

# PSE Electric Progress Report and Gas IRP Webinar with IRP Stakeholders

December 12, 2022

## Overview

On December 12, 2022, Puget Sound Energy (PSE) hosted an online webinar with Integrated Resource Plan (IRP) stakeholders on the Electric Progress Report to:

- Provide updates on the 2023 Electric Progress Report process
- Share information about PSE’s clean energy products and services
- Share resource plan modeling results
- Discuss candidate portfolios for the 2023 Electric Progress Report

Additionally, participants were able to ask questions and make comments using a chat box provided by the Zoom platform.

Below is a report of the questions submitted to the chat box. Answers to the questions were provided verbally by PSE staff during the meeting. Please note that questions were answered in order of relevance to the topic currently being discussed. Questions regarding other topics were answered at the end of the meeting.

To view a recording of the webinar and to hear responses from staff, please visit the project website at [pse.com/irp](https://pse.com/irp).

## Attendees

A total of 97 stakeholders, PSE staff and facilitators attended the meeting.

### Attendees included:

Aaron Tam, Alexandra Karpoff, Allison Jacobs, Allison Mountjoy, Amy Wheelless, Andrew Rector, Andrew Wood, Anthony O'Rourke, Anusha Papasani, Austin Nnoli, Bill Pascoe, Bill Will, Bob Williams, Bradley Cebulko, Byron Harmon, Carol Loughlin, Carrryn Vande Griend, Charlee Thompson, Cindy Song, Cindy Vu, CJ Nguyen, Claire Moerder, Claire Wendle, Colin Crowley, Corey Corbett, Court Olson, David Meyer, David Tomlinson, Don Marsh, Douglass Hart, Elizabeth Hossner, Fred Heutte, Garret LaBove, Gurvinder Singh, Hannah Wahl, Heather Mulligan, James Adcock, James Doone, Jeffrey Larsen, Jennifer Magat, Jennifer Snyder, Jesse Durst, Jessica McKenzie, Jisong Wu, Joel Nightingale, Jon Lange, Justin Kotwicki, Kara Durbin, Kasey Curtis, Kathleen McManus, Kelly Xu, Kevin Smit, Kim Zamora Delgado, Kolin Loveless, Kristine Rompa, Leslie Almond, Lorin Molander, Lucila Gambino, Marc Alberts, Mark Lenssen, Meredith Mathis, Michael M., Michael Wehling, Michelle Wildie, Mike Elenbaas, Nancy Shimeall, Nathan Critchfield, Norm Hansen, Paul Gascoigne, Phillip Popoff, Ping Liu, Ray Outlaw, Renchang Dai, Ryan Roy, Sachi Begur, Sarah Buck, Sashwat Roy, Scott Spettel, Scott Williams, Seth Baker, Sheri Maynard, Sophie Glass, Stephanie Chase, Stephanie Price, Taylor Nickel, Tyler Tobin, Virginia Lohr, Warren Halverson, Weimin Dang, Wendy Gerlitz, Will Henderson, Willard Westre

## Questions Received

Questions from attendees are posted in the order in which they were received. The meeting began at 9:00 AM PDT and ended at 12:00 PM PDT.

Name	Time Sent	Comment
Sophie Glass,	9:08 am	See below for the breakout room questions so you can start mulling over the

