$ 29	$ -	$ -	20.0	Deemed	00000	65	71	0.27	0.
28		Any Residence		Yes	Regionwide		$ 38	$ -	$ -	20.0	Deemed	00000	65	71	0.27	0.
29		Any Residence	00000	Yes	Regionwide	00000	$ 45	$ -	$ -	20.0	Deemed	00000	74	81	0.27	0.
30		Any Residence		Yes	Regionwide		$ 53	$ -	$ -	20.0	Deemed	00000	90	98	0.27	0.
31		Any Residence		Yes	Regionwide		$ 121	$ -	$ -	20.0	Deemed	00000	91	99	0.27	0.

MeasureTable | ProData | Refrigerators | Measure Development | Standards | CEC Appliance DB | CEC Refrig Data, clean | Distribution | CEC data pivot

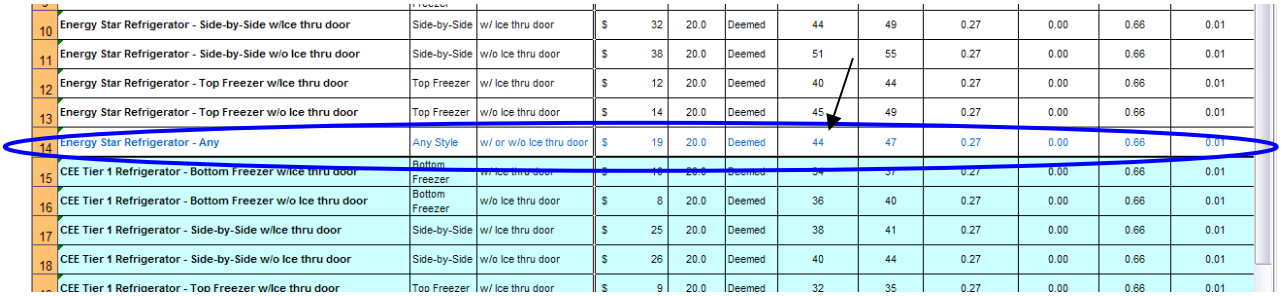
From these remaining fields to the right, we also need:

- Application
- Incremental Capital Cost
- Measure Life
- Annual Savings @ *Site* (kWh/yr) (NOT the *Busbar* column!)
- Reference Number (normally, this is extremely useful. In the example, though, every refrigerator is noted as “New Measure”.)

There are VERY few cases in which the remaining fields are required.

At this point, you are ready to compare the currently claimed value of a “generic” refrigerator. (In this example, EES has been claiming 54 kWh/yr for an *Energy Star Refrigerator – Any*. This particular measure doesn’t stipulate where the freezer is and it doesn’t matter whether it has an ice maker or not. It is applicable in any housing type, whether new or existing construction.

Measure Metrics and the Residential Measure Database indicate that EES has been claiming 54 kWh/yr in 2010 for this measure. Reviewing this spreadsheet, we see that RTF has now determined that the value will be 44 kWh/yr (some fields have been hidden for this example).



10	Energy Star Refrigerator - Side-by-Side w/Ice thru door	Side-by-Side	w/ Ice thru door	$ 32	20.0	Deemed	44	49	0.27	0.00	0.66	0.01
11	Energy Star Refrigerator - Side-by-Side w/o Ice thru door	Side-by-Side	w/o Ice thru door	$ 38	20.0	Deemed	51	55	0.27	0.00	0.66	0.01
12	Energy Star Refrigerator - Top Freezer w/Ice thru door	Top Freezer	w/ Ice thru door	$ 12	20.0	Deemed	40	44	0.27	0.00	0.66	0.01
13	Energy Star Refrigerator - Top Freezer w/o Ice thru door	Top Freezer	w/o Ice thru door	$ 14	20.0	Deemed	45	49	0.27	0.00	0.66	0.01
14	Energy Star Refrigerator - Any	Any Style	w/ or w/o Ice thru door	$ 19	20.0	Deemed	44	47	0.27	0.00	0.66	0.01
15	CEE Tier 1 Refrigerator - Bottom Freezer w/Ice thru door	Bottom Freezer	w/ Ice thru door	$ 13	20.0	Deemed	54	57	0.27	0.00	0.66	0.01
16	CEE Tier 1 Refrigerator - Bottom Freezer w/o Ice thru door	Bottom Freezer	w/o Ice thru door	$ 8	20.0	Deemed	36	40	0.27	0.00	0.66	0.01
17	CEE Tier 1 Refrigerator - Side-by-Side w/Ice thru door	Side-by-Side	w/ Ice thru door	$ 25	20.0	Deemed	38	41	0.27	0.00	0.66	0.01
18	CEE Tier 1 Refrigerator - Side-by-Side w/o Ice thru door	Side-by-Side	w/o Ice thru door	$ 26	20.0	Deemed	40	44	0.27	0.00	0.66	0.01
	CEE Tier 1 Refrigerator - Top Freezer w/Ice thru door	Top Freezer	w/ Ice thru door	$ 9	20.0	Deemed	32	35	0.27	0.00	0.66	0.01

According to the Measure Revision Guidelines, steps must be taken to adjust the value from 54 to 44 kWh in 2011.

If the value is the same, no additional steps are required.

