2021 All Source RFP
Bidders’ Conference

July 29, 2021
Safety moment: Preventing wildfires

Wildfires are often preventable, because many originate from human error. Remember the following:

- Check your forest district's wildfire danger rating before starting a campfire.
- Stay with your campfire until out, drown with water, cover with dirt, and repeat.
- Don't throw cigarettes, other smoking materials, or matches on the ground or out of vehicle windows.
- Never park vehicles, including recreational vehicles, on dry vegetation. The exhaust system can get hot enough to start a fire.
- Be sure to have a working approved spark arrester on your off-road vehicles.
- Speak up and alert authorities if you suspect someone is in danger of starting a wildfire.
How to use Zoom

- Attendees will remain in listen-only mode
- The “chat” feature is disabled
- Enter questions anytime in the Q&A chat – organizers will read questions aloud during Q&A period of each presentation
- Call-in participants can still access the Q&A box if viewing the presentation online

If you have a question, type it in the Q&A box!
Introductions

**Puget Sound Energy**
Resource Acquisitions, Colin Crowley (Manager)

Commercial team
- Zac Yanez (Lead)
- Anthony O’Rourke
- Eric Kang
- Scott Williams
- Sheri Maynard

Quantitative analytics
- Wei-min Dang (Lead)
- Cuong Nguyen
- David Meyer
- Rahul Venkatesh

Clean Energy Planning, Brian Tyson
Distributed Energy Resources, Jessica Raker
Demand Response, Jeff Tripp
Energy Delivery, Mahmoud Ghofrani, Laxman Subedi

**Power System Consultants**
Energy Storage Location Study
- Tracy Rolstad

**Bates White**
Independent Evaluator
- Frank Mossburg
- Vincent Musco

**Maul Foster & Alongi**
Conference Facilitator
- Kathryn Murdock

**PSE Transmission**
- Leslie Almond
- Pete Jones
Agenda

1. Resource need
2. Eligible Resources
3. Minimum Requirements
4. PSE Assets Available for Bidder Use
   Q&A
   ---- Break----
5. Evaluation Process
6. CEIP and Customer Benefit Indicators
7. RFP Schedule
8. Targeted RFP and Schedule
9. Resources for Bidders
   Q&A
   ---- Break----
10. Bid Preparation and Submission Demonstrations
11. Energy Storage Location Study (Power System Consultants)
   Q&A
2021 All Source RFP CETA need from 2021 IRP

1,669 GWh of CETA-eligible clean energy resources by 2026 growing to 5,369 GWh by 2030

• Deliveries on or before 12/31/2025 for renewable resources
• Timing aligns with final year of PSE's first four-year Clean Energy Implementation Plan (CEIP) 2022-2025
• Similar to prior RFPs, need is likely to be dynamic during the RFP evaluation and PSE will use the best available forecast information at each phase of the RFP evaluation

<table>
<thead>
<tr>
<th>CETA Need in GWhs</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CETA qualifying resources</td>
<td>7,398</td>
<td>9,045</td>
<td>9,087</td>
<td>8,963</td>
<td>9,016</td>
</tr>
<tr>
<td>2 2021 IRP Draft CETA Energy Target - Mid with Conservation</td>
<td>7,398</td>
<td>8,345</td>
<td>9,297</td>
<td>10,059</td>
<td>10,958</td>
</tr>
<tr>
<td>3 CETA Need/(Surplus)</td>
<td>0</td>
<td>-699</td>
<td>210</td>
<td>1,096</td>
<td>1,942</td>
</tr>
<tr>
<td>4 Net Hydro CETA energy additions</td>
<td>-499</td>
<td>-499</td>
<td>-442</td>
<td>-275</td>
<td>-273</td>
</tr>
<tr>
<td>5 Adjusted CETA Need/(Surplus)</td>
<td>-499</td>
<td>-1,198</td>
<td>-232</td>
<td>821</td>
<td>1,669</td>
</tr>
<tr>
<td>6 Need Assuming 36% Capacity Factor (WA Wind) (MW)</td>
<td>260</td>
<td>529</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Need Assuming 24% Capacity Factor (East WA Solar) (MW)</td>
<td>391</td>
<td>794</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*PSE’s draft 2021 load forecast indicates an increase in total load and peak load over the 2020 load forecast. PSE will update its renewable energy and capacity needs when the 2021 load forecast and analysis of the impact on resource needs is complete.
2021 All Source RFP capacity and market reliance need from 2021 IRP

527 MW incremental capacity need by 2027 growing to 735 MW by 2031

- Deliveries on or before 12/31/2026 for capacity resources
- Need driven by removal of Colstrip units 3&4 from PSE’s portfolio after 2025 and expiration of the Centralia Power Purchase Agreement
- IRP market risk assessment identified need to reduce market reliance on short-term Mid C market purchases by up to ~1,000 MW
- Similar to prior RFPs, need is likely to be dynamic during the RFP evaluation and PSE will use the best available forecast information at each phase of the RFP evaluation
- Actual glide path will be driven by resource opportunities and risk assessment

<table>
<thead>
<tr>
<th>Need/(Surplus) and Additions in MW</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 2021 Draft IRP Need/(Surplus)</td>
<td>-230</td>
<td>-350</td>
<td>-306</td>
<td>-257</td>
<td>369</td>
<td>527</td>
</tr>
<tr>
<td>2. Reduced Market Reliance Need</td>
<td>185</td>
<td>372</td>
<td>574</td>
<td>776</td>
<td>979</td>
<td></td>
</tr>
<tr>
<td>3. Total Resource Need/(Surplus)</td>
<td>-230</td>
<td>-165</td>
<td>66</td>
<td>317</td>
<td>1,145</td>
<td>1,506</td>
</tr>
<tr>
<td>5. Adjusted Total Resource Need/(Surplus)</td>
<td>-331</td>
<td>-271</td>
<td>-5</td>
<td>246</td>
<td>1,074</td>
<td>1,506</td>
</tr>
<tr>
<td>6. Estimated Glide Path of Incremental Resource additions</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>306</td>
<td></td>
</tr>
</tbody>
</table>

