PSE IRP Feedback Report
Webinar 6: Portfolio Sensitivities
August 11, 2020

8/25/2020

The following stakeholder input was gathered through the online Feedback Form, from August 4 through August 18, 2020. PSE's response to the feedback can be found in the far-right column. To understand how PSE incorporated this feedback into the 2021 IRP, read the Consultation Update, which will be released on September 1, 2020.

Feedback Form Date	Stakeholder	Comment	PSE Response
8/11/2020	Don Marsh, CENSE	I am attaching a recommendation that PSE seriously consider Vehicle-to-Grid technology in the next 5-10 years to take advantage of idle car batteries to store increasing amounts of renewable energy from variable sources like wind and solar.	Thank you for your suggestion concerning a demand response Vehicle-to-Grid technology scenario. PSE will be asking stakeholders to prioritize the sensitivities during the October 20 IRP meeting. To address Vehicle-to-Grid specifically, this is a distributed energy storage resource and it is captured as part of the distributed batteries that we are modeling in the 2021 IRP. We acknowledge that your suggestion could be a lower cost than installing a new battery system. As a response to your input, we have included a sensitivity with a lower cost for batteries in the updated "Scenarios and Sensitivities" excel file located here located in the meeting materials for Webinar 6. This suggestion is also relevant to stakeholders who are concerned about the (high) interconnection cost for batteries. Thank you again for the contribution.
8/11/2020	Don Marsh, CENSE	Please take this seriously for the sake of your customers, the environment, and the long-term health of your company.	Thank you for your comment, thoughts, and suggestions.
8/12/2020	Don Marsh, CENSE	Attached is a request for PSE to include a time-of-use sensitivity in its studies of Distributed Energy Resources. Such programs can save money, increase reliability, and reduce greenhouse gas emissions. These are goals that are mandated by Washington's Clean Energy Transformation Act.	Thank you for your suggestion concerning a demand response time of use scenario and the attachment, as well as the four supporting documents. All of the documents you provided have been uploaded as part of the Webinar 6 Feedback Form package on pse.com/irp. PSE will be asking stakeholders to prioritize the sensitivities during the October 20 IRP meeting. Concerning PSE's current work regarding time of use, PSE is modeling a critical peak price demand response program as part of the resource alternatives.
8/12/2020	Don Marsh, CENSE	If a time-of-use sensitivity is not included, please explain to stakeholders why not.	Thank you for your suggestion concerning a demand response time of use scenario. PSE will be asking stakeholders prioritize the sensitivities during the October 20 IRP meeting.
8/13/2020	Michael Laurie, Watershed LLC	I strongly support the submissions you received from Don Marsh on Time of Use Sensitivity and Vehicle to Grid potential. I think these will be 2 key needed pieces in adapting the grid and PSE's energy supply to our changing world and to the need to rapidly transition to a climate friendly energy system. Thanks	Thank you for expressing your support of Don Marsh's suggestions for sensitivities. PSE will be asking stakeholders prioritize the sensitivities during the October 20 IRP meeting. PSE has included your support in the updated "Scenarios and Sensitivities" excel file.
8/13/2020	Don Marsh, CENSE	I attached a request to study Virtual Power Plants to save customers money, to provide better reliability and resiliency for our energy grid, to reduce greenhouse gas emissions, and to provide local jobs at a time when the economy could use some assistance without taxpayer funds.	Thank you for your request to study Virtual Power Plants (VPPs) and the attachment you provided. VPPs are a platform to find the best use of distributed energy resources (DER) on the grid and are included on PSE's grid modernization road map. PSE is evaluating distributed resources in the 2021 IRP.
8/13/2020	Don Marsh, CENSE	The 2021 should have a sensitivity assessing the potential of VPPs to help achieve CETA goals.	Thank you for your suggestion of a 2021 IRP sensitivity assessing the potential of VPPs to help achieve CETA goals. PSE is modeling 80% renewable resources by 2030 and 100% by 2045 to meet the Washington Clean Energy Transformation Act (CETA). VPPs are a platform to find the best use of distributed energy resources (DER) on the grid and are included on PSE's grid modernization road map. PSE is evaluating distributed resources in the 2021 IRP.

Feedback Form Date	Stakeholder	Comment	PSE Response
8/15/2020	Jane Lindley, Act 4 Climate	Here is an example of a utility that is wise enough to plan for large increase of EV ownership: https://www.utilitydive.com/news/xcel-energy-unveils-plan-to-serve-15m-evs-by-2030/583428/ “Electric vehicles are the next frontier in the clean energy transition," Xcel Chairman and CEO Ben Fowke said in a statement. "We have substantial plans in place in the states we serve, and we can expand on this with partnership and support from policymakers, regulators, customers, automakers and our communities.” The plan will result in $1 billion in annual customer fuel savings, through a mix of residential charging, increased access to public electric transportation and charging, and faster fleet electrification, according to the utility.	Thank you for providing information concerning EVs and Xcel Energy’s promotion and support of EVs.