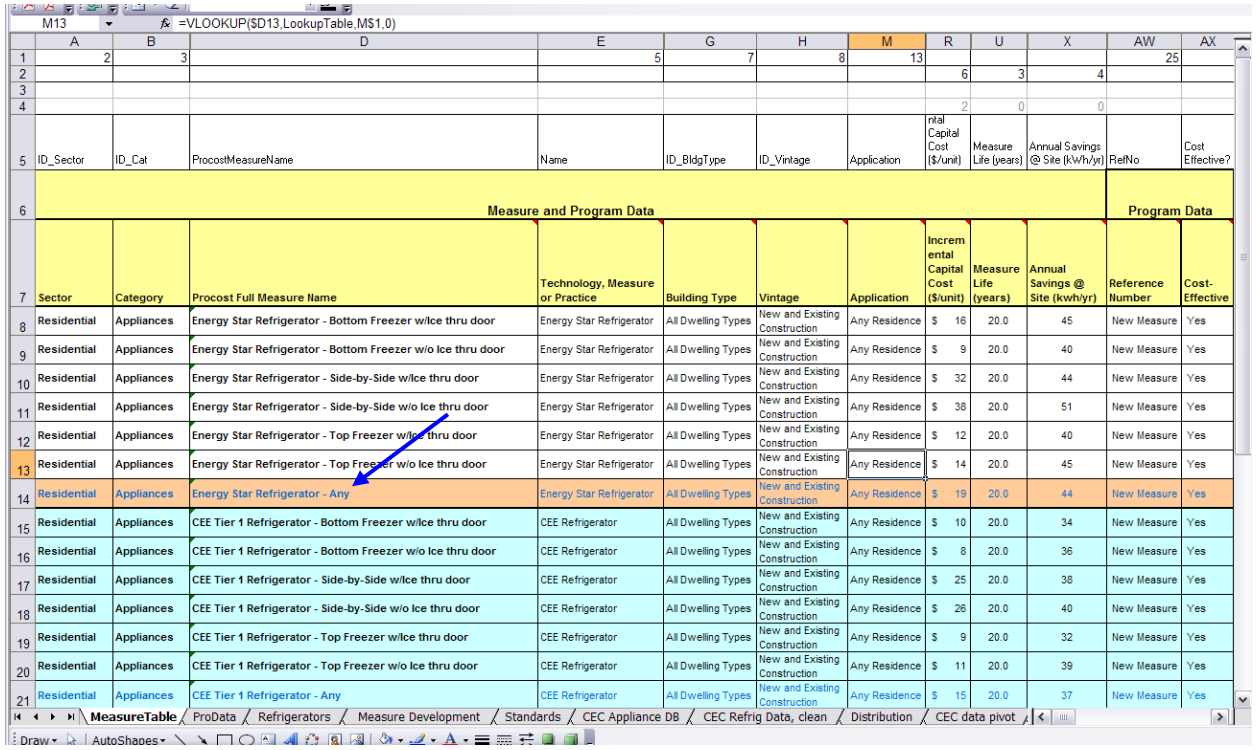
Printing the RTF Data

When a revision is deemed necessary, it is necessary to print the RTF detail page and attach it to the revised source of savings template, which will include all of the updated information. Please do not simply include a hyperlink on the source of savings template. For audit purposes, it is necessary that we have quick and direct access to the actual savings data, rather than a hyperlink.

If you attempt to print the spreadsheet, it'll be mostly unreadable; there are too may fields to fit on even ledger-size paper. Therefore, when the spreadsheet is open, please hide all but these columns (PLEASE DON'T **DELETE** ANY!):

- Sector
- Category
- Procost Full Measure Name
- Technology, Measure or Practice
- Building Type
- Vintage
- Application
- Incremental Capital Cost
- Measure Life
- Annual Savings at Site
- Reference Number
- Cost Effective?

Now, if you can highlight the row that specifically applies to that measure, that'd be appreciated. You should now have something that looks like this:



M13 =VLOOKUP($D13,LookupTable,M$1,0)

