April 4, 2023

MEMORANDUM

TO: Council Members

FROM: Annika Roberts and Dylan DSouza

SUBJECT: Generating Resource Builds Summary and Power Plan Comparison

BACKGROUND:

Presenter: Annika Roberts and Dylan DSouza

Summary: Staff will present a review of regional and WECC wide supply side resource acquisitions and retirements since the adoption of the 2021 Power Plan. This update has been shared with the Generating Resource Advisory Committee (GRAC), and a brief summary of their comments and reactions have been incorporated into this presentation.

Relevance: The 2021 Power Plan tasked the region with developing at least 3500 MW of renewable resources by 2027. Also as part of the Plan development, the Council generated a WECC wide build out to inform market prices used in our study. This update on resource acquisitions and retirements is meant to serve as a check-in on how regional actions align with or diverge from the 2021 Power Plan resource strategy and assumptions of the larger WECC. In preparation for the mid-term assessment, this is a first look at how closely the region is following the power plan resource strategy.

Workplan: Tracking and reporting on generating resource builds, both in region and across the WECC, as compared to the 2021 Power Plan analysis and strategy
More Info: Presentation to Generating Resource Advisory Committee: https://www.nwcouncil.org/meeting/generating-resources-advisory-committee-2023-03-31/
Resource Updates Since 2021 Power Plan

Annika Roberts & Dylan DSouza
April 2023
Outline

- Plan Context
- In-Region Generating Resource Update
- WECC-wide Generating Resource Update
- Broader Resource Landscape
- What we heard from the GRAC
- Next steps
GENERATING RESOURCES AND THE PLAN
2021 Power Plan: Regional Resource Strategy

**Existing System: More flexibility**
- Greater potential flexibility in the hydro system and the ability to more effectively use our thermal fleet to provide reserves is needed, collectively reducing regional needs and supporting the integration of renewables.

**Renewables: >3.5 GW by 2027**
- Significant renewable build recommended (>3.5 GW by 2027), due to their low costs, interruptibility, and carbon reduction benefits. This build out will impact the transmission system.

**Energy Efficiency: 750 aMW by 2027**
- Significantly less acquisition than prior plan due to greater cost-competitiveness with other resources, not being dispatchable, and being sensitive to market prices.

**Demand Response: low-cost capacity**
- Products that provide highest value to the system are those that can be regularly deployed at low cost and with minimal to no impact on customer (e.g. DVR, TOU).
Renewables in the 2021 Plan

- At least **3500 MW** additional renewable resources by 2027
- Additional recommendation for policymakers/utilities pursuing aggressive emissions reductions to evaluate adding more renewables as a means of displacing emissions both within their portfolio and in the broader market.
IN-REGION GENERATING RESOURCES
Nameplate Capacity (Megawatts)

Pacific Northwest Resource Additions & Retirements

- Solar + Storage
- Energy Storage
- Wind
- Solar
- Petroleum
- Natural gas
- Hydro
- Geothermal
- Coal
- Biomass

Source: Council’s project database

April 2020 Plan cut off
2021 Power Plan (April 2020) vs. Today (March 2023)

Source: Council’s project database

- **Installed Nameplate Capacity - 63,301 MW** (April 2020)
  - Wind: 15%
  - Natural Gas Baseload: 11%
  - Nuclear: 2%
  - Natural Gas Peaking: 3%
  - Solar: 1%
  - Other*: 1%
  - Biomass: 2%
  - Coal: 10%

- **Installed Nameplate Capacity - 65,886 MW** (March 2023)
  - Wind: 19%
  - Natural Gas Baseload: 11%
  - Nuclear: 2%
  - Natural Gas Peaking: 3%
  - Solar: 2%
  - Other*: 1%
  - Biomass: 2%
  - Coal: 8%

*Other - Geothermal, Petroleum, Solar, Energy Storage (Pumped Hydro + Battery)
Average Regional Renewable Builds Across Various Sensitivities

- Early coal retirement, with limits on gas, and the deep decarbonization scenario resulted in the highest builds.
- Lowest was ~3,500 MW, with no limits on gas and no SCC.
Resource changes* since 2021 Power Plan...

- 507 MW new solar PV
- 2687 MW new wind; not all in region (Ekola flats, Cedar springs I, II, III)
- Starting to see a little bit of storage
- Consistent with the Plan forecast lots of new renewable builds and no new fossil fuel plants planned.

*Resources were frozen in April of 2020, before many of these resources had gone online.
... and announced retirements

Additions and Retirements since the 2021 Plan
(incl. announced planned retirements)

<table>
<thead>
<tr>
<th>Year</th>
<th>Biomass</th>
<th>Geothermal</th>
<th>Natural gas</th>
<th>Solar</th>
<th>Wind</th>
<th>Energy Storage</th>
<th>Hydro</th>
<th>Natural gas (retirement)</th>
<th>Petroleum</th>
<th>Petroleum (retirement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023</td>
<td>0</td>
<td>0</td>
<td>-27</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2024</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2025</td>
<td>0</td>
<td>0</td>
<td>-137</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Centralia 2 North Valmy 2
- Klamath Hydro
- Jim Bridger 1 & 2*

* PacifiCorp has announced Jim Bridger units will be converted to Natural Gas (1&2 in 2024, 3&4 in 2030)
# PNW Coal Unit Retirements

