MEMORANDUM

TO: Power Committee

FROM: Charlie Grist, Tina Jayaweera, Kevin Smit

SUBJECT: Update on Efficiency Supply Curves for Baseline and for Scenario Analysis for the Draft 2021 Power Plan

BACKGROUND:

Presenter: Charlie Grist

Summary: Staff will present the final results of its assessment of regional conservation potential for the Draft 2021 Power Plan. These results are for the baseline conditions scenario which will be used in most of the 2021 Plan scenario analysis. Staff will also describe its proposed approach to modifications of the baseline conservation potential for three scenarios where energy efficiency will be tested under differing circumstances. These include testing the robustness of energy efficiency, paths to decarbonization, and analyzing the Bonneville portfolio.

Workplan: Power Division A.1: Develop the 2021 Power Plan: Conservation for the 2021 Plan

More Info: Staff presented preliminary findings to the Power Committee in March. Energy efficiency supply curve inputs, analysis and results are available on the Council web site here EE Supply. Presentations and discussions of the Conservation Resources Advisory Committee are here: CRAC.
Final Supply Curves for the Draft 2021 Plan

Power Committee
May 12, 2020

Changes Since March

• QA/QC Review
  • Over 1500 comments addressed
• Many revised inputs
  • Applicability, cost, savings, ramp rates
• Several measures added
• Overlapping measures adjusted or deleted
High-Level Results
Files on Council website [link](#)

Savings By Sector & Levelized Cost

![Graph showing savings by sector and levelized cost.](Image)
Over 20% Achievable Savings

Technically Achievable Savings as Percent of Frozen Efficiency Load 2041

<table>
<thead>
<tr>
<th></th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Agriculture</th>
<th>Utility Distribution</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent</td>
<td>0%</td>
<td>25%</td>
<td>15%</td>
<td>10%</td>
<td>0%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Earliest Achievable Amount by Cost Bin

Technical Potential by Levelized Cost Bin ($/ MWh) & Time

- <$40
- $40-$80
- $80-$120
- >$120
Potential Savings by Cost Bin & Sector

Max Achievable Conservation by Sector at Various Price Bins (Incremental)

Achievable by 2041 (aMW)

Levelized Cost ($/MWh)

<40 | 40-80 | <120 | >120

Utility
Residential
Industrial
Commercial
Agriculture

Utility Distribution System
Motors/Drives
Fans and Blowers
Compressed Air
Food Preparation
Irrigation
Low Temp Refer
Material Handling
Material Processing
Whole Bldg/Meter Level
Other Motors
Other
Melting and Casting
Pollution Control

Savings Potential by End Use

Total 5048 aMW

HVAC, 34%
Lighting, 15%
Water Heating, 14%
Refrigeration
Electronics
Dryer
Pumps
Process Loads
All Electric
Electrical Utility System
Irrigation
Low Temp Refer
Material Handling
Material Processing
Whole Bldg/Meter Level
Other Motors
Other
Pollution Control
Melting and Casting

THE 2021 NORTHWEST POWER PLAN
Selected New Measures for 2021 Plan

Residential
- Central AC
- Optimized control for DHP in Forced Air
- Circulator pumps for DHW & hydronic

Ag
- Ventilation systems for dairy

Commercial
- Fans
- Pumps
- Triple-glazed window
- Low-e window film
- HPWH
- Unitary AC
- VHE-DOAS

Industrial
- HVAC
- Pumps
- Fans & Blowers
- Compressors
- Advanced Motors

Energy & Peak Potential for EE
EE Capacity by Price Bin

Energy (aMW) or Capacity (MW) by 2041

- Average Energy
- Winter MW
- Summer MW

Levelized Cost Bin ($/MWh)
Peak Impacts Vary by End Use

Peak to Energy Savings Ratios for Select End Uses

- HVAC
- Lighting
- Water Heating
- Refrigeration
- Fans and Blowers
- Irrigation

Significant Savings Available

Frozen Efficiency Forecast & Forecast minus Total Achievable Potential

Regional Electricity Use (aMW)

Frozen Efficiency Forecast
Forecast minus Savings Potential
EE Supply Curves in Scenarios

Plan Scenarios

- Robustness of Energy Efficiency
- Early Coal Retirement
- Paths to Decarbonization
  - Organized/Limited Markets for Energy and Capacity
- Analyze the Bonneville Portfolio
  - Greenhouse Gas Cost Tipping Point
  - Reliance on Extra-Regional Markets for RA
Scenario: Robustness of Energy Efficiency EE Adjustments

• Provide alternate supply curves with:
  • Differing ramp rates to reflect acceleration/deceleration of amount of EE
  • Changing maximum amount of achievable EE
• Potentially add in emerging EE measures that did not pass the “similarly reliable and available” criteria for the baseline conditions (i.e. emerging technologies)
  • Alternatively may increase maximum achievable to greater than 100% to emulate emerging tech
• Change kW impact or load profile to see value of capacity contribution from EE
• Accounting for interaction between the availability of EE and DR

Scenario: Paths to Decarbonization EE Adjustments

• Increased opportunity of EE from more electric end use equipment due to fuel switching assumed in load forecast
• Increase availability à la EE Robustness
• Increased availability from emerging technologies
  • Add new ET’s where possible
  • Expand the Max Tech of existing measures (e.g., similar to the federal standards process)
Scenario: Analyze the BPA Scenario
EE Supply Curves

- Number of “units” (houses, sq. ft, etc) that are served by Bonneville preference customers
- Some “saturation” updates (e.g., share of electric space heating)
- Post-2028: As obligations change, i.e. either fewer or additional customers, scale EE availability to match the assumed customer utilities with load being served by Bonneville
Additional Slides

Approximate* Savings Profile of Non-Weather-Sensitive Measures

*Weighted by savings and based on predominant GLS shapes for 2031, <$100/MWh
Approximate* Savings Profile of Weather-Sensitive Measures

*Weighted by savings and based on predominant GLS shapes for 2031 and <$100/MWh