	A	B	D	E	G	H	M	R	U	X	AW	AX
1	2	3		5	7	8	13				25	
2								6	3	4		
3												
4								2	0	0		
5	ID_Sector	ID_Cat	ProcostMeasureName	Name	ID_BldgType	ID_Vintage	Application	ntal Capital Cost ($/unit)	Measure Life (years)	Annual Savings @ Site (kWh/yr)	RefNo	Cost Effective?
6	Measure and Program Data										Program Data	
7	Sector	Category	Procost Full Measure Name	Technology, Measure or Practice	Building Type	Vintage	Application	Incremental Capital Cost ($/unit)	Measure Life (years)	Annual Savings @ Site (kwh/yr)	Reference Number	Cost-Effective
8	Residential	Appliances	Energy Star Refrigerator - Bottom Freezer w/Ice thru door	Energy Star Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 16	20.0	45	New Measure	Yes
9	Residential	Appliances	Energy Star Refrigerator - Bottom Freezer w/o Ice thru door	Energy Star Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 9	20.0	40	New Measure	Yes
10	Residential	Appliances	Energy Star Refrigerator - Side-by-Side w/Ice thru door	Energy Star Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 32	20.0	44	New Measure	Yes
11	Residential	Appliances	Energy Star Refrigerator - Side-by-Side w/o Ice thru door	Energy Star Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 38	20.0	51	New Measure	Yes
12	Residential	Appliances	Energy Star Refrigerator - Top Freezer w/Ice thru door	Energy Star Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 12	20.0	40	New Measure	Yes
13	Residential	Appliances	Energy Star Refrigerator - Top Freezer w/o Ice thru door	Energy Star Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 14	20.0	45	New Measure	Yes
14	Residential	Appliances	Energy Star Refrigerator - Any	Energy Star Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 19	20.0	44	New Measure	Yes
15	Residential	Appliances	CEE Tier 1 Refrigerator - Bottom Freezer w/Ice thru door	CEE Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 10	20.0	34	New Measure	Yes
16	Residential	Appliances	CEE Tier 1 Refrigerator - Bottom Freezer w/o Ice thru door	CEE Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 8	20.0	36	New Measure	Yes
17	Residential	Appliances	CEE Tier 1 Refrigerator - Side-by-Side w/Ice thru door	CEE Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 25	20.0	38	New Measure	Yes
18	Residential	Appliances	CEE Tier 1 Refrigerator - Side-by-Side w/o Ice thru door	CEE Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 26	20.0	40	New Measure	Yes
19	Residential	Appliances	CEE Tier 1 Refrigerator - Top Freezer w/Ice thru door	CEE Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 9	20.0	32	New Measure	Yes
20	Residential	Appliances	CEE Tier 1 Refrigerator - Top Freezer w/o Ice thru door	CEE Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 11	20.0	39	New Measure	Yes
21	Residential	Appliances	CEE Tier 1 Refrigerator - Any	CEE Refrigerator	All Dwelling Types	New and Existing Construction	Any Residence	$ 15	20.0	37	New Measure	Yes

MeasureTable | ProData | Refrigerators | Measure Development | Standards | CEC Appliance DB | CEC Refrig Data, clean | Distribution | CEC data pivot

Next, please print this sheet (it should now fit on an 8 ½ x 11) and include it with your source of savings document that summarizes the key savings attributes.

Please remember to NOT select Save when you close the workbook.

Lastly, please complete the Measure Life/Measure Cost template. Forward all three documents to the Compliance program manager. The Program Manager will review the documents with the Director, Customer Energy Management and obtain revision approval.

APPENDIX B: RTF Deemed Adjustment Justification

RTF Deemed Adjustment Justification

Creating a PSE Deemed Measure Savings Amount Based on an RTF Deemed Value

Program:

Program Manager:

Measure Name:

RTF Measure Reference Number:

Original RTF Savings Value:

Amount of Adjustment:

Resultant Value:

Evaluation Analyst:

Date of Adjustment Request:

Please describe in detail, the justification for the adjusted value. Please site any pertinent engineering or evaluation studies.

APPENDIX C: Template Locations

ERR, RTF Deemed Adjustment Form: H:\Budget & Administration\Measure Metrics\Templates\EvaluationTemplates

Source of Savings, Measure Life-Measure Cost, Business Case: H:\Budget & Administration\Measure Metrics\Templates\MeasureBackgroundTemplates

Exhibit 4 (EES List of Measures, Incentives and Eligibility): As this is a living document, undergoing constant revision, please request the link from the Measure Metrics program manager.

RTF Deemed Adjustment Justification is located here: H:\Budget & Administration\Measure Metrics\Templates\MeasureBackgroundTemplates

Energy Efficiency Services

EM&V Framework

Attachment 6

Guidelines for Measure Creation

Version 2.5

August, 2011

PUGET SOUND ENERGY

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Glossary of Terms

Unless otherwise noted in a specific Conservation Schedule or another document, the following commonly-used terms, used throughout and applicable only to this document have the below noted meanings. Definitions or glossaries contained in other EES documents, policies or guidelines referring to specific processes or unique functions shall have the meanings noted in those documents, policies or guidelines.

Attachment 1	The former name of the EES List of Measures, Incentives and Eligibility. As of 2011, the document is referred to as Exhibit 4.
Business Case	A document that clearly states the intended customer sectors, targeted energy savings and estimated costs, Source of savings, and the estimated cost effectiveness of the measure.
Exhibit 4	The EES List of Measures, Incentives and Eligibility, formerly known as Attachment 1.
Program	A service providing energy savings measures to customers.
Measure	A product, material, or service that saves energy.
Program Manager	The PSE staff person responsible for managing the implementation of a program.
WUTC	Washington Utilities and Transportation Council.

Summary Overview

New measures include those that have not been offered in the past or an addition to a "family" of measures. For instance, variable speed furnace motors may be a completely new measure added to a program. Similarly, a new model of hot food holding cabinet (HFHC), even though PSE offers rebates on several HFHC measures, is considered a new measure.

New measures need to be supported by a clearly documented business case, source of savings justification, and complete cost effectiveness calculations using approved tools. It is the program manager's responsibility to ensure that new measures are well documented and accurately represented in Exhibit 4, the EES List of Measures, Incentives and Eligibility.

The Director, Customer Energy Management (CEM) must approve the new measure prior to it being implemented.

Tariff Impact

The key difference between the implementation process of a new measure versus a measure revision is the potential Tariff impact.

