Exhibit 8:

Evaluation, Measurement & Verification (EM&V) Framework

November 1, 2019

PSE PUGET SOUND ENERGY

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Acknowledgements

Puget Sound Energy would like to acknowledge and thank the members of the Conservation and Resource Advisory Group (CRAG), for their help in designing this EM&V Framework document.

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 Energy Efficiency Department documents, policies or guidelines that refer 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 State and Local Energy Efficiency Action Network (2012). https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf.

The 2012 version of the guide is an update to the 2007 National Action Plan for *Energy Efficiency Model Energy Efficiency Program Impact Evaluation Guide*, Appendix A. Prepared by Steven R. Schiller, Schiller Consulting, Inc..

Baseline: Energy consumption that would have occurred without implementation of the subject project or program. Baselines are categorized as either Pre-Conditions (for retrofit and replacement measures or programs) or Current Practice (for measure addition and new construction programs). For the Pre-Conditions baseline, cost-effectiveness is determined based on the full cost of the measure. For the Current Practice baseline, cost-effectiveness is determined based on the incremental cost of the newly installed measure over current practice.[1]

Other baselines, including those for air emissions, water usage, and other resources, can also be established to use in calculating non-energy impacts (NEIs.)

Baseline period: The period of time selected as representative 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.

Claimed Savings: are values reported by a program implementer or administrator after the efficiency activities have been completed.

Condition: Reference to conditions found in Appendix A Order 01 of Docket UE-152058.

[1] http://rtf.nwcouncil.org/subcommittees/Guidelines/RTF%20Guidelines%20(revised%206-17-2014).pdf

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.

Cost-Effectiveness Analysis: The exercise to determine the cost-effectiveness of programs and measures from various viewpoints including Utility Cost and Total Resource Cost.

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.

DSMc: A web-based central library containing the data required for running DCM programs and simulations. It is a single system of record for PSE energy efficiency programs, with standardization of program data collection to ensure quality and timely visibility of portfolio performance, and provide centralized program forecasting, tracking and management.

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 Department: A department within PSE that is responsible for fielding Energy Efficiency Services to customers.

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 and levels of demand or energy saving.

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, Measurement and Verification (EM&V) 2.0: A set of principles that relies on the existing EM&V framework coupled with advanced data analytics to provide continuous, granular results of evaluation activities.

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." Often used in context of reported savings.

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).

Evaluated Savings: Values reported by an independent, third-party evaluator after the efficiency activities and impact evaluation have been completed.

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.

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.

HVAC Interactive Effects: impact of the installation of high-efficiency lighting systems on a building's heating and cooling systems. This typically equates to a reduction in cooling load and an increase in heating load. HVAC interactive effects are expressed as a multiplier in energy savings algorithms, resulting in either additional energy savings or an energy savings penalty. (Reference: 'Standard Savings Estimation Protocol for Lighting Measures,' RTF, 2012)

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.

Implementation Teams: Puget Sound Energy, Energy Efficiency Department 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.

Internal Evaluation Team: Puget Sound Energy staff that perform analysis and reporting in Energy Efficiency Programs and Measures but do not have energy savings targets as part of their goals or incentive structure.

Market Effects 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 factors affecting a market. The evaluation can include 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 Archive: Used to refer to the systems that catalogue PSE's measure offerings including the The Measure Library within DSMc and the Tracking and Reporting System.

Measure Life: See Effective Useful Life (EUL).

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 spillover, free ridership, 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 Evaluations: Evaluations to assess program delivery from design to implementation, to identify bottlenecks and constraints, highlight efficiencies and potential improvements, and determine what worked and what did not. Process evaluations focus on a program as currently operated to identify timely improvement opportunities.

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; a 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.

Projected Savings: Values reported by a program implementer or administrator prior to the time the efficiency activities are completed.

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

Realization rate: The ratio of ex-post evaluated gross savings to ex-ante reported gross savings. Realization rates compare the ex-post evaluated savings to the ex-ante reported 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.

Standards for Econometric Analysis and Notation (SEAN): PSE Internal standards for the rigor and documentation of econometric analysis.

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.

Unit Energy Savings (UES): 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 Deemed Savings.