8/15/2020	Jane Lindley, Act 4 Climate	Along with helping to build EV infrastructure, I recommend that PSE seriously consider Vehicle-to-Grid technology, which will almost certainly become a large and inexpensive resource to store renewable energy as PSE strives to meet CETA goals by 2030 and 2045.	Thank you for your comment considering Vehicle-to-Grid technology.
8/17/2020	Anne Newcomb	I would like to compliment you on the great presentations you have put together and your clear and kind communications with us as Stakeholders. It is very exciting to see PSE moving to the clean energy future! It feels right to be working together on this very important project for the entire planet!	Thank you for sharing your positive impression of PSE’s 2021 IRP process.
8/17/2020	Anne Newcomb	I like many others involved would like to see the variable social cost of carbon included. By this I mean having the cost reflected at the time of burned fossil fuels for electricity produced. I think this will help customers and regulators see a truer cost of burning fossil fuels than if the cost is included in the entire mix. If you could also add in the cost of clean up of ground water from Colstrip and any oil or gas spills or explosion clean up this would be helpful. I have heard PSE can get community pushback for Solar and Wind projects. Possibly by showing the true costs of fossil fuels to customers they will become more and more supportive of renewable energy in their communities. This could make PSE's renewable energy projects flow more easily. Thank you for including the ramp up of Solar projects on the Westside. By creating solar energy projects in public parks, homes and business roofs and grounds the energy can be produced near the end user reducing energy loss on transmission lines and hopefully reducing the amount of transmission lines needed. Incentives are very helpful! I bet County and State Parks would be interested in collaboration on solar and wind projects. I appreciated seeing your integrated grid model on page 42! It looks like with the help of many talented PSE employees, PSE is going to be on track to meet CETA's important CO'2 reduction goals!!! Thank You for your dedicated work on the most important PSE IRP yet! Keep up the great work!	Thank you for sharing your support for PSE examining the social cost of carbon as a variable cost and thoughts concerning capturing costs differently in the IRP concerning specific resource types. PSE includes costs associated with electric generating plants including capital costs, taxes, insurance, transmission, fixed operations & maintenance, variable operations & maintenance, fuel, and decommissioning costs. Thank you for sharing your appreciation for the presentation on DER Integration in the August 11 webinar. Thank you for sharing your positive impression of PSE’s 2021 IRP process.
8/18/2020	Orijit Ghoshal, Invenergy	Attached are Invenergy's comments on the social cost of carbon as presented on August 11. [PSE inserted Overall Comment on Use of the Social Cost of Carbon] During Webinar 6 on August 11, 2020, Puget Sound Energy (PSE) did not adequately respond to or resolve the concerns expressed by Invenergy and other stakeholders about its preferred approach to including the Social Cost of Carbon (SCC) in its 2021 Integrated Resource Plan (IRP). Invenergy strongly encourages PSE to reconsider including the SCC as a fixed annual cost in the resource portfolio modeling for its 2021 IRP. Instead, PSE should treat the SCC as an incremental cost of hourly dispatch for Greenhouse Gas (GHG)-emitting resources. This approach will be more consistent with: a) the purpose and intent of the Clean Energy Transformation Act (CETA); b) accepted practices for internalizing the environmental externality costs of GHG emissions into decision making; and c) how the SCC was developed as an estimate of the economic value of environmental damages caused by GHG emissions and the intended use of the SCC. Before proceeding with the resource portfolio modeling sensitivity analyses, Invenergy strongly encourages PSE to address the issues surrounding properly including the SCC in its resource portfolio modeling analyses for the 2021 IRP.	Thank you for the attachment, your comments and questions. PSE has inserted the content of your letter directly in the form to facilitate our responses. The attachment you provided has also been uploaded as part of the Webinar 6 Feedback Form package on pse.com.