<table>
<thead>
<tr>
<th>Coal Unit</th>
<th>Nameplate Capacity (MW)</th>
<th>Planned Retirement (2021 PP)</th>
<th>Planned Retirement (March 2023)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Valmy 1</td>
<td>277</td>
<td>2019/2021</td>
<td>2021</td>
</tr>
<tr>
<td>Colstrip 1</td>
<td>358</td>
<td>Jan 2020</td>
<td>2020</td>
</tr>
<tr>
<td>Colstrip 2</td>
<td>358</td>
<td>Jan 2020</td>
<td>2020</td>
</tr>
<tr>
<td>Boardman</td>
<td>601</td>
<td>Oct 2020</td>
<td>2020</td>
</tr>
<tr>
<td>Centralia 1</td>
<td>730</td>
<td>Dec 2020</td>
<td>2020</td>
</tr>
<tr>
<td>Jim Bridger 1</td>
<td>608</td>
<td>2023</td>
<td>2024*</td>
</tr>
<tr>
<td>Centralia 2</td>
<td>730</td>
<td>2025</td>
<td>2025</td>
</tr>
<tr>
<td>North Valmy 2</td>
<td>289</td>
<td>2025</td>
<td>2025</td>
</tr>
<tr>
<td>Jim Bridger 2</td>
<td>617</td>
<td>2028</td>
<td>2024*</td>
</tr>
<tr>
<td>Colstrip 3</td>
<td>778</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Colstrip 4</td>
<td>778</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Jim Bridger 3</td>
<td>608</td>
<td>–</td>
<td>2030*</td>
</tr>
<tr>
<td>Jim Bridger 4</td>
<td>608</td>
<td>–</td>
<td>2030*</td>
</tr>
</tbody>
</table>

*Planned conversion to natural gas announced in PacifiCorp’s draft IRP
WECC-WIDE GENERATING RESOURCE PATTERNS
Generating Resource Additions by Technology (WECC)

Total: 7,631 MW
Solar: 3,520 MW
Battery: 1,879 MW
Wind: 1,955 MW
Solar+: 336 MW
Gas Turbine: 148 MW
Geothermal: 63 MW

Source: Council’s project database
Where are the New Generating Resources Across the Wider WECC
BROADER RESOURCE LANDSCAPE
National Resource Additions

- Not the view of the rest of this presentation, but large scale look forward
- We see the PNW is trending the way of the rest of the country
  - However, seeing more wind than solar, no new gas, and only just touching battery storage
- Direction at least partially policy driven
Policy Changes

Federally:
- Bipartisan infrastructure Law (BIL) & Inflation Reduction Act (IRA)
- Extended ITCs & PTCs
- Lots of grants available
- Electrification & Clean Energy focus

Regionally:
- WA Cap & Invest & Continued CETA compliance
- OR implementation of Gov. Brown’s Executive order

Locally:
- New IRPs are forthcoming, dealing with what BIL/IRA means for their jurisdictions
FROM THE GRAC
## Advisory Committee Share Out

<table>
<thead>
<tr>
<th>Advisory Committee</th>
<th>Key Points</th>
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<tbody>
<tr>
<td>Avista</td>
<td>IRP in April, saw cost changes</td>
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<tr>
<td>BPA</td>
<td>LT build with refreshed assumptions</td>
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<tr>
<td>Clark PUD</td>
<td>Gas turbine upgraded for more flexibility, goal of improving renewable integration</td>
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<td>Grant PUD</td>
<td>Submitted IRP last fall, long term focus as near-term things are changing so quickly</td>
</tr>
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<td>Idaho Power</td>
<td>Flagged 200+ MW of announce batteries in next 2 years, seeing big response from developers</td>
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<td>MT Energy Office</td>
<td>NWestern submitting IRP by end of April, 175 MW RICE unit 2023/24 timeframe</td>
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<tr>
<td>UAMPS</td>
<td>Flagged the importance of flexibility and resiliency, urged Council work on the subject</td>
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<tr>
<td>PSE</td>
<td>Wrapped 2023 progress report, saw diverse portfolio mix responding to peak and clean energy needs</td>
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<tr>
<td>ODOE</td>
<td>Highlighted OR’s community solar program and recent solar + storage efforts</td>
</tr>
<tr>
<td>WA UTC</td>
<td>Underlined the driving force of WA’s clean energy policies</td>
</tr>
<tr>
<td>PSU</td>
<td>Brought attention to new batteries coming up in utility IRPs and the importance of long duration energy storage</td>
</tr>
<tr>
<td>PSU</td>
<td>Emphasized extreme weather events and their impact on the system, and planning</td>
</tr>
<tr>
<td>WA Department of Commerce</td>
<td>Agreed with points about batteries and solar + storage, expressed interest in virtual power plant models</td>
</tr>
</tbody>
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A valuable exercise to hear what’s on stakeholders’ minds, what they’re seeing in their service territories, and in their work.

Notably, many jurisdictions are thinking about similar things which align with Council work/focus as well.
Up Next

- IRPs forthcoming
  - Tracking those updates, will come back to the committee with a summary
- Continuing to develop the granularity of our WECC data
- Emerging Technologies
  - Batteries, + Storage
- Culminating in the midterm assessment
  - Does the resource strategy in the 2021 PP continue to ensure an adequate, efficient, economical and reliable power system?

From division workplan update. Note the few key check points as we help prepare inputs for an updated adequacy assessment feeding into the midterm assessment in mid 2024.