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

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 (for example, billing analysis, metering) for the purpose of determining the energy use/savings of the installed measures. PSE also engages in programmatic Verification activities, managed by the Verification Team, including inspections, quality assurance reviews, and tracking checks and balances as part of routine program implementation.

Verification Team: Puget Sound Energy, Energy Efficiency Department employees who verify the installation of energy efficiency measures.

Acronyms

CRAG – Conservation and Resource Advisory Group

ECM – Energy Conservation Measure

EME – Energy Management Engineer

EM&V – Evaluation, Measurement & Verification

ERR – Evaluation Report Response

EUL – Effective Useful Life, aka “Measure Life”

IPMVP - International Performance Measurement and Verification Protocol

IRP – Integrated Resource Plan

kWh – Kilowatt hour

M&V – Measurement and Verification

MWh – Megawatt hour

NEEA – Northwest Energy Efficiency Alliance

NWRG – Northwest Research Group

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

RCW – Revised Code of Washington

RFP – Request for Proposal

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

SEAN – Standards for Econometric Analysis and Notation

TRC – Total Resource Cost

UC – Utility Cost Test (also known as PACT)

UES – Unit Energy Savings

UTC – Washington Utilities and Transportation Commission

WAC – Washington Administrative Code

I. Executive Summary

The purpose of this document is to meet the requirements and intentions of Docket UE-152058 Order 1 Appendix A (6)(c) and WAC 480-109-110(1)(c). 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 Department programs. The Framework addresses PSE's Energy Efficiency 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 Energy Efficiency Department portfolio of programs.

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 Energy Efficiency Department staff, external evaluators who will perform future 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 supporting documents exist that can be provided upon request. Each biennium the Company will develop an Annual Evaluation Plan, in consultation with the Conservation Resource Advisory Group (CRAG), which will contain an 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 consistent with applicable conditions.

This EM&V Framework outlines 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, the Framework is very much a “living document” that may require modifications over time. See Table IV-1, page 12.

II. Overview of Puget Sound Energy's EM&V Processes

This document describes PSE's approach to evaluating, measuring and verifying the results of the DSM energy efficiency measures, programs, and portfolio funded by Schedule 120 as approved by the 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 Evaluation 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 IV-1. 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 Evaluation 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, and market evaluations. The Company will keep the CRAG apprised on the development of this Evaluation 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.[2]

In order to have available all relevant measure information for establishing deemed and calculated UES measures, PSE developed DSMc in 20162008. Data in DSMc includes, but is not limited to implementation date, engineering assumptions, link to the business

[2] National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. http://www.epa.gov/cleanenergy/documents/suca/evaluation_guide.pdf.

case, 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 DSMc is routinely updated throughout the year. The system is specifically not used to track cumulative annual savings.

For ECMs that are not prescriptive, PSE will use standard engineering protocols for ex-ante estimation of savings. See page 24 for a description of protocols used for Custom Measures.

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

- PSE's Implementation Teams will estimate energy and demand savings, document installations and prepare ex-ante savings estimates per measure, project and program, consistent with DSMc and standard engineering protocols.
- PSE's Implementation and Verification Team will also conduct QA/QC activities and follow tracking checks and balances as programmatic M&V.
- PSE's Verification Team will conduct statistically representative verifications of Energy Efficiency projects and measures.
- PSE's internal Evaluation Team and independent external evaluators will conduct evaluations as outlined in the annual Evaluation Plan.

EM&V activities, including impact, process, and market evaluations, 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 will be available to the CRAG and the UTC, consistent with the reporting schedules required by the UTC.

III. 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. PSE also offers rebates and incentives to residential customers for appliance and weatherization ECMs meeting the one year payback criteria. Some of the larger and more complicated ECMs are often provided through an extensive network of trade allies. PSE offers over 300 measure types to PSE customers through multiple electric and natural gas energy efficiency schedules, authorized by the UTC. Every PSE qualifying measure and program must be based on 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, including the 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 Energy Efficiency Department programs, and 2) guidance to PSE regarding methodology inputs and calculations for updating cost-effectiveness. Consistent with WAC 480-109-110(2) 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 originally developed in response to the UTC Order 5, *Electric Settlement Agreement* dated September 3, 2010, Docket UE-100177, and is updated each biennia. It is intended to provide overall guidelines including principles, objectives, responsibilities, methods and reporting requirements to direct PSE's energy efficiency EM&V activities. The document is updated in compliance with applicable requirements of WAC 480-109.