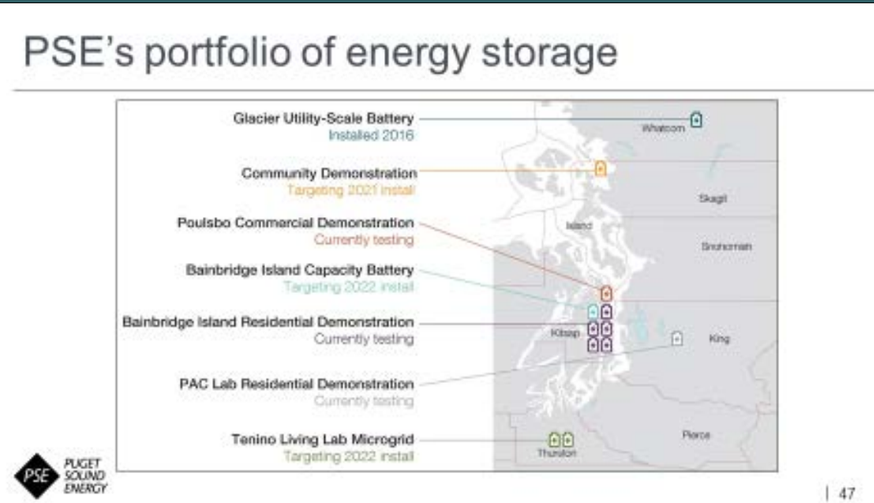
Feedback Form Date	Stakeholder	Comment	PSE Response
8/18/2020	Orijit Ghoshal, Invenergy	Incorporate the social cost of carbon into the incremental dispatch cost of all generators used to serve loads subject to CETA.	Thank you for your comment. As requested by Invenergy and other stakeholders, and discussed during the August 11 IRP meeting and in a prior meeting with Invenergy and other stakeholders, PSE has included a portfolio sensitivity that incorporates the social cost of carbon as a variable dispatch cost.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 1] CETA imposes two distinct requirements for PSE to limit its GHG emissions. The first requirement is to limit its annual GHG emissions (i.e., 80 percent GHG-free by 2030 and 100 GHG-free by 2045). The second requirement is for PSE to incorporate the SCC into its resource planning and acquisition decisions.	PSE understand CETA requirements and agrees with Invenergy's statement. PSE is including the SCC in its resource planning and acquisition decisions. A portfolio sensitivity where SCC is included as a dispatch cost has been added to the list and a sensitivity where annual GHG emissions is limited has also been added to the list of portfolios to analyze.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 2] Satisfying just one of these requirements does not relieve PSE of its obligation to satisfy the other requirement. Therefore, PSE needs to properly incorporate the SCC in its 2021 IRP.	Thank you for your concern about making sure PSE includes the SCC as part of the 2021 IRP. PSE is including the SCC in the decision to add new supply-side or demand side resources or to retire existing resources in the 2021 IRP. PSE plans to address both requirements through the 2021 IRP portfolio modeling.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 3] GHG emissions are an environmental externality. They are a real cost to society that is caused by but not borne by PSE or its retail electric customers. As a result, GHG emissions and the environmental damages they cause represent a clear market failure. Until and unless a mechanism to solve this market failure (e.g., carbon tax or GHG cap and trade program) is implemented in Washington State, the best available means for dealing with this market failure is to treat GHG emissions as an environmental externality.	Thank you for your suggestion concerning a scenario where social cost of carbon is incorporated in the incremental dispatch cost of all generators used to serve loads. This has been added to the portfolio sensitivity list to be analyzed.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 4] Instead of imposing a carbon tax or creating a GHG cap and trade program, it is quite clear that the intent of CETA is to treat GHG emissions as an environmental externality. While CETA does not explicitly use the terms "environmental externality" or "market failure", it recognizes and requires utilities to deal with GHG emissions as such. For example, Subsection 14(3)(a) of CETA states the following: An electric utility shall consider the social cost of greenhouse gas emissions, as determined by the commission for investor-owned utilities pursuant to section 15 of this act and the department for consumer-owned utilities, when developing integrated resource plans and clean energy action plans. An electric utility must incorporate the social cost of greenhouse gas emissions as a cost adder when: (i) Evaluating and selecting conservation policies, programs, and targets; (ii) Developing integrated resource plans and clean energy action plans; and (iii) Evaluating and selecting intermediate term and long-term resource options.	Thank you for your comment.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 5] Further, Section 15 of CETA identifies the SCC as the required metric for treating GHG emissions as an environmental externality: *For the purposes of this act, the cost of greenhouse gas emissions resulting from the generation of electricity, including the effect of emissions, is equal to the cost per metric ton of carbon dioxide equivalent emissions, using the two and one-half percent 21 discount rate, listed in table 2, technical support document: Technical update of the social cost of carbon for regulatory impact analysis under Executive Order No. 12866, published by the interagency working group on social cost of greenhouse gases of the United States government, August 2016. The commission must adjust the costs established in this section to reflect the effect of inflation.*	Thank you for your comment.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 6] The SCC was developed by the federal Interagency Working Group (IWG) as an economic estimate of the real, incremental environmental damage costs caused by the emission of one metric ton of CO2equivalent GHG emissions. The IWG specifically designed and developed the SCC to quantify the externality effects of GHG emissions and incorporate them into economic decisions.	Thank you for your comment.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 7] Applying the SCC as an incremental cost is also consistent with well-established economic principles for incorporating environmental externalities into decision-making, including for integrated resource planning.	Thank you for your comment.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 8] Environmental damages caused by GHG emissions are incremental costs; they are not fixed costs. Correspondingly, the SCC is an estimate of the incremental economic costs – not the fixed economic costs – of the environmental damages caused by GHG emissions.	Thank you for your comment.