* PSE’s draft 2021 load forecast indicates an increase in total load and peak load over the 2020 load forecast. PSE will update its renewable energy and capacity needs when the 2021 load forecast and analysis of the impact on resource needs is complete.
Eligible resources: Any commercially-proven, CETA-compliant technology

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description (including but not limited to)</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CETA-eligible energy</td>
<td>All commercially proven renewable resources</td>
<td>PPA, ownership</td>
</tr>
<tr>
<td>Baseload generation</td>
<td>Unit contingent, shaped, or blocked</td>
<td>PPA, ownership</td>
</tr>
<tr>
<td>Capacity products</td>
<td>Call options, dispatchable, storage</td>
<td>PPA, ownership</td>
</tr>
<tr>
<td>Temporal exchanges</td>
<td>Seasonal</td>
<td>PPA</td>
</tr>
<tr>
<td>Hybrid resources</td>
<td>Renewable + storage, etc.</td>
<td>PPA, ownership</td>
</tr>
<tr>
<td>Demand side resources</td>
<td>DR, DER, etc.</td>
<td>PPA</td>
</tr>
<tr>
<td>Other resources not specified above*</td>
<td>Any other commercially available resource</td>
<td></td>
</tr>
</tbody>
</table>

* The All Source RFP is open to all commercially-proven, CETA-compliant resources; Energy Efficiency resources traditionally acquired through PSE’s Customer Energy Management (CEM) team which has separate RFI (https://conduitnw.org/Pages/Article.aspx?rid=3715) and RFP (https://conduitnw.org/Pages/Article.aspx?rid=3741) processes.

Power Purchase Agreements
- Resource-specific PPAs up to 20 years (or longer, if resource demonstrates longer useful life)
- Standalone system (e.g. non-resource specific) PPAs between 4 to 5 years
- Power bridging agreement up to 5 years, tied to long-lead resource with COD after 2025

Ownership
- Only at or after COD (with consideration for tax and depreciation advantages)
- No PSE self-build development projects
- Co-ownership where PSE retains dispatchability and rights of control
Minimum Requirements

Summary of key minimum proposal requirements

### All Proposals

- Commercially-proven technology
- Proposal must be greater than 5 MW
- Deliveries on or before **12/31/2026** for capacity resources
- Deliveries on or before **12/31/2025** for renewable resources
- Located on PSE’s system; delivery to PSE or eligible POD (Exhibit H)
- Start interconnection process by September 1, 2021
- Demonstrate site control
- Include CETA Customer Benefit Plan
- Provide all required data (Exhibit B)
- Submit bid fee: one proposal with up to three (3) configurations

### Resource/Transaction Type

- **Generation projects requiring fuel**: Firm fuel delivery and supply plan
- **As-generated renewable energy**: Firm hourly schedule with all associated environmental attributes
- **Stand-alone storage**: Interconnection and transmission service with ability to charge and discharge
- **Wind proposals**: 1 year of verifiable wind data
- **Solar proposals**: 1 year of verifiable irradiance data
- **Ownership proposals**: At or after COD; no PSE self-build development projects
- **Development projects**: Project detail to substantiate viable project, labor plan
- **DER/DR projects**: Must include base configuration; may also provide two alternate configurations (see All-Source RFP, Section 2)
Bid completion and submission requirements

- Bidders must submit the following by 11:59 PST on September 1, 2021:
  - Completed and validated Exhibit B forms
  - Signed Mutual Confidentiality Agreement
  - Prototype term sheets with redlines (if any)
  - Signed PSE Customer Consent Letter
  - Bid fee

- Submit bids electronically through newly developed web platform (https://rfp.pse.com/)

- More information about completing Exhibit B and submission of proposals through the web platform later in the presentation

Review completeness of bid with the “Proposal Content Checklist” on Tab 1 of Exhibit B
Bid fee and success fee

**Bid fee** is assessed using a tiered fee structure based on nameplate capacity for equity considerations.

The bid fee is designed to help offset costs of
- the independent evaluator,
- other third-party consultants,
- conducting studies, and/or
- legal services

<table>
<thead>
<tr>
<th>Proposal Size</th>
<th>Bid Fee</th>
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<tbody>
<tr>
<td>≥5 – 10 MW</td>
<td>$2,500</td>
</tr>
<tr>
<td>&gt;10 – 20 MW</td>
<td>$5,000</td>
</tr>
<tr>
<td>&gt;20 MW</td>
<td>$10,000</td>
</tr>
</tbody>
</table>

**Success fee** cap based on tiered structure, however, assessed progressively.

- The success fee may be charged to all successful bidders at time of contract execution to help recover the incremental costs associated with due diligence work associated with negotiations.
- Success fee would only be charged if the bid fee doesn’t cover the costs.

<table>
<thead>
<tr>
<th>Project size</th>
<th>$/MW maximum</th>
<th>Success fee maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥5 – 80 MW</td>
<td>$650 / MW</td>
<td>$50,000</td>
</tr>
<tr>
<td>&gt;80 – 150 MW</td>
<td>$800 / MW</td>
<td>$105,200</td>
</tr>
<tr>
<td>&gt;150 MW</td>
<td>$1000/MW</td>
<td>$250,000</td>
</tr>
</tbody>
</table>
PSE transmission assets available for bidder use

**CA-OR Intertie**
- Annual availability during Mar 1 to Oct 31
- Bidder responsible for alternative Nov-Feb delivery plan

**Centralia**
- ≤ 100 MW
- Available: Jan 2024

**Central Ferry**
- ≤ 150 MW
- Available: Mar 2024

**Mid-C**
- ≤ 1000 MW
- Available: Jan 2024
- VERs not delivering to PSE system and instead to Mid-C will not receive a capacity credit

**2021 All-Source RFP Section 2, Exhibit H**

4 PSE Assets Available for Use
Transmission assumptions for evaluation purposes

- All resources delivered at the CA-OR Intertie (summer only), Centralia, or Central Ferry will be assigned a capacity credit consistent with Exhibit H
  - VERS delivered at Mid-C will not be assigned a capacity credit (“ELCC”) due to Mid-C transmission being made available to help PSE meet its Market Reliance and Resource Adequacy needs.

