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Appendix A. Methodological Consistency with the 6th Northwest Power Plan

To facilitate a comparison with the 6th Power Plan, the Council prepared an overview of the methodology used in developing the 6th Power Plan's conservation potential estimates. This appendix compares the methodology used in PSE's 2015 IRP to the benchmarks established by the Council.

Italics denote descriptions of methodologies used in this study.

Technical Resource Potential Assessment

The assessment reviewed a wide array of energy-efficiency technologies and practices across all sectors and major end uses.

The study considered measures from a variety of sources, including the 6th Plan, RTF, ENERGY STAR, and DEER. Appendix B.2 provides descriptions of all measures analyzed.

Methodology

- Technically feasibility savings = Number of applicable units * incremental savings/applicable unit
- "Applicable" units accounted for:
  - Fuel saturations (e.g., electric vs. gas DHW).

    Whenever possible, fuel saturations were based on data specific to PSE's service territory. PSE's 2010 Residential Energy Study (RES) and NEEA's 2008 Commercial Building Stock Assessment (CBSA) served as the primary sources of this information.

  - Building characteristics (e.g., single-family vs. mobile homes, basement/non-basement).

    Data derived from NEEA's 2011 Residential Building Stock Assessment (RBSA), RES, CBSA, and PSE billing information.

  - System saturations (e.g., heat pump vs. zonal, central AC vs. window AC).

    Whenever possible, system saturations were based on data specific to PSE's service territory. PSE's 2010 RES and NEEA's 2011 RBSA and 2008 CBSA served as the primary sources of this information.

  - Current measure saturations.

    Current saturations were incorporated into the applicability, based on information from the RES, RBSA, CBSA, the 6th Plan, RTF, and the experience of PSE conservation staff.

  - New and existing units.

    Existing and new units were calculated based on current and forecasted customers, respectively.

  - Measure life (stock turnover cycle).

Measure decay rates were applied to lost opportunity measures, based on measure life. Discretionary measures were assumed to be reinstalled at the end of their useful life.

- Measure substitutions (e.g., duct sealing of homes with forced-air resistance furnaces vs. conversion of homes to heat pumps with sealed ducts).

  The measure share applicability factor accounted for competition between measures to avoid double-counting.

- "Incremental" savings/applicable unit accounted for:
  - Expected kW and kWh savings, shaped by time-of-day, day of week and month of year.

    Energy and demand savings were either based on deemed values or calculated as a percent reduction in baseline end-use consumption. Hourly impacts were provided to PSE's IRP model.

  - Savings over baseline efficiency.

    Baseline set by codes/standards or current practices.

    Baselines were set based on current codes, standards, or current practices. Standards passed but not yet implemented became the baseline at the time mandated in the new standard.

    Not always equivalent to savings over "current use" (e.g., new refrigerator savings measured as "increment above current federal standards," not the refrigerator being replaced).

    Savings from equipment upgrades were calculated based on the minimum standard efficiency level available at the time of burnout.

  - Climate—heating, cooling degree days, and solar availability.

    Savings were based on the typical climate in PSE's service territory.

  - Measure interactions (e.g., lighting and HVAC, duct sealing and heat pump performance, heat pump conversion, and weatherization savings).

    These interactive effects were treated as a reduction in measure savings (e.g., commercial lighting measures might save less due to increased heating requirements).

Economic Potential: Ranking Based on Resource Valuation

- The total resource cost (TRC) served as the criterion for economic screening, and included all cost and benefits of measures, regardless of the parties paying for or receiving them.
  - TRC B/C Ratio > = 1.0

    Benefit-to-cost ratios were not calculated. Analysis used the levelized cost of conserved energy, as described below.

- Levelized cost of conserved energy (CCE) < levelized avoided cost for the load shape of the savings could substitute for TRC if "CCE" was adjusted to account for "non-kWh" benefits, including deferred T&D, non-energy benefits, environmental benefits, and the Act's 10% conservation credit.

  Levelized costs, on a TRC basis, were calculated for each measure in comparison with the Integrated Resource Planning's (IRP) supply-side resources. The levelized cost calculation incorporated deferred T&D (for electric resources), non-energy benefits, secondary fuel benefits, and the Act's 10% conservation credit (for electric resources).

Methodology

As valuation of energy and capacity savings was conducted in PSE's IRP model, it was not included as part of this study.

- The energy and capacity value (i.e., benefit) of savings was based on the avoided cost of future wholesale market purchases (forward price curves).
- The energy and capacity value accounted for the shape of savings (i.e., used time and seasonally differentiated avoided costs and measure savings).
- Uncertainties in future market prices were accounted for by performing the valuation under a wide range of future market price scenarios during the IRP process.
- Costs inputs (resource cost elements):

  All costs listed below were included in the per-unit measure costs, where appropriate.

  - Full incremental measure costs (material and labor).
  - Applicable ongoing O&M expenses (plus or minus).
  - Applicable periodic O&M expenses (plus or minus).
  - Utility administrative costs (e.g., program planning, marketing, delivery, ongoing administration, evaluation).
- Benefit inputs (resource value elements):

  All benefits listed below were assessed in calculating the levelized cost of conserved energy, where appropriate.

  - Direct energy savings.
  - Direct capacity savings.
  - Avoided T&D losses.
  - Deferral value of transmission and distribution system expansion (if applicable).
  - Non-energy benefits (e.g., water savings).
  - Environmental externalities.
- Discounted presented value inputs:

- Rate = After-tax average cost of capital weighted for project participants (real or nominal).

  The analysis used PSE's weighted average capital cost of 7.77%, nominal.

- Term = Project life; generally equivalent to life of resources added during the planning period.

  Costs were levelized over each measure's expected useful life. Any reinstallation costs over the 20-year planning period were similarly levelized.

- Money was discounted, not energy savings.

  The IRP analysis used this method.

Achievable Potential

- Annual acquisition targets, established through the IRP process (i.e., portfolio modeling).

  The results of the potentials assessment, bundled by levelized costs of conserved energy, were incorporated in the IRP model. Based on the value of savings, the IRP model selected the appropriate amount of conservation.

- Conservation competed against all other resource options in portfolio analysis:

  Conservation resource supply curves separated into:

  - Discretionary (non-lost opportunity).

    Defined as retrofit opportunities in existing facilities.

  - Lost-opportunity.

    Including equipment replacements in existing facilities and all new construction measures.

  - Annual achievable potential, constrained by historic "ramp rates" for discretionary and lost-opportunity resources:

    The maximum ramp-up/ramp-down rate for discretionary was 3x the prior year for discretionary, with an upper limit of 85% over the 20-year planning period.

    Analysis assumed 85% of discretionary resources could be acquired within a 10-year timeframe.

    The ramp rate for a lost-opportunity was 15% in first year, growing to 85% by the 12th year.

    Lost opportunity ramp rates varied by measure, and were based on the assumptions used in the 6th Plan.

    Achievable potentials could vary by the type of measure, customer sector, and program design (e.g., measures subject to federal standards could have 100% "achievable" potential).

While the analysis removed savings from known standards, it did not attempt to predict which savings would be acquired from future codes or standards.

- Revised technical, economic and achievable potential, based on changes in market conditions (e.g., revised codes or standards), program accomplishments, evaluations, and experience.

  Changes taking effect after the finalization of the 2015 IRP will be reflected in the 2017 IRP.

  - All programs should incorporate Measurement and Verification (M&V) plans that, at a minimum, track administrative and measure costs and savings.
  - The International Performance Measurement and Verification Protocols (IPMVP) should be used as a guide.