Name	Time Sent	Comment
Triangle Associates		<p>questions throughout the presentation: "The diversified portfolios were developed to reduce risks associated with over reliance on one or a few resources. Do you agree this type of resource diversification should be a priority?"</p> <p>The diversified portfolios require trade-offs:</p> <ul style="list-style-type: none"> <li>• Utility scale resources are less expensive to diversify but result in lower CBI scores</li> <li>• Localized resources (Distributed Energy Resources or DER) are more expensive but result in higher CBI scores</li> </ul> <p>How would you prioritize these trade-offs between resource types, costs, and various CBI metrics?"</p>
James Adcock	9:09 am	Re Intro Statements: Is a "Hydrogen Peaker" a Peaker which can only run on Hydrogen, or will it also be running on Natural Gas, and if so what percent Hydrogen vs. Natural Gas?
Sophie Glass, Triangle Associates	9:10 am	Thanks, Jim. We will get to this question.
James Adcock	9:13 am	Page 10 and Elizabeth's comments: Does PSE's modeled plans meet the CETA requirements to be 80% renewable or non-emitting by 2030?
Sophie Glass, Triangle Associates	9:13 am	Thanks Jim - we will take your questions after slide 12.
Bradley Cebulko	9:22 am	I have a question for Elizabeth that I do not think we will address later (please correct me if I am wrong). Will PSE please specify which assumptions have been modified in response to the Inflation Reduction Act? For example, electric supply-side resources, electric demand-side resources, electric demand forecasts? PSE addressed the IRA at a previous meeting but it would be helpful to confirm. I understand a response will come after Heather's presentation.
Sophie Glass, Triangle Associates	9:24 am	Thanks, Brad. We added your question to the queue.
Kristine Rompa	9:25 am	Does PSE pay people for their solar. I was asked why the bill can only be zero'ed out and we don't pay homeowner who have solar. Is this a tariff issue.
Don Marsh, Washington Clean Energy Coalition	9:26 am	These DER projects and programs are very encouraging. We would like to see even greater scale and scope in this area, because the community and environmental benefits are so impactful. Keep on going!
Sophie Glass, Triangle Associates	9:28 am	28, 36, 41, 51, 64
James Adcock	9:34 am	What percent of the 80% 2030 requirement will be met using "Retained RECs" ?
Sophie Glass, Triangle Associates	9:35 am	Thanks Jim - we've noted your question.
Sashwat Roy	9:36 am	Did the model not find any need for standalone energy storage?
Sophie Glass, Triangle Associates	9:37 am	Thanks Sashwat - we've noted this question for after slide 28.
Court Olson	9:39 am	On slide 25, in 2045 what is the difference between Existing Hydrogen and New Hydrogen, and why does Existing Hydrogen only appear in 2045 ?
James Adcock	9:39 am	Will Natural Gas + Hydrogen Peakers also dispatch for other utility's needs AKA "dispatch to market" or will they be reserved to only dispatch to meet PSE's Peak Power needs?
Sophie Glass, Triangle Associates	9:40 am	Thanks Jim. We will get to this in a moment.
Aaron Tam	9:41 am	What is "existing hydrogen" on slide 25?