- Updates to the Northwest Power Pool (“NWPP”) resource adequacy (“RA”) programs may be considered in Phase 2

- For resources delivering to the PODs in Exhibit H, a transmission adder will be applied consistent with the transmission provider’s OATT rate and PSE assumptions for future increases
  - Transmission adder only applied after current transmission contract assumed expiry date (5 years for Mid-C deliveries)

- Resources will only be assigned a transmission adder during months they are expected to deliver
  - VERS delivered to Mid-C will be given a half month per year transmission cost credit to reflect the assumption that transmission capacity will be utilized by firm capacity resources on peak days

- Resources with the ability to provide firm day-ahead schedule will receive capacity/RA credit
  - VER + storage, “block” PPA, dispatchable resources
Lower Snake River wind development rights

- PSE is making ~140 MW of (LSR) development rights in the Oliphant North area available for bidders to propose a new development project
- Bidders will be competing for the 150 MW of transmission at Central Ferry (Exhibit H) and the transmission adder will be assessed in their proposals
  - Non-LSR bidders may also compete for the 150 MW Central Ferry transmission
- Bidders can view PSE’s development rights via a data room available as of 7/23
  - Final proposals are due 9/1/2021
- Documents provided include the LGIA, wind leases, EIS, Conditional Use Permit, wind data, cultural resource map, initial site map
- PSE currently prefers bidders to propose PPA or PPA + purchase option transactions
  - Details outlined in the RFP documentation
  - PSE has a limited ability to use tax incentives
Q&A
RFP evaluation process and estimated timeline

- **Intake**
  - New proposal submission web portal
  - New proposal data collection through enhanced and enriched Exhibit B

- **Phase 1 individual proposal screening**
  - Quantitative evaluation (70%) - Automated inputs from database for energy and financial modeling; proposals compared by Portfolio Benefit / MW\(^1\)
  - Qualitative evaluation (30%) - Evaluation is cross-functional, thorough and spotlights CETA benefits
  - Phase 1 candidate list - Represents resources among the lowest costs and highest commercial values of each technology group, and meets at least 150% of the RFP resource needs

- **Phase 2 portfolio of proposals optimization**
  - Optimal portfolio mix of resources with maximum portfolio benefits
  - Sensitivity analysis will be performed for optimization under different economic settings such as levels of carbon costs and load growth; may include analysis of portfolio that maximizes CBIs
  - Creates the short list for negotiation and contracting

- **Negotiation and contracting**
  - Prototype term sheets and redlines for efficient negotiation
  - Compliance report filed with WUTC within 90 days of the conclusion of the RFP

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Quantitative evaluation (70%): Screening metrics allow comparison and ranking of resources with different characteristics and capacities

- Phase 1 projects compared and ranked based on similar resource characteristics (e.g., technology, location, etc.)
- The project with the highest portfolio benefit/offered nameplate will receive the full score
- At the end of Phase 1, PSE will select a pool of resources that represents best-performing proposals from different resource types generally consistent with ELCC categories in 2021 IRP
- PSE may further refine resource categories based on proposals received and other factors, such as whether the resources deliver to PSE’s system or to Mid-C

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio benefit ($</td>
<td>Difference between the net present value (“NPV”) portfolio revenue requirement with proposal replacing generic resource, and NPV portfolio revenue requirement of the all-generic portfolio.</td>
<td>Higher is better. Useful for comparing projects of similar size / technology type. Used to determine the least cost combination of resources that meets PSE’s resource needs.</td>
</tr>
<tr>
<td>Portfolio benefit/</td>
<td>NPV of a proposed project’s portfolio benefit divided by the net present value of the project’s offered nameplate capacity.</td>
<td>Higher is better. Useful for comparing different project sizes and technologies. Used along with qualitative metrics in establishing initial ranking of projects for inclusion in portfolio optimization.</td>
</tr>
<tr>
<td>offered nameplate ($/MW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levelized cost of energy ($/MWh)</td>
<td>NPV of a proposed project’s revenue requirement divided by the net present value of the project’s generation.</td>
<td>Lower is better. Useful for comparing projects that have the same or similar operating characteristics.</td>
</tr>
</tbody>
</table>
### Qualitative evaluation (30%): Non-price scoring rubric and due diligence

- Rubric designed to evaluate key areas applicable to all projects regardless of technology type
- Phase 1 rubric evaluation will occur on all conforming proposals:
  - Detailed information submitted by bidders (Exhibit B)
  - A “0” score on the rubric represents failure to meet RFP minimum criteria
  - Minimum criteria screening and fatal flaw review (3-day “cure period”)
- Bidders required to submit a Customer Benefit Plan; opportunity to submit updated plan by 1/31/22 based on CBIs in final CEIP
- Additional due diligence in Phase 2 and term sheet review