If a new measure defines a new program, a new Tariff sheet (Schedule) may be needed. If so, a minimum of 60 days is required to obtain WUTC approval. Similarly, it may be necessary to add a new program description to Exhibit 3, the EES Program Descriptions.

It is also necessary to add the new measure to Exhibit 4, which must be filed with the WUTC.

Business Case

The second difference from a measure revision is the need for a business case. To obtain EES Leadership approval for a new measure, it is necessary for the program manager to outline for management: customer eligibility, incentive amounts, cost effectiveness, etc., in a summary format, according to the following business case template:

H:\Budget & Administration\Measure Metrics\Templates\NewMesaureBusinessCase_032309.doc

It is also necessary for the program manager to substantiate the new measure's cost effectiveness and the source of savings claims. Please ensure that the Evaluation Staff is engaged and vets the proposed measure cost and savings figures. (These are also needed for measure revisions.)

All of the necessary Measure Metrics templates can be found here:

H:\Budget & Administration\Measure Metrics\Templates.

Approval Process

The packet of supporting information is to be provided by the program manager to the Compliance program manager. After review the information for completeness, he or she will forward the packet, along with a request for approval to the Director, CEM.. The Director, CEM will provide approval to the Compliance program manager, who will notify the program manager and System staff, who will enter the measure information into the EES Tracking System.

Implementation

After the Director, CEM approves the measure, the Compliance program manager, will provide the CRAG with a courtesy 24 hours notice that Exhibit 4 will be revised. A mark-up and final version of the revised Exhibit 4 is provided at the regular quarterly WUTC filing or more often when required. The final version will then be published on the PSE.com website when Exhibit 4 is filed with the WUTC.. The Compliance program manager will also update the Measure Metrics database and coordinate with EES savings tracking. The Measure Metrics database, hard copy files and H: drive files will be updated with the new measure.

CRAG Review

Regardless of a potential Tariff impact, it is necessary to provide the Compliance program manager an updated version of Exhibit 4. The Compliance program manager will provide the most up-to-date electronic version of Exhibit 4 for editing. Using “track changes”, the program manager will enter revisions in all of the appropriate sections and email the revision to the Compliance program manager. The mark-up version of Exhibit 4 will accumulate all revisions submitted during the current quarter. It, along with a “clean” version will be presented to the CRAG as a part of the quarterly WUTC filing process. After the CRAG has been given a business week to review the updates, the “clean” version of Exhibit 4 is filed with the WUTC records center and it is placed on the PSE.com website.

Energy Efficiency Services

EM&V Framework

Attachment 7

Guidelines for Retiring Measures

Policies and General Process Overviews

Version 3.0

June 2011

PUGET SOUND ENERGY

The Energy To Do Great Things

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MEASURE RETIREMENT GUIDELINES

Glossary of Terms

Measure Retirement	The state of a measure when it is no longer active for use for the purposes of making savings claims or providing rebates to customers. This term specifically indicates that, although the measure is no longer used, its attributes are archived in the Measure Metrics database.
Measure Cancellation	Another term used synonymously with Measure Retirement.

Overview

This document provides guidelines for retiring measures, whether they be a specific element of a range within a program (for example, Tier 1 clothes washers within the appliances range in the Single Family New Construction program) or the measure constitutes the entire program (for example, Single Family New Construction dishwashers).

Reasons for Retirement

Measures may be retired when:

1) Funding has expired[1]
2) The measure is no longer cost effective
3) Measure delivery resources are no longer available
4) The measure no longer fits[2] within the program portfolio
5) An archival error[3] occurs.

[1] This would be a special circumstance and would require CRAG review. There is a need to balance budgetary consideration with the need to acquire all available, feasible cost-effective conservation within the given biennium.

[2] For example, in 2010, a rebate is offered for MEF 2.0 clothes washers were offered. However, in 2011, the new base standard is an MEF of 2.2, the 2.0 clothes washer would be retired.

[3] Measures are never deleted in the Measure Metrics database. Therefore, if an data entry error occurs (a savings value of 96 kWh is entered, when the value should have been 69, for instance), the incorrect entry is retired and a new measure is created with the correct data.

Records Reconciliation

In order that all measure records reconcile, the process to retire a measure is similar to adding or revising a measure. It is necessary to:

1) remove the measure notation from Attachment 1 (consult the program manager, Compliance at least two weeks prior so that an updated version of Attachment 1 can be published) if the measure is enumerated,
2) using the Measure Retirement form, update the Measure Metrics database to retire the measure, noting the applicable grace periods,
3) Revise the tracking sheet to show
    a. Retirement date and approval
    b. Administrative processing allowance date
4) notify the director, Customer Energy Management, in writing.

There are two types of measures that affect savings and expenses.

Measures that comprise an entire program

Retiring this type of measure indicates that expenses will no longer be charged to a corresponding PSE order number and that savings will no longer be claimed.

For instance, if there was one class of dishwasher assigned to PSE order number 18230100 and we retired dishwashers at the end of the year, it would be necessary to close this order number at the appropriate interval (noted below) and ensure that savings and expenses were not assigned to it.

It will be necessary to notify the CRAG in writing with as much lead time as possible prior to the actual retirement of the measure/program. This is considered a “major” change in which the CRAG will be interested.