Feedback Form Date	Stakeholder	Comment	PSE Response
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 9] While CETA requires PSE to use the SCC to represent the environmental damage costs caused by GHG emissions, it does not authorize PSE to include the damage costs in its revenue requirements or in its retail electric rates.	Thank you for your comment.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 10] Therefore, PSE's analysis for its 2021 IRP needs to recognize the distinction between the two types of costs and account for them properly. Specifically, resource decisions should be made on the basis of the sum of revenue requirements costs plus environmental damage costs (as represented by the SCC). However, rate impacts of resource decisions should only include revenue requirements costs.	Thank you for your comment.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 11] There is nothing in CETA that requires or justifies treating the SCC as a fixed annual cost.	Thank you for your comment.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 12] Treating the SCC as a fixed annual cost biases resource decisions in favor of more GHG-intensive resources. A key reason for this is that excluding the SCC from simulation of hourly dispatching decisions in the portfolio modeling leads to increased generation by more GHG-intensive resources. In turn, this allows the fixed costs of the more GHG-intensive resources to be spread over a larger quantity of generation, thereby causing the total (revenue requirements and externality) costs of those resources to artificially appear lower than if the SCC were included in hourly dispatching decisions.	Thank you for your comment.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 13] PSE has said its past analyses showed that including the SCC as a variable cost of dispatch did not materially change the mix of resources in its modeling results. Invenergy remains skeptical about the validity of this conclusion, including due to flaws in PSE's prior assumptions and methodology for incorporating the SCC. Further, if including the SCC as a variable cost of dispatch truly does not change PSE's resource decisions, then PSE should have no objection to using that method.	Thank you for your comments. As discussed during the August 11 webinar, PSE will conduct new analysis for the 2021 IRP to model the SCC as both the cost adder and a variable cost of dispatch.
8/18/2020	Orijit Ghoshal, Invenergy	[Specific comment 14] If PSE does not agree that the SCC should be properly modeled as an incremental cost of hourly dispatch, PSE should perform a fair and rigorous side-by-side analysis of PSE's preferred approach of treating the SCC as a fixed annual cost with the more sound approach of including the SCC as a variable hourly dispatch cost for existing and new GHG-emitting resources it would use to serve its retail customers' needs. PSE should complete the side-by-side analysis and obtain feedback on the results from stakeholders before proceeding with the numerous portfolio sensitivity analyses it is planning to perform.	Thank you for your comment.
8/18/2020	Katie Ware, Renewable Northwest	Please see attachment.	Thank you for your comments. As discussed during the August 11 webinar, PSE will conduct new analysis for the 2021 IRP to model the SCC as both the cost adder and a variable cost of dispatch. The side-by-side results will be shared during upcoming webinars and stakeholders will be able to review the results.
8/18/2020	Katie Ware, Renewable Northwest	1. Renewable Northwest appreciates PSE's request for stakeholder suggestions regarding the appropriate portfolio sensitivities PSE should model. Below are our recommendations: a. Regarding the renewable over-generation test, we recommend that PSE incorporate the effects of this sensitivity on the 2% cost threshold relevant to compliance with CETA standards. Specifically, should PSE choose to or be required to over-generate renewables to meet load, how early in a compliance period would PSE meet the 2% cost threshold, and thus be considered in compliance with the clean energy standards? b. Regarding the must-take DR and battery storage sensitivity, we again recommend that PSE incorporate the effects on the 2% cost threshold. We recommend that PSE consider this detail in modeling other sensitivities which may lead PSE to the cost cap early in each compliance period. c. Regarding the highly-centralized sensitivity within the Transmission Constraints and Build Limitations category, we recommend that PSE consider including additional constraints specific to renewable proxy locations, whereby a strict delivery requirement mandated by CETA may create geographic limitations to new-build renewables. d. Regarding the SCC as a tax in WA, OR and CA sensitivity, we agree with PSE that this tax should be modeled WECC-wide for consistency.	Thank you for your comments and questions. PSE responses referenced as "a – d": a. PSE plans to include renewables to meet CETA requirement and does not elect to over-generate renewables during planning. However, over-generation may occur during certain times of the year. It is important to understand the impact of over-generation without additional constraints. Including the 2% cost threshold may limit the addition of new resources and thus not meet CETA requirements. PSE plans to model the over-generation sensitivity without the 2% cost threshold. b. The description you provided is consistent with PSE's approach regarding the must-take DR and battery storage. c. PSE will be reaching out to you to clarify this suggestion. d. Thank you for expressing your support that SCC PSE that this tax should be modeled WECC. This will be noted in the updated spreadsheet file.