<table>
<thead>
<tr>
<th>Evaluation Categories</th>
<th>Measures</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Counterparty Viability</td>
<td>• Experience with similar projects&lt;br&gt;• Counterparty stability</td>
<td>10%</td>
</tr>
<tr>
<td>2. Project Viability</td>
<td>• Financing plan&lt;br&gt;• Supply chain&lt;br&gt;• Program design (DR, DER)&lt;br&gt;• Technology Risk</td>
<td>10%</td>
</tr>
<tr>
<td>3. Site Control / Customer Acquisition</td>
<td>• Land agreements status&lt;br&gt;• Customer acquisition plan (DR, DER)</td>
<td>10%</td>
</tr>
<tr>
<td>4. Permitting and Studies</td>
<td>• Status of permitting and habitat studies</td>
<td>10%</td>
</tr>
<tr>
<td>5. Energy Delivery</td>
<td>• Interconnection and Transmission status (on/off PSE system)&lt;br&gt;• Interconnection on Distribution (DR, DER)</td>
<td>25%</td>
</tr>
<tr>
<td>6. CETA Customer Benefit Plan</td>
<td>• Plan to address five CBIs: Environment&lt;br&gt;• Economic&lt;br&gt;• Health&lt;br&gt;• Energy and Non-Energy Benefits&lt;br&gt;• Energy Security and Resiliency</td>
<td>35%</td>
</tr>
</tbody>
</table>
Consistent with IRP modeling and assumptions, **Aurora and Plexos** will be used to select the optimal resource portfolio to maximize portfolio benefit.

**Proposal Inputs**
- Resource assumptions
- Year available
- Renewable/capacity contribution

**IRP base portfolio, assumptions & Resource Needs**
- Peak capacity need
- Market reliance reduction need
- CETA need
- Load obligation

**Financial and Energy Model**
- Resource financial costs
- Fixes charges such as transmission and production O&M
- Resource dispatch (MWh)
- Resource variable cost ($)
- Equivalent market revenue ($)
- GHG Emission and costs
- Flexibility benefits
- Balancing charges

**Optimization Logic**
- LTCE logic
- Generic resources displacement based on renewable and/or capacity contribution

**Aurora / Plexos**
About customer benefit indicators

Customer benefit indicator ("CBI") is an attribute, either quantitative or qualitative, of resources or related distribution investments associated with customer benefits described in RCW 19.405.040(8).

Customer benefit indicators are outcomes that improve customers lives

- Customer benefit indicators will:
  - Shape programs, actions and investment decisions
  - Help ensure all customers benefit from clean electricity transition
  - Be used through energy resource planning process (e.g., CEIP, Integrated Resource Plan, Clean Energy Action Plan)
### Draft customer benefit indicators

**Updated 07/15/21**

<table>
<thead>
<tr>
<th><strong>Highly impacted</strong> communities and vulnerable populations</th>
<th><strong>All PSE customers</strong> (including highly impacted communities and vulnerable populations)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy benefits</strong></td>
<td><strong>Public health</strong></td>
</tr>
<tr>
<td>• Improved participation from named communities</td>
<td>• Improved outdoor air quality</td>
</tr>
<tr>
<td></td>
<td>• Improved community health</td>
</tr>
<tr>
<td></td>
<td><strong>Resiliency</strong></td>
</tr>
<tr>
<td></td>
<td>• Decrease in frequency &amp; duration of outages</td>
</tr>
<tr>
<td></td>
<td>• Increased resiliency</td>
</tr>
<tr>
<td><strong>Burden reduction</strong></td>
<td><strong>Environment</strong></td>
</tr>
<tr>
<td>• Improved participation from named communities</td>
<td>• Reduce GHG emissions</td>
</tr>
<tr>
<td>• Reduced cost impacts</td>
<td>• Reduction of climate change impacts</td>
</tr>
<tr>
<td><strong>Non-energy benefits</strong></td>
<td><strong>Risk reduction</strong></td>
</tr>
<tr>
<td>• Improved participation from named communities</td>
<td>• Reduction of climate change impacts</td>
</tr>
<tr>
<td>• Increase in clean energy jobs</td>
<td>• Decrease in frequency &amp; duration of outages</td>
</tr>
<tr>
<td>• Improved home comfort</td>
<td>• Increased resiliency</td>
</tr>
<tr>
<td><strong>Cost reduction</strong></td>
<td><strong>Energy security</strong></td>
</tr>
<tr>
<td></td>
<td>• Decrease in frequency &amp; duration of outages</td>
</tr>
<tr>
<td></td>
<td>• Increased resiliency</td>
</tr>
<tr>
<td></td>
<td><strong>Cost reduction</strong></td>
</tr>
<tr>
<td></td>
<td>• Affordability of clean energy</td>
</tr>
</tbody>
</table>

*Prioritized customer benefit indicator*
How customer benefit indicators will be used in the 2021 All-Source RFP

**Phase 1**
- Five customer benefit indicator (“CBI”) categories based on CEIP rulemaking and 2021 IRP work
  - ♦ Environment
  - ♦ Economic
  - ♦ Health
  - ♦ Energy and Non-Energy Benefits
  - ♦ Energy Security and Resiliency
- How well does a project meet or address each category?
- Breadth and depth of responses, prior experiences
- Looking for commitments or specific plans to carry out related to indicators
- How will bidders track, measure and quantify

- Bidder opportunity to submit updated Customer Benefit Plan by January 31, 2022 based on CBIs in final CEIP

**Phase 2**
- PSE may perform analyses aimed at producing a resource portfolio that meets the capacity and renewable need while maximizing customer benefit indicators
- Highlight prioritized indicators
- Help identify the resource mix that best aligns with CETA customer benefit and equity goals
All-Source RFP Draft Schedule*

* The All-Source RFP schedule is subject to adjustment based on Washington Utilities and Transportation Commission (“WUTC”) review and the actual pace of the evaluation process.
Upcoming workshops

**ELCC Workshop:** End of August, 2022
- Modeling approach and assumptions used to derive generic resource ELCC assumptions
- How the generic and resource-specific ELCC values will be used in the RFP analysis
- How the resource-specific ELCC values are different than the generic ELCC assumptions
- Reference material (“primer”) to be posted on the RFP website at least one week prior to the workshop