Measures that are a single element of an overall program

Retiring this type of measure implies that the overall program is still paying rebates on similar products and savings will still be claimed.

For example, PSE order number 18230001 relates to “EE clothes washers”. If a Tier 1, MEF 1.8 clothes washer was retired at the end of the year, but PSE still paid rebates for Tier 2 and Tier 3 clothes washers (and even added Tier 4 clothes washers), the order number would not need to be closed, as we would continue to report savings and expenses to 1823001.

Notification

PSE Customers

EES will take appropriate steps to avoid complaints from customers resulting from retired measures. However, unless it can be accomplished with minimal expense, it is unnecessary to notify customers of a retired measure in direct correspondence, other than deleting the measure from Attachment 1 or notifying the CRAG.

It is only necessary to provide pro-active notification (via the PSE.com website, direct mail, telephonic communication, etc.) for retired measures that typically have a long lead time or are very expensive (typically, these are not mutually exclusive). Examples would be a heat pump or furnace.

Similarly, if it possible to conduct a mass notification (builders' associations, etc.), it is advisable to provide a proactive notification of the measure's retirement.

Where feasible, it is preferable to retire a measure at the start of a program year. This will ensure that savings and financial tracking are consistent and can be reconciled. Even so, there are many situations in which it isn't possible to make a "clean" break.

EES Tracking Functions

It is necessary to proactively notify all EES staff members who are responsible for ensuring the accuracy of savings claims and comply with regulatory and Company requirements.

Please use the form attached to this guideline as Appendix A. It is also preferable to provide as much information relative to the measure tracking as possible. At minimum, the existing measure, its retirement data and any data relative to its (potential) replacement measure should be provided.

To ensure accurate record keeping, it is also very useful to provide the retired measure's savings value, the grace period and any new/replacement savings values, work order numbers, applicable Schedule(s), tracking system ID number, etc., as illustrated in the below example:

ProgDes	PrgCode	MeasDesc	MEASUREID	CC	OrderNum	OrderNum Revision	Category	UOM	Savings	Incentive	Action
DUCTLESS HEAT PUMP PILOT - CALC	DHPC	DHP Pilot - Dist Reb > 400 units	DHPPDP	4430	18230464	18230628	Heating, Residential	KWH	3500	1050	
DUCTLESS HEAT PUMP PILOT - CALC	DHPC	DHP Pilot - Dist Reb <= 400 units	DHPPD	4430	18230464	18230628	Heating, Residential	KWH	3500	1500	
DUCTLESS HEAT PUMP PILOT - CALC	DHPC	DHP Pilot - Cust Reb <= 400 units	DHPPC	4430	18230464	18230628	Heating, Residential	KWH	3500	1200	
DUCTLESS HEAT PUMP PILOT - CALC	DHPC	DHP Pilot - Cust Reb > 400 units	DHPPCP	4430	18230464	18230628	Heating, Residential	KWH	3500	800	
Residential Calculated Rebates	RCR	Windows Rebate Gas .30 or better (max $1000)	WING_30_09	4430	18230678	18230637	Glass, Residential	THERM	0.06	6	
Residential Calculated Rebates	RCR	Window Rebate Gas .30 (Max $500)	WING_30_10	4430		18230637	Glass, Residential	THERM	1.01	6	New Measure
Residential Calculated Rebates	RCR	Windows Rebate Electric .30 or better (max $1000)	WIN_30_09	4430	18230462	18230627	Glass, Residential	KWH	22	6	
Residential Calculated Rebates	RCR	Windows Rebate .33 or better (max $500)	WIN_09	4430	18230462	18230627	Glass, Residential	KWH	17	3	
Residential Calculated Rebates	RCR	Window Rebate Electric .30 (Max $500)	WINE_30_10	4430		18230627	Glass, Residential	KWH	21	6	New Measure
Residential Retrofit Rebates	RRR	Furnace	FUR	4430	18230443	18230638	Heating, Residential	THERM	89	350	
Residential Retrofit Rebates	RRR	Waste Water Heat Recovery	WH_WWHR_2010	4430	18230626		Water Heater, Residential	KWH	485	250	
Residential Retrofit Rebates	RRR	Geothermal Heat Pump	HP_GEO_2010	4430	18230628		Heat Pumps, Residential	KWH	4037	1500	
Residential Retrofit Rebates	RRR	Heat Pump Tier 1	HP_T1_2010	4430	18230628		Heat Pumps, Residential	KWH	507	200	
Residential Retrofit Rebates	RRR	Heat Pump Tier 2	HP_T2_2010	4430	18230628		Heat Pumps, Residential	KWH	755	350	
Residential Retrofit Rebates	RRR	Tankless Water Heater Tier 1	TWH_T1_2010	4430	18230636		Water Heater, Residential	THERM	74	150	
Residential Retrofit Rebates	RRR	Tankless Water Heater Tier 2	TWH_T2_2010	4430	18230636		Water Heater, Residential	THERM	93	200	
Residential Retrofit Rebates	RRR	Electric Storage Water Heater	WH_E_2010	4430	18230626		Water Heater, Residential	KWH	125	50	
Residential Retrofit Rebates	RRR	Gas Water Heater Tier 1	WH_GT1_2010	4430	18230636		Water Heater, Residential	THERM	18	50	
Residential Retrofit Rebates	RRR	Gas Water Heate Tier 2	WH_GT2_2010	4430	18230636		Water Heater, Residential	THERM	30	50	
Residential Retrofit Rebates	RRR	Heat Pump Water Heater	WH_HP_2010	4430	18230626		Water Heater, Residential	KWH	2001	250	
Residential Retrofit Rebates	RRR	Electric FAF to HP Conversion	HP_EFCONV_2010	4430	18230628		Heat Pumps, Residential	KWH	7164	1000	
Residential Retrofit Rebates	RRR	Ductless Heat Pump	DHP_2010	4430	18230628		Heat Pumps, Residential	KWH	3950	800	
Residential Retrofit Rebates	RRR	Heat Pump Tier 1 (8/1/2008)	HPT1_080801	4430	18230406		Heat Pumps, Residential	KWH	507	200	Deactivate
Residential Retrofit Rebates	RRR	Heat Pump Tier 2 (8/1/2008)	HPT2_080801	4430	18230406		Heat Pumps, Residential	KWH	755	350	Deactivate
Residential Retrofit Rebates	RRR	Gas Furnace	FUR_G_2010	4430	18230638		Heating, Residential	THERM	89	250	
Residential Retrofit Rebates	RRR	Gas Boiler	BLR_G_2010	4430	18230638		Heating, Residential	THERM	119	350	
Residential Retrofit Rebates	RRR	Tankless Water Heater	TWH	4430	18230674		Water Heater, Residential	THERM	74	150	Deactivate
Residential Retrofit Rebates	RRR	Gas Water Heater	GWH	4430	18230301		Water Heater, Residential	THERM	18	50	Deactivate