The roles of PSE, CRAG, External Evaluators, and UTC are listed in Table IX-1, Page 32.

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IV. Evaluation Measurement and Verification Principles, Objectives and Metrics

In energy efficiency literature, Evaluation, Measurement and Verification (EM&V) is the process of determining program and project impacts. EM&V is a two-stage process. In the Evaluation stage, various research and analysis activities are conducted to identify program level performance. The Measurement and Verification stage precedes the Evaluation stage, and applies various quality assurance activities to assess project level performance. PSE maintains documentation of programmatic M&V activities, processes, and costs, in keeping with current M&V policies, protocols, and guidelines.

Overall, the EM&V process identifies project and program level effects and opportunities for improvement at both levels.

There are two key objectives of evaluations:

1. Provide summative results - Develop retrospective estimates of energy savings attributable to a program in a manner that is defensible in regulatory proceedings conducted to ensure that funds are properly and effectively spent. Summative evaluation types include Impact Evaluation, and Market Effects Evaluation.
2. Provide formative results – Provide an understanding of why those effects Occurred, identifying program improvements and providing a basis for future savings estimates. Formative evaluation types include Process Evaluation and Market Evaluation.

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

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 both very important for prudent program management and will be performed to create best practice portfolio planning, and implementation. They will accompany impact evaluations in all cases where such studies add pertinent value.

Program evaluations will be planned on a maximum four year schedule or cycle. Occasionally, special evaluation projects that may arise from regional or other interests will be interspersed. The CRAG will be consulted on the development of this plan.

A. Transparency

Sound evaluation of energy efficiency programs requires transparency and independence. This results in high quality information on which business and 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)[3] for program evaluations.

B. Budget

The Evaluation 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 Evaluation budgets between market, process and impact analyses (and internal and external activities) will be described in each year's Annual Evaluation Plan.

Measurement and verification activities are performed as part of a larger program implementation and administration effort, involving Senior Market Analysts, Energy Management Engineers, Program Implementers, Rebate Analysts, Budget and Administration Analysts and others. PSE details these activities in the Evaluation and the Verification Team budgets in Exhibit 1: *Savings and Budgets.*

A full report on Evaluation expenditures and activities for the prior year will be part of the Annual Report on Energy Conservation Accomplishments. This information will include a description of the evaluation 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.

WAC 480-109-120(1)(vi)(B) calls for budget requirements for evaluation of programs. PSE is committed to evaluation spending consistent with the applicable condition.

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

C. Goals, Priorities and Guiding Principles

PSE is committed to evaluate all major programs over a multiple-year cycle. Program evaluations are expected to follow 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.

1. Goals

The goal of evaluation planning is 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.

2. Priorities

The Company will prioritize Evaluation resources based on consideration of the following issues:

- Size of the project or program: More resources would be directed at evaluating a prescriptive program providing more than 25 percent of a sector's savings than a site-specific project with an incentive payment over $50,000);
- Uncertainty of results: Resource characteristics that are known within relatively tight confidence intervals are less of a priority for Evaluation efforts than those that are more 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 in allocating EM&V resources;
- Regulatory impact: Information necessary for regulatory processes or regulatory oversight will receive a higher EM&V priority than information unnecessary for that purpose.
- Timing: Information that would have value in improving an ongoing program would have higher preference;
- Cost of measurement: Cost of EM&V should be optimized. Alternative approaches should be considered when the value of incrementally better data is greater than the cost of that data; and,
- Timeliness; 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.

3. Guiding Principles

When choosing and planning evaluations the following guiding principles will be taken into consideration:

- In compliance with applicable conditions, external evaluators will often be retained to perform impact evaluations. At a minimum these evaluations will be performed over a maximum four year EM&V cycle, such that all major programs are covered at least as stipulated in regulatory conditions.
- External consultants may also be retained to evaluate PSE's Energy Efficiency Department program processes and market conditions. Additional evaluation activity may be conducted as deemed appropriate for program management or planning purposes;
- Secondary research will be leveraged as appropriate;
- Evaluation design will undergo expert review before and during to planning and implementation;
- All key assumptions used by program planners will be documented and verified in evaluations;
- The procurement process used to select evaluation contractors will be timely, flexible and transparent;
- Evaluation dollars and efforts will be prioritized 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.