Name	Time Sent	Comment
Jessica McKenzie	9:41 am	was Washington wind broken into different areas like east vs west?
Willard Westre	9:41 am	s-28 What is PSE assuming re its share of transmission capital cost
Jessica McKenzie	9:42 am	were durations other than 4hr evaluated? for Standalone storage?
Court Olson	9:42 am	On slide 28 please explain why so much more Wyoming wind is show compared to Montana? Explain why the Wyoming transmission hurdle we've heard about in prior presentations will be overcome, while Montana wind, where existing transmission capacity from Colstrip, is underutilized.
James Adcock	9:42 am	What is PSE's assumed "Electricity to Electricity" round-trip efficiency of Hydrogen to be generated from electricity and then burned in Peakers to re-generate Electricity?
Don Marsh, Washington Clean Energy Coalition	9:43 am	By 2045, I think it is quite likely that customers will add more than 100 MW of DER storage. Part of customers' motivation will be reliability, but there could be financial incentives provided by Time Varying Rates. Also, battery capacity and cost will continue to improve over the next two decades.
Andrew Rector	9:43 am	Echo Jim's question re: H2's efficiency, and also curious where those H2 plants are and whether they would have underground storage available
Sashwat Roy	9:50 am	How is the outstanding RFP accounted for in the portfolio modeling?
Sophie Glass, Triangle Associates	9:50 am	Thx Sashwat
Sashwat Roy	10:00 am	Thanks!
Jon Lange	10:03 am	Can PSE share any of the data that came from the analyzation of the winter and summer peak capacity needs?
Sophie Glass, Triangle Associates	10:04 am	Thanks Jon - we will answer this after slide 36
James Adcock	10:04 am	I still don't understand if PSE's modeling fully captures the NG Emissions of PSE's new combined NG+Hydrogen Peakers as they will be *actually* operated by PSE. Certainly if PSE's modeling does not actually capture the real emissions from those Peakers as those Peakers will actually be operated, then that would be an error in PSE's modeling.
Court Olson	10:06 m	On slide 29 a slightly lower winter peak is stated. We discussed this in a prior meeting and I pointed out that winter peak may actually increase in some years, since climate change impacts are more erratic and more extreme. So this statement needs to be retracted.
Jessica McKenzie	10:07 am	Does this modeling of RA assume PSE has joined something like WRAP? or the modeling of this section is totally separate of any market formation?
Sophie Glass, Triangle Associates	10:07 am	Thanks Jim, Court, and Jessica. Stay tuned for answers.
Bradley Cebulko	10:08 am	Is PSE at a point in its analysis where it could predict the amount (MWh) of curtailment it expects annually throughout the planning horizon? I ask as it relates to forecasts of green hydrogen production.
Court Olson	10:08 am	On slide 29 under E V Forecast an overall increased demand is assumed. Will PSE please model EV demand after time of day rates are implemented, which is what needs to happen?
James Adcock	10:12 am	Slide 35: Is the modeling on an hourly basis, or does the modeling understand, for example, that PSE could predictively operate a Peaker outside of Peak hours in order to charge batteries?
Court Olson	10:13 am	On Slide 30, a rather steep electricity demand increase is shown. As I've said in may prior IRP meetings, existing and new buildings energy demands are decreasing (as historical demand data has shown). Question #1: Please break down this projected demand into the demand caused by EV charging and separately caused by transition from use of natural gas for heating to electricity for heating. Question #2, how has PSE anticipated increased energy efficiency in

Name	Time Sent	Comment
		existing buildings into its projected electricity demand increase?
Bill Will	10:13 am	Are you modeling how demand response might be used to manage peak demand?
Bradley Cebulko	10:15 am	Slide 36: Fuel costs, both natural gas and alternative fuels, are volatile and unknown. Gas/biodiesel/hydrogen resources appear to be part of the least cost portfolio. How will PSE quantify the fuel costs risks (which largely fall on customers) when developing the lowest reasonable cost portfolio?
James Adcock	10:17 am	What I remember is that PSE is using three different climate models, two of which agree that Winter will be more mild, and one of which, as Court suggests, predicts more chaotic Winters.
James Adcock	10:21 am	It is not just "Winter" -- PSE has already declared "Energy Events" in both the Summer and the Winter.
Court Olson	10:24 am	On Slide 32 we would like to see additional factors included to meet winter peak, including time varied rates, more winter hydro, more Montana wind, more import of California winter capability (where they still have active solar generation at their latitude).
Renchang Dai, PSE	10:30 am	We have no price signal in RA. we charge battery when energy available
Don Marsh, Washington Clean Energy Coalition	10:33 am	Jim's question about when batteries are charged has an impact on the cost effectiveness of batteries. If PSE doesn't fully utilize the equipment it has, there is a risk that customers will pay more to acquire more infrastructure than we need if we smartly manage what we already have. The modeling needs to fully utilize the value of batteries. In the future, AI may help solve this tricky problem.
Sashwat Roy	10:33 am	I have a question.
James Adcock	10:33 am	So you (Renchang) are saying that in "off peak hours" if PSE had uncommitted Peaker capacity then the model assumes that PSE *would* dispatch that Peaker during those off-peak hours in order to charge the battery?
Sophie Glass, Triangle Associates	10:33 am	The diversified portfolios were developed to reduce risks associated with over reliance on one or a few resources. Do you agree this type of resource diversification should be a priority?  The diversified portfolios require trade-offs: <ul style="list-style-type: none"> <li>• Utility scale resources are less expensive to diversify but result in lower CBI scores</li> <li>• Localized resources (Distributed Energy Resources or DER) are more expensive but result in higher CBI scores</li> </ul> How would you prioritize these trade-offs between resource types, costs, and various CBI metrics?
James Adcock	10:35 am	I don't understand Sophie's posting to chat and how participants are supposed to respond to it?
Sophie Glass, Triangle Associates	10:36 am	Jim - that is the discussion question for the breakout sessions later this morning. Just posting it now to get people thinking
Sophie Glass, Triangle Associates	10:37 am	At approx. 11, we will split into small groups and you'll have a chance to talk about this in a smaller setting. Just wanting people to know the discussion question in advance in case that helps get gears turning.
Sashwat Roy	10:37 am	I have a question on the multiple references to the "tight market". How is PSE looking at the resource buildout across the WECC including California and its impacts on energy availability especially during the winter when excess CA solar could be available?
James Adcock	10:37 am	OK, so we will respond to your chat posting later in Breakout -- thank you for the explanation.
James Adcock	10:39 am	Slide 40 -- so PSE would build new Natural Gas Peakers prior to the actual availability of Hydrogen to blend into those Natural Gas Peakers?
Don Marsh, Washington Clean Energy	10:40 am	For your modeling assumptions for Small Modular Nuclear, what are you using for Localized Cost of Energy? I'm worried about cost risks here.