There have been cases in the past where this information is requested by EES Stakeholders. It is much more effective when it is provided pro-actively.

Timing Allowances

Claims Processing

An example of when a "clean" break isn't possible may be:

A new home builder purchased dozens of dishwashers in October of 2009 and cannot install them all until December 15, 2009.

Due to vacations/holidays, it isn't possible for them to file the rebate application/s ($20 per dishwasher) until after the first week of January. If the dishwasher measure has been retired effective January 1, 2010, does that mean that PSE will refuse those rebate applications and not claim conservation savings for them?

Another circumstance that impacts expense and savings reporting is EES rebate processors' backlogs. For example:

In the above dishwasher scenario, where the program (in this case, there is only one class of dishwasher), is ending, this measure is the only one associated with order number 18230100. Any rebate applications submitted after this date are rejected. However, the rebate processors have accumulated 300 dishwasher rebate applications—all received prior to December 31, 2009—to process along with their other duties.

Grace Period Allowance

To prevent significant complaints, EES has established the below grace period guidelines. These guidelines only apply to measure that have been retired. For measures whose savings were adjusted at year-end but are still being offered, please reference the EES 2011 Guidelines for Ensuring Accuracy of Electric and Gas Savings Claims at: H:\Budget & Administration\EES Policies\EES Reporting Policies and Procedures.

1) A grace period is appropriate for retired measures that comprise an entire program and are thus linked to an order number. The timeframe of this grace period depends on the volume of claims for this measure, the financial impact, customer sensitivity, how proactively PSE has communicated with its constituents and resources necessary to track these "outliers".
    a. In the case noted above for dishwashers, a grace period of February 15 (45 days) was determined to be appropriate.
        i. New home builders were notified in December that January 1 was the retirement date and that their rebate applications would be rejected after February 15 2010.
    b. In the case of 2007 heat pumps (some customers were still installing/making rebate claims for heat pumps purchased in 2007 through 2009), EES will continue to accept and pay rebates and make savings claims for them, as there remains an active heat pump order number (that applies to two other heat pump types).
        i. This is a key consideration. In example #1, if it were only one model or tier of dishwashers (out of many tiers) that were being retired, it may not be necessary to establish a grace period. Program staff would still be able to recognize expenses and make claims against the order number.

EES Administrative Processing Allowance

EES has established these administrative processing guidelines. Please note that these steps apply only to order numbers with a single measure (as outlined in our dishwasher example above). Retired measures that are included as a suite that rolls up to an order number (as our heat pump example) do not require a processing allowance.

1) The program manager should meet with a representative of the rebate processors to determine a date by which all applications can be processed and paid.
    a. In addition to the grace period noted on the tracking form (step 2.a above), the program manager should also clearly indicate the administrative processing allowance date.
2) Final savings, incentive dollars & expenses will be applied in the month following the agreed-upon date.

Grace period allowances are rarely concurrent with the below outlined administrative processing allowance. They are usually consecutive.

Tracking Notation

If no dollars have been allocated to the measure on its effective retirement date and savings claims/costs are assigned to that measure (either through assessments, direct charging to the order number, etc.) an apparent accounting discrepancy will be created.

For example, to stay with our dishwasher example, the measure is retired December 31, 2009. No budget dollars have been allocated to pay for this program as of January 1, 2010. If, though, expenses were charged to the order number, an inspector could reasonable be expected to say "how is PSE going to pay for these dishwashers if you don't have any money budgeted for them?" (NOTE: The answer is that the funds are going to come from another program.)