D. Captured Data and Metrics

Critical portfolio metrics to be evaluated are:

- 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, and existing conditions;
- Costs and benefit data for cost-effectiveness analyses including total ECM cost, incremental ECM cost and other metrics or combinations, 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.

E. Evaluation Cycle

As described in this EM&V Framework, PSE will perform Evaluation annually on a maximum four year schedule of selected programs such that all major programs are covered appropriately over time, in accordance with regulatory conditions. On the following page is the hierarchy of documents outlining planning steps for each evaluation cycle (see Table IV-1, page 12).

- 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 Evaluation Plan" section[4] indicating which major evaluation activities (for example, updating 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 Exhibit 6: *2018-2019 Evaluation Plan* in the Biennial Conservation Plan).
- The Annual Evaluation Plan will include, where feasible, input from other regional parties such the RTF, NEEA and others that are conducting evaluation activities to coordinate and collaborate in evaluation activities.
- The annual Evaluation 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, and market evaluations. PSE will engage the CRAG on the development of the annual Evaluation plan.
- Research Plans – Also referred to as Scopes of Work will be created for each Evaluation project planned in a given cycle (impact, process and market effects evaluations). New DSM programs will include a research strategy at the 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.

[4] 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.

Table IV-1: Evaluation Planning Cycles and Documents

	EM&V Framework*	Annual Evaluation 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 (Included in Annual Reports) DSMc (Included in Exhibit 4: Measures, Incentives & Eligibility updates) 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. DSMc will provide current and historical savings. Custom and the majority of calculated measure savings 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[5]	CRAG	CRAG	CRAG
Filed with Commission[6]	Yes	Yes	No

[5] of the above-listed document

[6] See Table IX-1 on page 32 for more details on roles and responsibilities

V. 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.

A. 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[7] 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,[8] 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 impact evaluation methodology represents best practices for refining and improving accuracy of ex-ante savings estimates.

B. 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 are founded on industry best practice, based on applicable industry reference documents including the NAPEE Guide and the IPMVP.

7 Ex-post evaluation estimated savings: Savings estimates reported by an evaluator after the energy impact evaluation has been completed. (From Definitions section)

8 Ex-ante savings estimate: Forecasted savings used for program and portfolio planning and tracking purposes. (From Definitions section)

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.)[9]
- 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.

C. Approaches for Estimating Savings

Energy savings will be estimated using one or more of the four following approaches, depending on the complexity of estimating savings:

1. Measurement and verification (M&V) – Site-level inspection and testing activities conforming with the IPMVP to confirm measure performance. Choosing between M&V options involves many considerations, including the definition of the measurement boundary (for example, an individual building or an entire campus), or whether savings are from a single measure or multiple site measures. The resulting savings estimate may be applied to an entire population or program using statistical analyses. M&V based-analysis is applied when savings from a measure or project type vary widely.
2. Statistical Analyses - Analysis of large volumes of metered energy usage data (for example, billing analyses for program-level savings estimates). This approach is appropriate when there is sufficient participant and nonparticipant data to estimate savings at the desired confidence and precision levels.

[9] American Evaluation Association (AEA), Guiding Principles for Evaluators, http://www.eval.org/p/cm/ld/fid=51.

3. 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 DSMc). This approach requires less analysis than others, but is only valid for measures with fixed operating conditions.
4. Calculated Savings – Mathematical derivation of measure-specific savings based on accepted and standardized data collection and analysis. Standardized data collection reduces cost by eliminating or minimizing the need for site-specific measurement planning. Calculated savings analysis is applied when savings from a measure type vary widely but can be estimated reliably.

Irrespective of which of the above approaches are utilized for evaluation, 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. Evaluators can refer to inspection specifications developed by the RTF. Also, in some cases, such as large-scale custom measures/projects, baseline inspections will also be conducted.

D. Baseline

An energy use baseline establishes the energy use that would have occurred had a program not been implemented. Baselines are key to a reasonable quantification of energy savings during a particular period, as they isolate the energy usage that a program is intended to reduce from the energy use caused by changes in energy codes, standard practices, and other non-programmatic effects.