Feedback Form Date	Stakeholder	Comment	PSE Response
8/18/2020	Katie Ware, Renewable Northwest	2. Renewable Northwest supports PSE's approach to modeling the social cost of carbon (SCC) as a post-economic dispatch fixed cost adder. Our understanding aligns with what PSE has vocalized in multiple webinars, that an alternative methodology applying the SCC as a dispatch adder would artificially deflate the capacity factors of emitting resources, thus skewing the model's output.	Thank you for your feedback.
8/18/2020	Katie Ware, Renewable Northwest	3. Renewable Northwest appreciates PSE's consideration of stakeholder feedback in considering how to meet the 20% alternative compliance permitted by CETA's greenhouse-gas neutrality standard. While our preference is always going to be that PSE does not rely on alternative compliance, we recognize the utility in planning a gradual transition to 100% clean. That said, we would advise against relying on resource-based compliance payments, given the more climate-beneficial options granted by CETA. Unbundled RECs support renewable energy development, and Energy Transformation Projects (ETPs) aim to reduce the state's non-energy sector GHG emissions. Both of these options support system transformation and GHG-emission reductions, while penalties do not.	Thank you for your feedback. CETA alternative compliance will be further discussed in the September 1, 2020 webinar.
8/18/2020	Katie Ware, Renewable Northwest	Renewable Northwest thanks PSE for its consideration of this feedback. We look forward to continued engagement as a stakeholder in this 2021 IRP process.	PSE appreciates the involvement of Renewable Northwest! Thank you for your participation!
8/18/2020	Joni Bosh, NW Energy Coalition	See attached comments	Thank you for the attached letter directed to Elizabeth Hossner, Manager Resource Planning & Analysis, and your comments and questions. PSE has inserted the content of your letter directly in the form to facilitate our responses. The attachment you provided has also been uploaded as part of the Webinar 6 Feedback Form package on pse.com/irp.
8/18/2020	Joni Bosh, NW Energy Coalition	NW Energy Coalition (NWEC) appreciates the opportunity to ask questions about and make suggestions regarding Puget Sound Energy's (PSE's) proposed portfolio scenarios and sensitivities to address in analysis in the Integrated Resource Planning effort. Our comments focus on the excel slide presented in the webinar of July 11th that lists all the various scenarios that PSE might model, respond to PSE's question of how it should meet the 20% alternative compliance option offered in the Clean Energy Transformation Act (CETA), and on demand response.	PSE appreciates the involvement by NWEC and thank you for your input.
8/18/2020	Joni Bosh, NW Energy Coalition	The Social Cost of Carbon (SCC) represents the costs of environmental damages that society at large, not PSE customers, bears from GHG emissions. The SCC is an environmental externality which CETA requires be applied when making resource decisions to account for the effects of GHG emissions. As an externality, the SCC should be applied to dispatch of all resources both owned and acquired, and all market purchases (since the source cannot generally be known for market purchases), rather than applied as part of the fixed costs of capital assets. In neither case should the SCC be treated as part of the revenue requirement.	Thank you for your description concerning defining environmental externality in terms of relevant to the SCC.
8/18/2020	Joni Bosh, NW Energy Coalition	We would further clarify that the comment under "Notes" on scenario 19 on the excel sheet does not exactly capture what we are asking for – the SCC should be added at dispatch to all resources; adding the SCC as a separate cost to market purchases would be appropriate, as long as those added costs are not included in the revenue requirement. Therefore, we would change the Note on line 19 to: dispatch cost in LTCE only, SCC not included in electric price, BUT AS so a separate EXTERNAL COST adder included for TO ALL market purchases.	Thank you for the clarification.
8/18/2020	Joni Bosh, NW Energy Coalition	We would consider the options described on lines 35 and 36 as "bookends" for the initial analysis purposes.	Thank you for your comment.
8/18/2020	Joni Bosh, NW Energy Coalition	Slide 17 – NWEC would appreciate if the actual values that will be used in modeling are presented in the slide, rather than the descriptors "low", "mid" and "high".	Thank you for the suggestion PSE add more detail to the slides, specifically value ranges on Slide 17 of the August 11 presentation.
8/18/2020	Joni Bosh, NW Energy Coalition	Slide 26 - PSE will need to be very clear as to how the choices will be ranked or prioritized, so there are no unanticipated disappointments if some analyses are not completed.	The actual prioritization of the sensitivities by stakeholders will occur at the October 20, 2020 webinar. We are still thinking through the best way to do that and appreciate this comment.