Name	Time Sent	Comment
Coalition		
Don Marsh, Washington Clean Energy Coalition	10:40 am	Sorry, meant Levelized Cost of Energy...
James Adcock	10:41 am	Nuke PPA, hopefully.
Bradley Cebulko	10:41 am	Slide 39: and 40: what are your fuel cost assumptions for biodiesel and hydrogen?  Slide 39: How is PSE considering its CETA equity requirements and a biodiesel peaker? In particular, how will PSE ensure highly impacted communities and vulnerable populations are not allocated a disproportionate burden from the facility?
James Adcock	10:42 am	PPA = "Power Purchase Agreement" -- where a separate owner/operator takes liability for the Nukes.
Renchang Dai, PSE	10:43 am	Jim, thank you for the question on battery charging in RA model. All resources are sampled and load demand is sampled as well, if we have surplus and battery needs a charge, we will charge battery. We will have a follow up in the feedback report for the battery modeling in Aurora for IRP.
Claire Wendle, Triangle Associates	10:44 am	<a href="https://afdc.energy.gov/files/u/publication/alternative_fuel_price_report_january_2022.pdf">https://afdc.energy.gov/files/u/publication/alternative_fuel_price_report_january_2022.pdf</a>
James Adcock	10:53 am	I would like to comment on slide 43 briefly.
Sophie Glass, Triangle Associates	10:53 am	Hi Jim - we will take comments and questions after slide 51.
Don Marsh, Washington Clean Energy Coalition	10:57 am	Small Modular Nuclear is a strange choice for PSE. The feasibility is still unclear. The reliability is unknown. The cost is high. These should raise questions about including it in your portfolio. If you're looking for diversity and cutting edge technology, there are opportunities for offshore wind, tidal energy, geothermal, advanced efficiency, and others that may be more attractive by 2032. We agree that this will need to be revisited in a few years.
Jennifer Snyder, UTC	11:00 am	Staff would appreciate a short break soon
Willard Westre	11:02 am	S-45 Will you explore the effectiveness of overbuilding MT wind beyond the 750 MW to account for the approx. 40% capacity factor of MT wind in order to fully utilize the available 750 MW of transmission capacity?
James Adcock	11:05 am	+1 Don: Small Nukes not a "real" possibility for PSE.
Bradley Cebulko	11:06 am	Break please
Don Marsh, Washington Clean Energy Coalition	11:13 am	I would like to access the CBI spreadsheet that James mentioned. I don't see it on the website. Where can I get it?
Sophie Glass, Triangle Associates	11:14 am	Yep, Don. In a moment PSE will share the link. Thanks for the question.
Meredith Mathis, PSE	11:14 am	The CBI spreadsheet is on this page under meeting materials for the Sept. 28 and 30 and Oct. 25 Drop-In sessions <a href="https://www.pse.com/IRP/Get-involved">https://www.pse.com/IRP/Get-involved</a>
James Adcock	11:16 am	Slide 54: Isn't PSE taking on too much risk of missing the 2030 80% requirements by delaying so much of the new build-out until the 2030 timeframe?
James Adcock	11:19 am	Slide 55: Isn't building even "just" three new natural gas peaker plants a whole lot of new natural gas generation?
Don Marsh, Washington Clean Energy Coalition	11:21 am	The CBI spreadsheet that I just downloaded doesn't seem to line up with the portfolios presented here. Am I mistaken? Could we get an updated spreadsheet that has the latest portfolios?
Bradley Cebulko	11:22 am	Slide 58: Is the assumption that each of the portfolios have the same quantitative and qualitative "benefits"?