**Market Reliance Reduction Workshop:** End of September, 2022
- Sharing of ongoing analysis of proposed market reliance reduction
- New information affecting planned reduction, glide path and timing of market reliance reduction
- Information to be posted to the RFP website at least one week prior to workshop

Workshop dates will be shared with stakeholders and interested parties through the RFP mailbox and posted on PSE’s public RFP website www.pse.com/rfp
PSE will file a targeted DER RFP in November 2021

**Targeted Distributed Energy Resources RFP**

- Draft Targeted DER RFP will be filed by 11/15/21 and will include VPP specifications
- Process tailored for the unique benefits of smaller-scale DERs, including customer engagement and additional value streams from being located on the distribution system
- Solicited resources expected to be consistent with resource additions in 2021 IRP electric preferred portfolio:
  - DR: 29 MW
  - DER solar: 80 MW
  - DER battery: 25 MW
- Targets may be modified per CEIP to be filed in October 2021
- All-Source RFP acquisition targets may be revised based on final DER RFP targets

**Coordination and co-optimization of targeted DER RFP with All-Source RFP**

- Each RFP separately evaluated through short list selection
- Short list from targeted DER RFP included in a combined portfolio analysis with short list from All-Source RFP to identify the best resources from both RFPs
- DERs have two opportunities to propose (All-Source RFP and Targeted DER RFP).
- Resources considered to meet both a) specific requirements identified in the CEIP and b) the broader electric portfolio need identified in the All-Source RFP regardless of the RFP into which they bid
# 2021 Targeted DER RFP Schedule and Estimated Timing of Combined Analysis

**PSE will conduct a combined portfolio analysis of the All-Source RFP and Targeted DER RFP preliminary shortlists. Final shortlists would reflect adjustments, if any, resulting from combined analysis.**
New resources for bidders, stakeholders and other interested parties

<table>
<thead>
<tr>
<th><strong>Public website</strong> (<a href="http://www.pse.com/rfp">www.pse.com/rfp</a>)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All-Source RFP and Targeted DR/DER RFP schedules</td>
</tr>
<tr>
<td>• Updates and notifications</td>
</tr>
<tr>
<td>• Information about upcoming workshops</td>
</tr>
<tr>
<td>• Complete RFP documents for download</td>
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</tbody>
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<tr>
<th><strong>RFP mailbox</strong> (<a href="mailto:AllSourceRFPmailbox@pse.com">AllSourceRFPmailbox@pse.com</a>)</th>
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<tbody>
<tr>
<td>• All questions related to the All Source RFP (periodic Q&amp;A postings to website for benefit of all)</td>
</tr>
<tr>
<td>• Questions about the Targeted DER RFP may be sent to <a href="mailto:DERRFPmailbox@pse.com">DERRFPmailbox@pse.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>New web portal for submittal of proposals</strong> (<a href="http://www.rfp.pse.com">https://www.rfp.pse.com</a>)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Accessible through the public website (<a href="http://www.pse.com/rfp">www.pse.com/rfp</a>)</td>
</tr>
<tr>
<td>• Unlimited access to submit and resubmit proposals during RFP submission window</td>
</tr>
<tr>
<td>• Users manual and reference, with support through RFP inbox available to bidders</td>
</tr>
<tr>
<td>• More information on submission process later in presentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Bates White (Independent Evaluator)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Frank Mossburg: <a href="mailto:frank.mossburg@bateswhite.com">frank.mossburg@bateswhite.com</a></td>
</tr>
<tr>
<td>• Vincent Musco: <a href="mailto:vincent.musco@bateswhite.com">vincent.musco@bateswhite.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PSE transmission and interconnection website</strong> (<a href="http://www.oatioasis.com/psei/">http://www.oatioasis.com/psei/</a>)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PSE transmission and interconnection contact information on home page of OASIS website (<a href="http://www.oatioasis.com/psei/">http://www.oatioasis.com/psei/</a>)</td>
</tr>
<tr>
<td>• BPA transmission contacts: <a href="https://www.bpa.gov/Contact/Pages/Contact-Information-Transmission.aspx">https://www.bpa.gov/Contact/Pages/Contact-Information-Transmission.aspx</a></td>
</tr>
</tbody>
</table>
Q&A
Bid preparation and submission demonstrations

Goals

- Allow bidders to successfully submit bids
- Minimize issues with automation effort

Demonstrations

- Exhibit B - Clarify for bidders how to use the form
- RFP portal - Clarify for bidders how to use the portal
- RFP portal / Exhibit B – Troubleshooting data validation issues
PSC North America at a glance

3 LOCAL OFFICES

51 LOCAL SUBJECT MATTER EXPERTS

14 YEARS OF SERVICE IN NORTH AMERICA
Tracy Rolstad Education

- Diploma, Naval War College, College of Naval Command and Staff
- BSEE, University of Idaho

Nuclear Navy
- Nuclear Operational Prototype (S1C)
- Nuclear Power School (Reactor Operator)
- Electronics Technician School
  - Radar, Communications, etc.