In cases where the measure is the only attribute that comprises the PSE order number:

a. The program manager should clearly mark the appropriate tracking form (either an Excel spreadsheet, Access database table, etc.) as close as possible to the order number: *"Measure Retired, <<effective date>> by <<program manager name>>. Administrative process period ends <<date agreed to with rebate processing group>>. No entries after that date. Close order number by <<6 months following effective date>>".*
b. Six months following the retirement date, request the Budget business analyst to close the order number. He/she will validate that expenses have no longer been assigned to the order number and request PSE accounting to close the order number

When the program is audited in the future, it will be clear as to why there were expenses/ savings charged to the order number even though the measure was retired.

Claims that are received after the grace period should be refused by mailing a standard form letter to the claimant.

a. If a claim is paid after the end of the grace period, savings may not be claimed and expenses recognized against that order number without a memo from the cost center manager attached to the tracking form.

The memo needs to state:

1. The customer name, date of claim
2. Reason that the claim was made after the end of the grace period.
3. Reason that the claim should be paid
    a. Acceptable reasons include "avoid WUTC escalation[4]" or "issue escalated to EES Leadership".
4. A clearly indicated approval of payment from the cost center manager.

Savings Claims

Please reference the EES 2011 Guidelines for Ensuring Accuracy of Electric and Gas Savings Claims at: H:\Budget & Administration\EES Policies\EES Reporting Policies and Procedures.

Pursuant to the EES Savings Claims Guidelines, the savings value claimed for a retired measure will be the value which was in effect at the time that the measure was installed.

This may necessitate additional administrative work on the part of the program staff to refer to individual application forms to determine the actual time of installation.

[4] There are circumstances in which a customer becomes insistent that the Company's policies or implementation of the policies is incorrect. It is up to the program staff to determine if continued escalation of a disagreement may be counterproductive. In these circumstances, it is sometimes mutually beneficial to pay the disputed rebate, rather than process a response to a potential complaint to the WUTC.

Appendix A

Measure Retirement

Each quarter, EES reports its measure status to the CRAG. As we are expected to pursue all available, cost-effective, feasible conservation, we will need to explain why we are no longer offering such a measure. Please provide responses below as clearly as possible. Upon completion, the retirement will be noted in the EES List of Measures, Incentives and Eligibility, the retirement approved by the Director, CEM and the Measure Metrics archive will be updated.

Measure Name:

Program Name: Tariff Schedule:

Date that Measure will be retired:

Will there be a grace period? If so, what is the closing date?
(Will rebates still be paid after the retirement date?)

Savings Type: Electric Gas (check one)
(RTF Deemed or PSE Deemed. If RTF, please cite the RTF reference no.)

Savings Claim Amt.: kWh Therms (Check one)

Why is the measure being retired?:
- Measure no longer cost-effective
- New measure taking its place
- Measure no longer in RTF database
- No customer demand for offering
- Other (please elaborate)

Please give a very brief description of the analyses performed that led to this decision:

(EG; “High-efficiency refrigerators are now cheaper than less efficient units, making rebates for them unnecessary.”)

This template is located here:

H:\Budget & Administration\Measure Metrics\Templates\MeasureBackgroundTemplates\Measure Retirement.dotx

Energy Efficiency Services

EM&V Framework

Attachment 8

Comparison of NAPEE documents, Program Impact Evaluation Guide, and Understanding Cost Effectiveness of Energy Efficiency Programs to PSE's EM&V Framework

10/24/2011

Table of Contents

Overview

This document draws a comparison of the characteristics of Puget Sound Energy's EM&V Framework document to the National Action Plan for Energy Efficiency Model Energy Efficiency Program Impact Evaluation Guide[1] (PIEG). In addition, another NAPEE document, Understanding Cost Effectiveness of Energy Efficiency Programs[2] is referenced for comparison to cost effectiveness text in the Framework. The PIEG provides guidance on approaches for calculating energy, demand, and emissions savings resulting from energy efficiency programs.

The Puget Sound Energy (PSE) EM&V Framework describes PSE's overarching approach to evaluation of DSM energy efficiency programs, like the PIEG which focuses of program evaluation similarly. The National Action Plan for Model Energy Efficiency Program Impact Evaluation Guide is referenced throughout the EM&V Framework.

Importance of Evaluation

The PIEG, in Section 2, lists two objectives of evaluation[3] that address the importance of evaluation. The two objectives are copied word for word in the EM&V Framework. They are:

- To document and measure the effects of a program and determine whether it met its goals with respect to being a reliable energy resource.
- To help understand why those effects occurred and identify ways to improve or discontinue current programs, and develop future programs.[4]

The PIEG is focused on program evaluation as opposed to project evaluation. It lists three specific types of evaluations with the most text devoted to impact evaluations:

- Impact evaluations
- Process evaluations
- Market effects evaluation[5]

Under the heading "Evaluation Principles, Objectives and Metrics" the Framework[6], lists five types of evaluations, expanding on the list found in PIEG:

- Impact evaluations

[1] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steve Schiller, Schiller Consulting, Inc. <www.epa.gov/eeactionplan>
[2] National Action Plan for Energy Efficiency (2008), Understanding Cost Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy Makers. Energy and Environmental Economics, Inc. and Regulatory Assistance Project. <www.epa.gov/eeactionplan>
[3] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide, page 2-1. Prepared by Steve Schiller, Schiller Consulting, Inc.
[4] EM&V Framework, August 19, 2011, page 4.
[5] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide, page 2-4. Prepared by Steve Schiller, Schiller Consulting, Inc.
[6] EM&V Framework, August 19, 2011, pages 4-5.