8/18/2020	Joni Bosh, NW Energy Coalition	Slide 36 – requests feedback from stakeholders on prioritizing the four options that can be considered for alternative compliance. To be very clear, 19.405.040(1)(a)(ii) actually requires a utility to " use electricity from renewable resources and non-emitting electric generation in an amount equal to one hundred percent of the utility's retail electric loads over each multiyear compliance period", which would be the preferred compliance. But we recognize that 19.405.040(1)(b), which immediately follows, allows a utility to meet up to 20 percent of that obligation between 2030 and 2045 with alternative compliance options. Of the options available, the one that should not be evaluated is energy from MSW generators ("garbage burners"), which have yet to be proven to provide a net reduction in GHG emissions.	To clarify, PSE is modeling 100% of the utility's retail electric loads over each multiyear compliance period as a sensitivity. There will be opportunity to additional stakeholder feedback at the October 20, 2020 webinar. PSE agrees with NWEC; PSE will not be evaluating the MSW generators ("garbage burners") in the 2021 IRP.

Feedback Form Date	Stakeholder	Comment	PSE Response
8/18/2020	Joni Bosh, NW Energy Coalition	NWEC proposes the following additional sensitivities: • Advanced Demand Response, based on the Northwest Power and Conservation Council draft inputs, including resource potential and cost by DR type, for the 2021 Northwest Power Plan, adjusted as appropriate for the mix of customer classes and uses in PSE's service territory. This will help provide an estimate of the potential to address PSE's capacity needs as the resource mix changes in the coming decade and beyond. • Updated Upstream Methane Factor, using the EDF Low upstream emissions factor of 2.47% as documented in the NW Council's workshop that we forwarded as part of the IRP comment process. NWEC requested this sensitivity during the August 11 workshop but it is not reflected in the updated version of the summary spreadsheet. We recommend running this sensitivity using scenario #1, mid economic conditions, and substituting the 2.47% upstream methane emissions factor. This will provide a bookend sensitivity on upstream emissions and the social cost of carbon for PSE's resource portfolio and market purchases. • High Electric Vehicle Saturation, using an appropriate scale-up factor such as 50% higher than the forecast estimate for 2025, adjusted appropriately thereafter. We recommend two versions of this sensitivity, one assuming no load shaping and the other assuming some combination of rate design and incentives to shape demand away from system peak. The purpose of this sensitivity is to assess the impact of faster EV saturation on overall resource needs and specifically on daily and seasonal peak impact.	Thank you for providing your additional sensitivities requests. They have been added to the list. PSE is still considering the modeling options related to the upstream emissions and will provide additional information in the consultation update on September 1, 2020. PSE will be asking stakeholders prioritize the sensitivities during the October 20 IRP meeting. At this part of the process, stakeholders will have access to the draft portfolio results to better inform their selections. Stakeholders will provide valuable feedback as to how PSE can best prioritize sensitivity analyses.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slide 11: I'm still struggling some with the difference between a scenario and a sensitivity. It seems to me that some single-input changes, which could be called a sensitivity, could change the company's electric price forecast. It would be nice if it was possible to freeze the electric price forecast, and then compare various tweaks to the models and see how PSE might respond to that forecast, but if a sensitivity is likely to impact the forecast, then the comparison becomes difficult.	Scenarios are different sets of assumptions that create future power market conditions. These assumptions include: - Gas prices, carbon regulation, and regional loads that create different wholesale market power prices, which affect the relative value of different resources. - Wholesale price forecasts developed using the AURORA model. - Other major generators in the Western U.S., as well as loads from those areas. Portfolio sensitivities are minor changes to a scenarios set of assumptions that create alternate portfolios of supply and demand side generation for PSE. - A scenario must be selected to change in order to perform a sensitivity analysis. - Typically, a single variable or single set of assumptions is changed in order to isolate the effect of that change on the scenario. - The results of a sensitivity can be compared to the base scenario, or other sensitivities that are based on the same scenario. The electric price forecast is an input to the IRP model. PSE runs different scenarios to create different electric price forecasts to test with PSE's portfolio. PSE will reach out to you to discuss this further.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slide 15: Economic conditions are perhaps the biggest assumptions in the portfolio, and have become very difficult to vet given the pandemic and apparent recession. How will PSE's scenarios and sensitivities give the company a good view of the relative value of different resource decisions in a volatile environment? Is there a tipping point for economic indicators that would prompt PSE to either use the inputs representing low economic conditions for various sensitivities? o In general, how, if at all, does the IRP modeling process inform which indicators the utility monitors to inform adaptive management practices?	Concerning how the IRP modeling process informs which indicators the utility monitors to inform adaptive management practices, PSE applies adaptive management practices through our corporate governance processes. For example, the demand forecast is approved by an executive oversight group prior to sharing with stakeholders. For the IRP, PSE runs a stochastic analysis that varies different economic conditions such as demand forecast, gas prices and electric price forecasts.