Professional Technical Education
- Too numerous to list…
Experience

- Power Systems Consultants
  - Technical Director, Power Networks-North America
    - Presently WECC SRS Chair
      - Former WECC TSS Chair, Vice Chair, Secretary, DS Chair, JUG Chair, MSRATF Chair, PowerWorld User Group Chair

- Avista Corporation
  - Senior Power System Consultant, System Planning

- Utility System Efficiencies
  - Senior Power Systems Analyst/Principal Engineer

- The Bonneville Power Administration
  - Senior Engineer, System Operations

- The Joint Warfare Analysis Center
  - EP Senior Analyst, PACOM Chief of Targets

- Nuclear Navy (Attack Submarines)
  - Chief Petty Officer (ETC/SS)
  - Engineering Watch Supervisor/Reactor Operator
Task: Determine Favorable Locations for BESS

- Identify favorable BESS sites in PSE system
  - Two methods
    - Qualitative
    - Quantitative
  - Qualitative
    - Over head imagery
    - Drawings
    - Power flow base case examination
    - Station configuration
    - Discussions with Puget staff
  - Quantitative
    - Builds off qualitative examination
      - Green, yellow, red station “grades”
      - Green=good, etc
    - Examine charge/discharge in 3 WECC cases
      - All Lines in Service
      - NERC TPL-001 P0
      - N-1 & N-2 contingencies (select cases based on PTDF/OTDF)
      - NERC TPL-001 P1 & P6

Battery Energy Storage System (aka BESS)
Representative BESS System

- The study is technology neutral
  - Storage type is not important
  - Nor is equipment supplier
- Hornsdale example shows
  - Containerized nature of BESS
  - Size per MW/MW-hr
  - Typical Layout
  - Contextualizes conversation

Hornsdale…once the worlds largest BESS
Map and Extract PSE Stations for Screening
Qualitative Example (Not Favorable)

- Qualitative
  - Overhead imagery
    - Constrained footprint
  - Drawings
    - 2 transmission lines
  - Power flow base case examination
    - Ratings of lines, # of lines
  - Station configuration
  - Discussions with Puget staff
    - Fails Good Neighbor test!
      - Development potential is evident
      - Open space is desirable
      - Heavy residential presence is not desirable
      - The minimal number of landowners are impacted by a project
      - Land use should be reasonably consistent with its present use
      - See report for greater details
Qualitative Results (High Risk in Red)

<table>
<thead>
<tr>
<th>Sub Name</th>
<th>Nominal kV Range</th>
<th># of Lines</th>
<th>Substation Type</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCO C</td>
<td>115.0 (only)</td>
<td>4</td>
<td>Main Bus</td>
<td>WHATCOMI</td>
</tr>
<tr>
<td>BAKER SW</td>
<td>115.0 (only)</td>
<td>4</td>
<td>Main Bus</td>
<td>SKAGIT</td>
</tr>
<tr>
<td>BALDI</td>
<td>230.0 (only)</td>
<td>2</td>
<td>Tap</td>
<td>S.KING</td>
</tr>
<tr>
<td>CASCADE</td>
<td>34.5 to 230.0</td>
<td>3</td>
<td>Xfmr Term/Main Bus</td>
<td>KITTITAS</td>
</tr>
<tr>
<td>COTAGEBR</td>
<td>115.0 (only)</td>
<td>4</td>
<td>Main Bus</td>
<td>N.KING</td>
</tr>
<tr>
<td>ELECTHTS</td>
<td>57.5 to 115.0</td>
<td>5</td>
<td>Xfmr Term/Main Bus</td>
<td>PIERCE</td>
</tr>
<tr>
<td>HORSRNCH</td>
<td>230.0 (only)</td>
<td>3</td>
<td>Main Bus</td>
<td>N.KING</td>
</tr>
<tr>
<td>HRNCHTAP</td>
<td>230.0 (only)</td>
<td>2</td>
<td>Tap</td>
<td>N.KING</td>
</tr>
<tr>
<td>KLAHANIE</td>
<td>230.0 (only)</td>
<td>2</td>
<td>Tap</td>
<td>N.KING</td>
</tr>
<tr>
<td>LAKESIDE</td>
<td>115.0 (only)</td>
<td>7</td>
<td>Main Bus</td>
<td>N.KING</td>
</tr>
<tr>
<td>MINTFARM</td>
<td>13.8 to 230.0</td>
<td>1</td>
<td>Main (Gen Interconnection)</td>
<td>Portland Area</td>
</tr>
<tr>
<td>NOVELTYH</td>
<td>115.0 to 230.0</td>
<td>7</td>
<td>Main &amp; Aux/Main Bus</td>
<td>N.KING</td>
</tr>
<tr>
<td>OLYMPA P</td>
<td>115.0 (only)</td>
<td>9</td>
<td>Main Bus</td>
<td>THURSTN</td>
</tr>
<tr>
<td>SHUFFLETON</td>
<td>115.0 (only)</td>
<td>4</td>
<td>Main &amp; Aux</td>
<td>S.KING</td>
</tr>
<tr>
<td>SNOQ SW</td>
<td>2.0 to 115.0</td>
<td>5</td>
<td>Main Bus</td>
<td>N.KING</td>
</tr>
<tr>
<td>FREDONIA</td>
<td>13.8 to 115.0</td>
<td>4</td>
<td>Main Bus</td>
<td>SKAGIT</td>
</tr>
</tbody>
</table>
Why Main Bus is less than desirable?

- Main bus
  - Provides basic service
  - Less reliable than other configurations
    - Breaker failure clears bus
  - Improved station types
    - Main & Transfer
    - Ring bus
    - Breaker & ½
    - Double bus/breaker

- Main bus results are removed
  - For final reporting
Qualitative results (Low Risk and Medium Risk)