- Cost effectiveness analysis
- Process evaluations
- Market evaluations
- Market effects evaluations

Cost effectiveness analysis is a task taken on by the evaluation staff at PSE. Market evaluations entail research aspects that typically go beyond a process evaluation, in that they may focus on identifying the needs and of key market actors or trade allies, identify measure costs, and inform a market based program design. Market effects evaluations assess market transformation or estimate a program's influence on encouraging future energy efficiency projects because of changes in the marketplace.

Impact Evaluation

The rest of PIEG, starting with section 3, addresses Impact Evaluations. Basic Impact Evaluation Concepts are listed as:

- Impact Evaluations are used for determining directly achieved program benefits (e.g., energy and demand savings, avoided emissions).
- Savings cannot be directly measured, only indirectly determined by comparing energy use and demand after a program is implemented to what would have been had the program not been implemented.
- Successful evaluations harmonize the costs incurred with the value of the information received, that is, they appropriately balance risk management, uncertainty and cost considerations.[7]

The EM&V Framework acknowledges these concepts and specifically addresses concept number 3 by stating, "The goal of evaluation planning is to spend the least money necessary in order to adequately ascertain the best value savings estimates and mitigate the risk of either under or over-reporting savings. Evaluation planning identifies the types of evaluation information that is crucial to different stakeholders."[8]

Basics for Calculating Gross Energy Savings

The PIEG cites and describes[9] IPMVP[10] Options A – D:

- Retrofit Isolation: Key Parameter Measurement
- Retrofit Isolation: All Parameter Measurement
- Whole Facility

[7] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide, page 3-1. Prepared by Steve Schiller, Schiller Consulting, Inc.
[8] EM&V Framework, August 19, 2011, page 6
[9] National Action Plan for Energy Efficiency (2007), Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steve Schiller, Schiller Consulting, Inc., pages 4-3 – 4-17
[10] The International Performance Measurement and Verification Protocol, Volume 1 is available at: <http://www.evo-world.org/> .

- Calibrated Simulation

The Framework also cites the International Performance Measurement and Verification Protocol to follow when performing program evaluations.[11]

How Energy and Demand Savings Are Determined

The PIEG lists three components of how savings are determined:[12]

- Gross program energy and demand savings are determined
- Gross program savings are converted to net energy and demand savings using a range of possible considerations (e.g., free rider and spillover corrections).
- Avoided emissions are calculated based on net energy savings
- Additional co benefits are calculated as appropriate.

The EM&V Framework has a section that discusses Net Savings but consistent with condition K(10)(c), PSE does not estimate Net Savings, since the Net-to-Gross ratio is set to 1.0. Gross savings is reported in Washington State. That said, the Framework does acknowledge the value of evaluating free-ridership and spillover, key metrics to Net Savings, as useful for program design.

Avoided emissions are not mentioned in the EM&V Framework as they are not currently calculated as a benefit of PSE's EES programs. Other co benefits or Non-Energy Benefits are acknowledged in the Framework, have not been used in recent years for the purposes of passing the Total Resource Cost Test, but going forward evaluations will seek to quantify them.

Planning an Impact Evaluation

In Section 7, Planning an Impact Evaluation, of the PIEG, speaks of integrating evaluation into the program implementation cycle so that evaluation results may be used to make informed decisions on program improvements and program designs.

The EM&V Framework outlines a four year cycle for evaluation of all PSE programs so evaluations may inform future program design and savings estimates. Occasionally, special evaluation projects may arise from regional or other interests that will be interspersed within the four year cycle as needed.

Cost Effectiveness

While PIEG mentions cost effectiveness as an element of Impact Evaluations it is mute on cost effectiveness analysis methodologies, another NAPEE document, Understanding Cost-Effectiveness of Energy Efficiency Programs, describes methodologies for determining program cost effectiveness in detail.[13] This document

[11] PSE EM&V Framework, August 19,2011, page 5
[12] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide, pages 3-1 – 3-2. Prepared by Steve Schiller, Schiller Consulting, Inc
[13] National Action Plan for Energy Efficiency (2008), Understanding Cost Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers. Energy and Environmental Economics, Inc. and Regulatory Assistance Project.

defines items such as Avoided Cost, Customer Bill Savings, Customer Cost, Incentive Cost, Measure Cost, Program Overhead Cost, Quantified Non-Energy Benefits, and Un-Quantified Non-Energy Benefits, and lays out the means of using these items in four cost effectiveness tests, stipulated by the WUTC for PSE to use starting in 2012. These tests are listed below:

- Total Resource Cost (TRC), with addition of the 10% Power Act Credit
- Utility Cost (UC) or Program Administrator Cost Test (PACT)
- Ratepayer Impact Measure (RIM)
- Participant Cost Test (PCT)

These tests are described in the EM&V Framework. The TRC and UC tests are designated as the primary cost effectiveness tests with the RIM and PCT tests as additional tests to report.[14]

www.epa.gov/eeactionplan

[14] EM&V Framework, August 19, 2011, pages 15-16