Feedback Form Date	Stakeholder	Comment	PSE Response
8/18/2020	Kyle Frankiewich, WUTC Staff	Slide 19: What does the over-generation sensitivity represent? Is this the removal of a modeling constraint that prevents overgeneration?	During the 2019 IRP process, PSE evaluated modeling results and found that there were hours where renewable generation was being sold into the market but the energy was still being counted towards meeting the renewable requirement. This test is isolates PSE as a system to prevent the renewable energy from being sold, forcing it to be curtailed or stored instead.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slide 20: What decision point does sensitivity 13 analyze? It seems that the trapped energy issue explored here might be better understood through a stochastic analysis using PSE's granular historical data for wind and solar resources in WA. There also may be some Tx paths or renewable generation profiles that are complement each other such that 'overbuilding' relative to available Tx is more reasonable in some regions than it is in others. Is this nuance explored within sensitivity 13? Relatedly, do the transmission constraint sensitivities effectively model minimum in-state builds?	Concerning the first question, yes, PSE will be getting to the trapped energy issue in sensitivity 13. This sensitivity evaluates buying less than nameplate firm transmission and evaluating the risk if non-firm transmission can be purchased for the energy over transmission limit or if the energy will get curtailed. Concerning 'overbuilding' or complimentary renewable generation, this is addressed in the baseline assumptions with dual purpose transmission.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slide 21: What NEIs are included in sensitivity 16? I understand that the CPA provided some NEIs on a measure-by-measure basis. I'd like to better understand this and verify that there's no double-counting here, and that NEIs are appropriately included in the baseline model run. Relatedly, the company has previously mentioned that early runs show the cost-effective conservation selection are pretty far up the conservation curve. Where specifically? In the company's current runs, what is the $/MWh delta between where the marginally cost-effective bundle and the next available conservation bundle that was marginally not cost-effective?	PSE will provide additional information in the consultation update available on September 1, 2020.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slide 24: It seems that sensitivity 26 includes two different constraints – no new gas, and 100% renewable by 2030. I have no problem with these constraints as a modeling exercise, but would appreciate some clarification. Are these separate constraints? Or does no new gas lead to 100% renewable by 2030 for some reason?	Sensitivity #26 models 100% renewable generation by 2030. We understand your confusion and will change the description to say "100% renewable resources by 2030, no gas generation" in the updated excel file.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slides 29-36 were skipped. I hope we get a chance to discuss these, as I think stakeholder feedback on how to contemplate Energy Transformation Projects in the IRP would be useful.	Thank you for your comment. Slides 29-36 will be presented at the September 1 webinar. Concerning how PSE will contemplate Energy Transformation Projects, this is an IRP result, and will be presented later in the process and be included in the final 2021 IRP.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slides 47-48: These projects are exciting. Other utilities, such as Green Mountain Power, PGE and a number of California IOUs, are even further down this road. Is PSE going to extrapolate from current demonstrations and projects from other utilities to develop cost and resource size estimates appropriate to PSE's service territory? Will these resources be selectable within PSE's modeling tools?	For the 2021 IRP modeling process, PSE plans to use the generic resource cost discussed during the 2021 IRP webinar 1 held on May 28, 2020. Stakeholders reviewed those costs and provided feedback, which was summarized in the feedback report and consultation update available on our website. The IRP process will select generic storage resources, which could be delivered through many different program designs. PSE's own demonstration work, and our regular discussions with other utilities, form a basis for what will actually be implemented in future programs and the associated values from that implementation.

Feedback Form Date	Stakeholder	Comment	PSE Response
			
8/18/2020	Kyle Frankiewich, WUTC Staff	Slide 54: How soon will these forecasting and hosting capacity capabilities be available? Will this granularity prompt a revisit of the system-wide T&D deferral estimates?	PSE will be addressing these questions in the consultation update on September 1, 2020.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slide 54: How does PSE anticipate the geospatial analysis will inform the utility's compliance with CETA's requirement to equitably distribute energy- and non-energy benefits?	PSE will be addressing these questions in the consultation update on September 1, 2020.
8/18/2020	Kyle Frankiewich, WUTC Staff	Slides 57-58: I understood the company's explanation of the must-take solar and batteries as an inclusion of PSE's acquisition of these resources not for whole-system need, but as cost-competitive alternatives to other distribution-level system projects. Is this correct? This seems reasonable, but more information would be useful – info on historical acquisition rates for these types of NWAs, and on the company's forecasted future acquisitions. Are the ~160 MW of cumulative resources shown in slide 57 *all* included as must-take?	PSE will be addressing these questions in the consultation update on September 1, 2020.