<table>
<thead>
<tr>
<th>Sub Name</th>
<th>Nominal kV Range</th>
<th># of Lines</th>
<th>Bus Configuration (low &amp; high voltage)</th>
<th>Zone</th>
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</thead>
<tbody>
<tr>
<td>Alderton</td>
<td>115.0 (only)</td>
<td>7</td>
<td>Main &amp; Aux</td>
<td>PIERCE</td>
</tr>
<tr>
<td>Berrydale</td>
<td>115.0 to 230.0</td>
<td>7</td>
<td>Main &amp; Aux / Brk &amp; half</td>
<td>S.KING</td>
</tr>
<tr>
<td>Christopher</td>
<td>115.0 (only)</td>
<td>6</td>
<td>Main Bus</td>
<td>S.KING</td>
</tr>
<tr>
<td>Frederickson</td>
<td>13.8 to 115.0</td>
<td>4</td>
<td>Main Bus</td>
<td>PIERCE</td>
</tr>
<tr>
<td>Fredonia</td>
<td>13.8 to 230.0 (115kV)</td>
<td>2</td>
<td>Main Bus</td>
<td>SKAGIT</td>
</tr>
<tr>
<td>Lake Tradition</td>
<td>115.0 (only)</td>
<td>8</td>
<td>Main Bus</td>
<td>N.KING</td>
</tr>
<tr>
<td>March Point</td>
<td>115.0 to 230.0</td>
<td>12</td>
<td>Main &amp; Aux / Xfrm Term</td>
<td>SKAGIT</td>
</tr>
<tr>
<td>Midway</td>
<td>115.0 (only)</td>
<td>6</td>
<td>Main &amp; Aux</td>
<td>S.KING</td>
</tr>
<tr>
<td>Saint Clair</td>
<td>115.0 to 230.0</td>
<td>7</td>
<td>Main &amp; Aux / DB-DB</td>
<td>THURSTN</td>
</tr>
<tr>
<td>Sammamish</td>
<td>115.0 to 230.0</td>
<td>11</td>
<td>Main &amp; Aux / Main &amp; Aux</td>
<td>N.KING</td>
</tr>
<tr>
<td>Talbot Hill</td>
<td>115.0 to 230.0</td>
<td>14</td>
<td>Main &amp; Aux / DB-DB</td>
<td>S.KING</td>
</tr>
<tr>
<td>Tono</td>
<td>115.0 (only)</td>
<td>4</td>
<td>Main &amp; Aux</td>
<td>THURSTN</td>
</tr>
<tr>
<td>Bellingham</td>
<td>115.0 (only)</td>
<td>11</td>
<td>Brk &amp; half</td>
<td>WHATCOM</td>
</tr>
<tr>
<td>Krain Corner</td>
<td>57.5 to 115</td>
<td>6</td>
<td>Main Bus</td>
<td>PIERCE</td>
</tr>
<tr>
<td>O'Brien</td>
<td>115.0 to 230.0</td>
<td>11</td>
<td>Main &amp; Aux / Xfrm Term</td>
<td>S.KING</td>
</tr>
<tr>
<td>Portal Way</td>
<td>115.0 (only)</td>
<td>5</td>
<td>Main &amp; Aux</td>
<td>WHATCOM</td>
</tr>
<tr>
<td>S. Bremerton</td>
<td>115.0 to 230.0</td>
<td>6</td>
<td>Main &amp; Aux / Xfrm Term</td>
<td>KITSAP</td>
</tr>
<tr>
<td>Sedro Woolley</td>
<td>115.0 to 230.0</td>
<td>12</td>
<td>Main &amp; Aux / Brk &amp; half</td>
<td>SKAGIT</td>
</tr>
<tr>
<td>Starwood</td>
<td>115.0 (only)</td>
<td>4</td>
<td>Main Bus</td>
<td>S.KING</td>
</tr>
<tr>
<td>White River</td>
<td>115.0 to 230.0</td>
<td>12</td>
<td>Main &amp; Aux / DB-DB</td>
<td>PIERCE</td>
</tr>
</tbody>
</table>
Quantitative Process (Simulation Based)

- Use of ATC tool in PowerWorld Simulator (version 21)
  - 3 WECC Base Cases
    - 2030: Heavy Summer, Heavy Winter, Light Spring
      - Charge and Discharge (generate)
  - Deliverability study with Puget gen fixed at case output
    - Sink/source was all other WECC gen
  - Purely physics, no contractual limits applied

ATC tool
- Efficient automation tool
- Examines multiple POI’s
- Multiple contingencies
  - P0 (N-0)
  - P1 (N-1)
  - P6 (N-2)
- Charge/discharge (discovers maximums)
- Multiple cases
"Raw" Quantitative Results (Culled to produce final results)