Program savings are calculated by comparing baseline energy use to post-implementation energy use, controlling for non-programmatic factors.

Considerable care needs to be taken in determining the baseline used for impact evaluations. PSE will follow the methodology outlined in RTF *Roadmap for the Assessment of Energy Efficiency Measures* as it relates to baseline for Deemed (UES) and Standard Protocol Measures

PSE will include baseline information in the detailed impact evaluation research plans for calculated measures, as well as for deemed (UES) savings values for prescriptive measures.

E. Uncertainty

Uncertainty is defined for PSE's 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. 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 tradeoffs 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.

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 either a one-tailed or two-tailed test as appropriate[10]) 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.

Random or sampling errors, 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.

10 Two-tailed tests, which test the likelihood that a sample mean either under- or overestimates an actual mean, require larger sample sizes than one-tailed tests, which only assess for the sampling error in once direction.. A one-tail test should only be used when there is strong proof that it is appropriate to do so, e.g., when there is a strong proof that only one of the two sampling errors (underestimation or overestimation) is occurring.

The Evaluation report will discuss all aspects of uncertainty and the decision process that determined sample size and confidence/precision level achieved.

F. Persistence

Persistence is how long the energy savings are expected to last once an energy efficiency activity has taken place.[11] 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.[12] 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.[13] Evaluators should consider current RTF guidance in determining persistence of savings.

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 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 (for instance, data from a facility's energy management system).

G. Net Savings

Net Savings is recognized in the industry as Gross Savings adjusted to account for energy efficiency not resulting directly from the measure or program. This adjustment includes savings from free-riders; program participants who would have installed the efficient measure or changed a behavior regardless of a program's incentive. A high rate of program free-ridership may be warranted if the case can be made that the program is having a positive effect in transforming the market.

This adjustment also includes savings from spillover which results from additional energy efficiency actions taken as a result of program influence beyond those directly subsidized or required by the program.

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

12 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

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

Actions producing spillover savings might be taken by both program participants and nonparticipants. Non-participant spillover may be prohibitively costly to estimate.

Though spillover is a positive influence of a program, high levels of free-ridership in a program may not be desirable, particularly if energy savings benefits of the incentive vary significantly across participant subgroups. Consistent with condition (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:

- Self-reporting surveys in which information is reported by participants or non-participants without external verification or review,[14]
- 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.

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

VI. Process, Market and Market Effects Evaluations

Process, Market, and to a lesser extent Market Effects Evaluations may encompass all rider -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.

A. *Process Evaluations*

Process evaluations of the Company's Energy Efficiency Department 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 (for example, 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.

B. *Market Evaluations*

Market evaluations characterize the structure or functioning of a market, or the behavior of participants in a market. 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.

C. *Market Effects Evaluations*

Market Effects Evaluations are designed to estimate market changes that have resulted from market transformation, or that are expected to result from a program's influence on future energy efficiency projects. These studies may rely on surveys and interviews with upstream market actors, or track sales or retail stocking practices.

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VII. Measure Savings

Measure savings are broken down into four types; 1) deemed (UES) measures; 2) standard protocol measures; 3) planning and provisional measures; and 4) custom measures. This section discusses the distinction and suitability of each. This chapter also discusses the effects of dual-fuel interactions.

A. Deemed (UES) Measures

Energy Efficiency Department prescriptive measures, also referred to as deemed (UES, or "Unit Energy Savings") measures, are utilized where a measure's unitized savings, (for example, savings per lamp or motor) have both a stable 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. Rather than calculating savings on a by-project basis programs are only required to collect a verified count of delivered units, plus the information needed to assign a specific application of the measure (for example, a single family residence with forced air furnace west of the Cascades) to the correct UES. Delivery is defined for each measure, by its specification and its specific applications.

There are clearly defined protocols for revising, retiring, and creating new 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 delivered measure cost, and estimated life.

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.

B. 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.

C. Provisional and Planning Measures

There is a fourth measure category referred to by the RTF as Provisional or Planning. 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 or planning status.

D. Custom Measures

Custom measures are those which do not fit the “deemed (UES)” or “calculated” measure categories. Ex-Ante savings calculations based on rigorous engineering protocols are completed for each custom project.