Name	Time Sent	Comment
Don Marsh, Washington Clean Energy Coalition	11:23 am	Do any of the CBIs correlate with costs? If so, the chart on slide 58 might be misleading, since cost may be influencing both axes.
James Adcock	11:25 am	Don: None of the CBI indexes correlate with costs -- which was one of my complaints back when PSE introduced their personal "random" choice of CBIs.
Don Marsh, Washington Clean Energy Coalition	11:25 am	Thanks for that clarification, James.
Alexandra Karpoff, PSE	11:25 am	Don - the CBI spreadsheet available on the website is an example, meant to present the methodology. We used the portfolios presented in the 2021 IRP.
Don Marsh, Washington Clean Energy Coalition	11:53 am	I would love to see a CBI spreadsheet for the current portfolios. Possible?
Sophie Glass, Triangle Associates	11:54 am	<a href="https://app.mural.co/t/triangleassociates9200/m/triangleassociates9200/1670260683974/a0d72eeeb7084372bfe0014c2d7bd41bfc94d2e1?sender=akilburg5841">https://app.mural.co/t/triangleassociates9200/m/triangleassociates9200/1670260683974/a0d72eeeb7084372bfe0014c2d7bd41bfc94d2e1?sender=akilburg5841</a>
James Adcock	11:56 am	Group 2 -- We actually emphasized: No Nukes.
Sophie Glass, Triangle Associates	11:57 am	Thanks Jim
Seth Baker, MFA	11:59 am	Thanks Jim
Don Marsh, Washington Clean Energy Coalition	11:59 am	I've always encouraged PSE to be more open to new technologies, but nukes are going to be a hard sell in this area. Perhaps PSE shouldn't be the first adopter of a new nuclear technology.
Court Olson	12:01 am	Can we get copies of the different breakout session posted notes?
Ray Outlaw, PSE	12:02 am	Court - here is the Mural board: <a href="https://app.mural.co/t/triangleassociates9200/m/triangleassociates9200/1670260683974/a0d72eeeb7084372bfe0014c2d7bd41bfc94d2e1?sender=akilburg5841">https://app.mural.co/t/triangleassociates9200/m/triangleassociates9200/1670260683974/a0d72eeeb7084372bfe0014c2d7bd41bfc94d2e1?sender=akilburg5841</a> . This will also be captured in the meeting summary.
Bradley Cebulko	12:03 am	For planning purposes, will these future meetings be morning or afternoon meetings?
Meredith Mathis, PSE	12:04 am	We are planning for afternoon meetings beginning at 1pm.
Sophie Glass, Triangle Associates	12:04 am	<a href="mailto:sglass@triangleassociates.com">sglass@triangleassociates.com</a>
Bradley Cebulko	12:04 am	Thank you
Aaron Tam	12:04 am	Thank you!