<table>
<thead>
<tr>
<th>Substation</th>
<th>Substation Type</th>
<th>P0 Results</th>
<th>P1 Results</th>
<th>P6 Results</th>
<th>Maximum ESS</th>
<th>Total Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Generating</td>
<td>Charging</td>
<td>Generating</td>
<td>Charging</td>
<td>Generating</td>
</tr>
<tr>
<td>Alderton</td>
<td>Main &amp; Aux</td>
<td>725</td>
<td>(790)</td>
<td>96</td>
<td>(366)</td>
<td>134*</td>
</tr>
<tr>
<td>Berrydale</td>
<td>Main &amp; Aux</td>
<td>982</td>
<td>(248)</td>
<td>702</td>
<td>(167)</td>
<td>515*</td>
</tr>
<tr>
<td>Christopher</td>
<td>Main Bus</td>
<td>751</td>
<td>(419)</td>
<td>552</td>
<td>(217)</td>
<td>484*</td>
</tr>
<tr>
<td>Frederickson</td>
<td>Main Bus</td>
<td>404</td>
<td>(316)</td>
<td>135</td>
<td>(96)</td>
<td>99*</td>
</tr>
<tr>
<td>Fredonia</td>
<td>Main Bus</td>
<td>510</td>
<td>(803)</td>
<td>110</td>
<td>(532)</td>
<td>9*</td>
</tr>
<tr>
<td>Lake Tradition</td>
<td>Main Bus</td>
<td>725</td>
<td>(534)</td>
<td>518</td>
<td>(136)</td>
<td>521*</td>
</tr>
<tr>
<td>March Point</td>
<td>Main &amp; Aux</td>
<td>664</td>
<td>(367)</td>
<td>272</td>
<td>(189)</td>
<td>9*</td>
</tr>
<tr>
<td>Midway</td>
<td>Main &amp; Aux</td>
<td>550</td>
<td>(263)</td>
<td>432</td>
<td>(164)</td>
<td>428*</td>
</tr>
<tr>
<td>Saint Clair</td>
<td>Main &amp; Aux</td>
<td>520</td>
<td>(546)</td>
<td>45</td>
<td>(254)</td>
<td>39*</td>
</tr>
<tr>
<td>Sammamish</td>
<td>Main &amp; Aux</td>
<td>409</td>
<td>(677)</td>
<td>323</td>
<td>(99)</td>
<td>323</td>
</tr>
<tr>
<td>Talbot Hill</td>
<td>Main &amp; Aux</td>
<td>754</td>
<td>(768)</td>
<td>552</td>
<td>(242)</td>
<td>450*</td>
</tr>
<tr>
<td>Tono</td>
<td>Main &amp; Aux</td>
<td>548</td>
<td>(445)</td>
<td>275</td>
<td>(85)</td>
<td>267</td>
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<tr>
<td>Bellingham</td>
<td>Brk &amp; half</td>
<td>695</td>
<td>(578)</td>
<td>322</td>
<td>(109)</td>
<td>10*</td>
</tr>
<tr>
<td>Krain Corner</td>
<td>Main Bus</td>
<td>250</td>
<td>(222)</td>
<td>136</td>
<td>(34)</td>
<td>136*</td>
</tr>
<tr>
<td>O’Brien</td>
<td>Main &amp; Aux</td>
<td>672</td>
<td>(554)</td>
<td>535</td>
<td>(258)</td>
<td>225</td>
</tr>
<tr>
<td>Portal Way</td>
<td>Main &amp; Aux</td>
<td>337</td>
<td>(565)</td>
<td>105</td>
<td>(446)</td>
<td>11*</td>
</tr>
<tr>
<td>S. Bremerton</td>
<td>Main &amp; Aux</td>
<td>426</td>
<td>(328)</td>
<td>301</td>
<td>(27)</td>
<td>79</td>
</tr>
<tr>
<td>Sedro Woolley</td>
<td>Main &amp; Aux</td>
<td>779</td>
<td>(950)</td>
<td>287</td>
<td>(589)</td>
<td>48*</td>
</tr>
<tr>
<td>Starwood</td>
<td>Main Bus</td>
<td>573</td>
<td>(335)</td>
<td>373</td>
<td>(181)</td>
<td>240</td>
</tr>
<tr>
<td>White River</td>
<td>Main &amp; Aux</td>
<td>872</td>
<td>(802)</td>
<td>583</td>
<td>(379)</td>
<td>365*</td>
</tr>
</tbody>
</table>
## Final Quantitative Results

<table>
<thead>
<tr>
<th>Substation</th>
<th>Substation Type</th>
<th>Voltage (kV)</th>
<th>Location</th>
<th>Total Maximum ESS (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alderton</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>47.15344</td>
<td>-122.2365</td>
</tr>
<tr>
<td>Berrydale</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>47.37803</td>
<td>-122.1311</td>
</tr>
<tr>
<td>March Point</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>48.45714</td>
<td>-122.5625</td>
</tr>
<tr>
<td>Midway</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>47.40239</td>
<td>-122.2944</td>
</tr>
<tr>
<td>Saint Clair</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>47.03511</td>
<td>-122.7356</td>
</tr>
<tr>
<td>Sammamish</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>47.68558</td>
<td>-122.1499</td>
</tr>
<tr>
<td>Talbot Hill</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>47.46864</td>
<td>-122.191</td>
</tr>
<tr>
<td>Tono</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>46.75539</td>
<td>-122.8775</td>
</tr>
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<td>Brk &amp; half</td>
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<td>48.75939</td>
<td>-122.4604</td>
</tr>
<tr>
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<td>Main &amp; Aux</td>
<td>115</td>
<td>47.40317</td>
<td>-122.2432</td>
</tr>
<tr>
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<td>Main &amp; Aux</td>
<td>115</td>
<td>48.90361</td>
<td>-122.63</td>
</tr>
<tr>
<td>S. Bremerton</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>47.53764</td>
<td>-122.6914</td>
</tr>
<tr>
<td>Sedro Woolley</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>48.50458</td>
<td>-122.204</td>
</tr>
<tr>
<td>White River</td>
<td>Main &amp; Aux</td>
<td>115</td>
<td>47.239</td>
<td>-122.2096</td>
</tr>
</tbody>
</table>
Relative Size Graphic

- **Generation Queue Not Modeled**
  - These are screening results
    - Deliverability study
      - Not studied as Energy Resource
      - Not studied as Network Resource
        - Nuanced difference
Thank you!

PSC Specialists Group, Inc.
pscconsulting.com
## New resources for bidders, stakeholders and other interested parties

**Public website** ([www.pse.com/rfp](http://www.pse.com/rfp))
- All-Source RFP and Targeted DR/DER RFP schedules
- Updates and notifications
- Information about upcoming workshops
- Complete RFP documents for download

**RFP mailbox** ([AllSourceRFPmailbox@pse.com](mailto:AllSourceRFPmailbox@pse.com))
- All questions related to the All Source RFP (periodic Q&A postings to website for benefit of all)
- Questions about the Targeted DER RFP may be sent to [DERRFPmailbox@pse.com](mailto:DERRFPmailbox@pse.com)

**New web portal for submittal of proposals** ([https://www.rfp.pse.com](http://https://www.rfp.pse.com))
- Accessible through the public website ([www.pse.com/rfp](http://www.pse.com/rfp))
- Unlimited access to submit and resubmit proposals during RFP submission window
- Users manual and reference, with support through RFP inbox available to bidders
- More information on submission process later in presentation

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- Vincent Musco: [vincent.musco@bateswhite.com](mailto:vincent.musco@bateswhite.com)

- BPA transmission contacts: [https://www.bpa.gov/Contact/Pages/contact-information-transmission.aspx](https://www.bpa.gov/Contact/Pages/contact-information-transmission.aspx)
Q&A