1. Characteristics of Custom Measures

Custom protocols are appropriate for measures that require site-specific data collection and analysis to develop a reliable estimate of savings. Site-specific conditions are unique to each site and highly variable from site to site. Often Custom Measures are complex (for example, including multiple components, interacting with other systems, etc.)

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

The Project Description typically includes:

- General site information and background sufficient to put the project into context,
- Detailed proposal from the customer and/or contractor,
- Initial site inspection or audit collects relevant baseline data and/or verifies existing conditions represented by the contractor and/or the customer (for example, observations, short-term measurements of loads, run-time, trend logs, sketches & photos, etc.),
- Clear description of Baseline conditions and Proposed Measure(s),

- Relevant discussions: custom calculation approach, Energy Code requirements, unique site-specific considerations, etc.,
- Summary of key characteristics, results and metrics (incentive amount, measure life, load shape, savings, measure cost, TRC, baseline energy use, percent savings, payback).

Custom ex-ante (forecasted) energy calculations must use generally accepted engineering protocols, and be incorporated into the custom project database. The business case developed for each custom project should include project cost, an incentive calculation, a cost effectiveness discussion and a custom M&V Plan. A QC Review by a senior-level engineer is required for all custom measures.

3. Available Documentation

Available documentation of Custom Measures and Projects includes:

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

E. Dual-Fuel Interactions on Measure Savings

PSE reports savings based on the tariff associated with the incentivized measure. Electrical measure savings are reported under the appropriate electric conservation tariff schedule and gas measures are reported under the appropriate gas conservation tariff schedule. Consequently, PSE does not report negative fuel savings when a measure funded via one tariff has a negative impact on the energy consumption associated with another tariff.

This approach is similar to the way other utilities in the state of Washington treat measures. For instance, a Seattle City Light-funded lighting retrofit at a building served by PSE natural gas space heat does not report for the increased gas use due to the lighting retrofit. However, if the building is served by electric resistance heat, the reported savings will be decreased to account for the interaction within the incentivized tariff.

For the full guideline, please see Exhibit 8, Supplement 9: Dual-Fuel Interaction Guidelines.

VIII. Data Management

The Energy Efficiency Department employs a combination of software applications to accumulate, validate and report financial and energy savings figures with a high degree of integrity and accuracy. All program participation and savings are tracked through a system developed for the Energy Efficiency Department called DSMc. Corporate systems, such as SAP, are used for all financial activity within the department.

In an effort to have all relevant measure information for prescriptive or deemed (UES) measures in a central, easily-accessible location, PSE developed its program archival system beginning in 2015, known as DSMc. DSMc and additional, attached information includes, but is not limited to measure life and cost, engineering assumptions, incentive amount, calculation type and savings value. The system allows authorized Energy Efficiency Department staff to view a single measure's detail, a program's portfolio of measures, measures by fuel type or a complete list of Energy Efficiency Department prescriptive measures, also referred to as deemed (UES) measures.

The Measure Library within DSMcworks in conjunction with the EES Tracking and Forecasting System to comprise what is known as "Measure Metrics". The EES Tracking and Forecasting System is another proprietary Microsoft Access database, used to monitor and forecast ongoing savings and budgets.

The Measure Library within DSMccontains two general categories of information. These are 1) RTF Deemed (UES), which are prescriptive savings whose values have been evaluated and deemed (UES) by the Regional Technical Forum; and 2) PSE deemed (UES) prescriptive savings. These savings 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 LED indoor 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.

- RTF provisional or planning measures are those measures 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 archive notation; either an energy savings, incentive or delivery adjustment, or no adjustment at all.

Measure data included in DSMc and EES Tracking and Reporting 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 Energy Efficiency List of Measures, Incentives & 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 Evaluation Plans.

The descriptions provided below provides 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 Energy Efficiency Department staff members that feed some of those listed here are not outlined in this document.

IX. Roles and Responsibilities for Conducting and Managing EM&V

The PSE Evaluation Team typically engages external evaluators to provide specialized skills required for a complete and timely evaluation. Neither the external evaluators nor the PSE staff supporting the evaluations have the achievement of energy savings goals as part of their performance goals. As such, evaluation activities and results are independent of program activities.