8/18/2020	Kyle Frankiewich, WUTC Staff	[Recommendation 1:] Clarity on baseline to sensitivities: The IRP participants discussed many requests that would alter the assumptions that are nailed down in the baseline. I'm using the word 'baseline' to mean the best approximation at a business-as-usual forecast with middle-of-the-road inputs across the board. I encourage the company to spend some time going over what inputs are included in this baseline run, as, if I understand correctly, all sensitivities and some scenarios will be compared to this.	Thank you for your feedback. PSE will include a full description in the IRP book and discuss the baseline assumptions in more detail at the October 20 webinar.
8/18/2020	Kyle Frankiewich, WUTC Staff	[Recommendation 2:] Sensitivity and scenario requests: I've tried to pull together staff requests made thus far in the process. I've compiled these in the attached Excel spreadsheet. Staff appreciates that many of our requests have been included in the 31 sensitivities listed by PSE.	Thank you for the attached Excel spreadsheet and the additional sensitivity requests. The file you provided have been uploaded as part of the Webinar 6 Feedback Form package on pse.com.
8/18/2020	Kyle Frankiewich, WUTC Staff	[Recommendation 3:] SCC as fixed-cost adder vs in dispatch: Staff is still at the learning stages in vetting this modeling decision. I understand that previous analysis has shown that the RPS component of CETA carries the most weight in determining PSE's future resource needs. I hope the company does a similar comparison in this cycle. Accepting the	Thank you for your feedback. PSE will include an SCC only sensitivity on the list and will run the analysis to test how the portfolio builds change with SCC as a fixed-cost adder vs a dispatch cost. This can be found as sensitivity 38 in the updated sensitivity spreadsheet.

Feedback Form Date	Stakeholder	Comment	PSE Response
		premise that, over the long term, the RPS is the main constraint guiding PSE's resource acquisitions, I still think this may be relevant with regard to gauge near-term cost-effectiveness for conservation, demand response, and distributed energy resources. I am also interested in Participant Gutman-Britten's proposal to run this side-by-side without the RPS constraint, which will give us a view into whether the optimized portfolio changes dramatically based on this modeling decision.	
8/18/2020	Kyle Frankiewich, WUTC Staff	[Recommendation 4:] Federal CO2 tax: I echo other stakeholders in recommending that the federal carbon tax modeled in sensitivity 22 be structured to align with bills being proposed in Congress.	Thank you for your feedback. This support is noted in the updated sensitivity spreadsheet.
8/18/2020	Kyle Frankiewich, WUTC Staff	[Recommendation 5:] Upstream emissions and NWPCC: I haven't verified this, but I understand that the Northwest Power and Conservation Council intends to model upstream emissions on natural gas in their next power plan. I have heard that their estimate is about 1.37% leakage. How does this compare to the estimates PSE intends to use? How does this compare with other published studies exploring this issue, such as the 2018 EDF assessment? Do the NWPCC's approach and assumptions align with PSE's (EPA and Canadian province govt estimates, if I recall)? To the extent PSE's modeling of this issue diverges from the Council's, I'd like to fully understand why.	PSE will be addressing these questions in the consultation update on September 1, 2020.
8/18/2020	Kyle Frankiewich, WUTC Staff	[Recommendation 6:] Climate change and weather data inputs: This issue may be more appropriate in the stochastic modeling and resource adequacy portion of the IRP process, but I wanted to flag this as an area of interest for staff. My core concern is whether PSE's preferred resource portfolio performs great under historical weather and water inputs, but poorly under weather inputs adjusted to account for climate change. PSE's planning efforts should contemplate this risk. Perhaps this could be part of a scenario tree as in slide 15, or perhaps we can see what we learn from scenario 31; we're open to discussion on how best to address this. Relatedly, is PSE's Itron Study re: Climate Change complete? If so, please provide a copy of the study and findings; please provide a rough timeframe if not.	Thank you for your feedback. PSE shares your concerns and plans to use the temperature sensitivity as well as the high and low demand forecasts and the stochastic analysis to inform the resource plan. PSE's load forecast is based on a normal weather assumption of heating degree days (HDD) and cooling degree days (CDD) calculated using hourly temperatures measured at the NOAA SeaTac weather station. This normal assumption is constant throughout the forecast period. Itron will construct trended HDDs and CDDs that reflect historical temperature trends at the SeaTac weather station. Steps include: 1. Itron will evaluate average and peak-producing temperature trends. Itron will evaluate the following concepts: • Average annual temperature • Maximum annual temperature • Minimum annual temperature 2. From the analysis in step 1, Itron will construct a trended normal daily temperature series, and trended normal daily and monthly HDD and CDD that may be used by PSE's current set of load forecast models. Results will be delivered to PSE in an Excel spreadsheet. 3. Itron will produce a report documenting the methodology and the results of the temperature trend analysis. The draft report is expected by early October.