A. Roles of External and PSE Evaluators, and PSE Implementation and Verification Staff

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

1. PSE Implementation Teams

- Estimate ex-ante site savings,
- Report savings estimates,
- Track program processes,
- Manage data,
- Redact customer information from reporting,
- Assess evaluation findings and document resulting program changes in an Evaluation Report Response document that is attached to the evaluation report.

2. Verification Team

- Work closely with the Implementation Teams to perform ongoing, statistically representative verifications of measure installations,
- Report findings to program managers to inform continuous improvement interests in program delivery,
- Review and revise the Verification Manual periodically to reflect program additions and changes.

3. PSE Evaluation Team

- Oversee impact evaluations to determine ex-post evaluated savings and determine realization rates,
- Provide support to the Verification Team, as requested,
- Review EM&V plans,
- Design RFPs for external evaluators,

- Prepare evaluation reporting,
- Conduct internal process and market evaluations,
- Manage external evaluations,
- Initiate the Evaluation Report Response process at the completion of the evaluation report.

4. External Evaluators

- Conduct impact evaluations to determine ex-post evaluated savings and prepare cost effectiveness analysis; determine realization rates,
- Verification activities,
- External process and market evaluations,
- Review internal analysis and evaluations,
- Verify program or portfolio level energy savings,
- Establish and report realization rates,
- Review DSMc and measure archive as needed.

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

- Review evaluation methodologies,
- Review M&V Plans as necessary,
- Review RFP plans as necessary,
- Review DSMc and DSMc updates as needed.

B. 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.
- Member of PSE's Evaluation Team may serve as day-to-day project managers 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 ERRs completed in each calendar year will be attached to the Annual Report for that year.

C. External Review and Oversight

External review, based on the regulatory conditions of WAC 480-109-110(1)(c), 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 also advise the Company on the topics related to EM&V.

Also in accordance with regulatory conditions, PSE will convene CRAG meetings four times annually. 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 DSMc and additional Source of Savings documentation, and may review and comment upon savings claims and other EM&V results prepared by PSE and/or external evaluators.

Table IX-1 presents a graphical version of the Roles and Responsibilities for PSE Staff, CRAG, External Evaluators, Washington Utilities and Transportation Commission, and Peer Reviewers.

Table IX-1: Roles and Responsibilities

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

X. Reporting Cycles and Schedule

The program implementation cycle operates on a calendar year basis, from January 1-December 31 each year. Table X-1, on the following page, 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 Conservation Plan.

Table X-1: EM&V 2020-2021 Reporting Schedule

Report	Description	Distribution Date	Distribution
2020-2021 Biennial Conservation Plan	A Biennial Conservation Plan (BCP) including revised program details and program tariffs, together with achievable conservation potential, by November 1, 2019, requesting an effective date of January 1, the following year	October 1, 2019: Draft BCP November 1, 2019: Complete BCP Filing	CRAG UTC
2018-2019 Biennial Conservation Report	A report on conservation program achievement for the most recently completed biennium (2018-2019) by June 1 of the following year (RCW 19.285 requires that this report be filed with the WA Department of Commerce annually, while wac 480-109-120(1)(C) requires a biennial filing with the UTC)	June 1, 2020	CRAG, UTC, Washington Dept of Commerce

Report	Description	Distribution Date	Distribution
2019 Annual Conservation Report	Backward looking. Reported Program level savings, adjustments, changes, comprehensive report on EM&V activities of the prior year	April 1, 2020	CRAG, UTC, Washington Dept of Commerce
2021 Annual Conservation Plan	Forward Looking. Program level expected savings, adjustments, major changes, EM&V. Primarily functions as an update to the 2020-2021 BCP	October 15, 2020: CRAG presentation November 15, 2020: UTC Filing	CRAG, UTC
2020 Annual Conservation Report	Backward looking. Reported Program level savings, adjustments, changes, comprehensive report on EM&V activities of the prior year	April 1, 2021 Filing	CRAG, UTC
2018-2019 Biennial Conservation Report	A report on conservation program achievement for the most recently completed biennium (2018-2019) by June 1 of the following year	June 1, 2020	CRAG, UTC, Washington Dept of Commerce

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XI. 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 April 1, per the schedule presented in Table 1, page 11.

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 indicated in the Measure Revision Guidelines. Such changes will be documented as changes in DSMc.