PSE IRP Feedback Report
Webinar 5: Social Cost of Carbon
July 21, 2020 – Addendum for NWEC comments

8/25/2020

The following stakeholder input was provided from NWEC on July 28, 2020.

Note – this is an addendum to the feedback report published August 4, 2020. All four documents NWEC provided as part of the Webinar 5 Feedback Form upload package on pse.com were read by the IRP team and uploaded. However, the formal letter was missed by PSE, and the material content is in the below table. An update to the consultation report dated August 11 is not needed. NWEC's comments are consistent with the consultation update. Further, NWEC was involved with an August 10 consultation meeting with PSE. PSE responses to NWEC's questions are below.

Feedback Form Date	Stakeholder	Comment	PSE Response
7/28/2020	Joni Bosh and Fred Heutte, NW Energy Coalition	Slide 14 – first point – While it was explained the SCC is provided to program staff who apply that value to conservation measures that come out of the RFP at the time when the measures are being screened for the IRP, we would appreciate a more detailed written explanation of the methodology. Demand side resources are often bundled into groups by costs so that the SCC must be reflected in the individual price as the model is selecting those resources. It was also stated during the presentation that the SCC is not applied to any demand side resource such as conservation of efficiency in either the long-term capacity expansion analysis or in Aurora modeling. Are other measures, such as grid controlled hot water heaters, treated the same way? How does this ensure that the DSP are fairly considered compared to other choices?	For the IRP models, the SCC is added to thermal emitting resources. This ensures that the emitting resources are being penalized and that no bias is being created towards renewable resources or demand-side resources. If the SCC were added to demand-side resources as a benefit, then it would create a bias towards demand-side resources over renewable resources which are also qualifying resources under CETA law.
7/28/2020	Joni Bosh and Fred Heutte, NW Energy Coalition	Slide 14 – points 2 and 3 – We appreciate the explanation why PSE has decided to apply the SCC as a fixed cost in the resource planning, but we respectfully disagree with this approach. The purpose of requiring the SCC as a planning price is to internalize into planning decisions the external cost of emitting CO2. The SCC does not function as a tax that is passed through to customers, but as an external cost that must be incorporated in resource investment decisions. If dispatch modeling informs resource investment choices in any way, the SCC must be included in the dispatch analysis to prevent distortions. While LCOE is not the only factor considered in choosing resources, it is an important one; accounting for SCC in dispatch modeling will reduce a NGCC's capacity factor (all else being equal), which will increase overall cost on a levelized basis. On a per MWh basis, including the SCC in only the investment analysis and not in modeled dispatch will skew the economics of two identical resources. This is illustrated by using the chart PSE provided on Slide 20 [graphic provided and available here – https://oohpseirp.blob.core.windows.net/media/Default/2021/meetings/July_21_webinar/Attachment_9_NWEC_Comments_on_SCC_in_IRP.pdf]. Treating SCC as a fixed cost may raise the capital cost of the certain thermal resources, but may well lower levelized costs (a per MWH measure). The model's economic "incentive" is to add thermals and run them more because they become more economic the more they run, as their upfront fixed cost is spread over more and more MWhs. By excluding SCC from dispatch modeling, it is more likely that certain new and existing thermal resources will run more than if the SCC was accounted for in their dispatch costs As a result, the incorrect price signal is being sent to the model, especially when selecting against demand-side resources. Consequently, there will be no way to test if higher amounts of demand-side resources will result in a lower cost/lower risk portfolio. PSE's agreement to run a scenario incorporating the SCC in dispatch will allow a comparison between treating SCC as a fixed cost and treating SCC as a variable cost to see if that makes a difference in the resources chosen for the portfolio. This is how we understand PSE's [graphic provided and available here – https://oohpseirp.blob.core.windows.net/media/Default/2021/meetings/July_21_webinar/Attachment_9_NWEC_Comments_on_SCC_in_IRP.pdf]. We suggest the following as an alternative to the methodology depicted in Slide 21:	Thank you for your feedback and providing the alternative methodology and the graphic. A clarification meeting was held on August 10 between PSE, Joni Bosh of NWEC, Charlie Black and Orijit Ghosal of Invenergy, Rob Briggs of Vashon Climate Action Group, and Eleanor Bastion of Washington Environmental Council. PSE will complete a modeling sensitivity where the SCC is modeled as a variable cost (dispatch cost).

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		An Alternative Approach is to Apply SCC as a Cost Adder to the Variable Cost of Thermal Generators This approach allows the externality (SCC) to be internalized into the operational and investment decision of the generator or power purchase. Incorporating the cost of the externality – carbon emissions – based on the SCC will cause a dispatch that relies on thermal generation less and makes thermal generation more expensive. A high variable cost and low(er) generator output means a thermal unit will have more difficulty recovering its fixed capital costs, which are unchanged. This fully internalizes the SCC externality.  **SCC is applied as a variable cost adder, which impacts the operation and selection of thermal units/market purchases in a single step** **SCC is an externality and not a "tax" as characterized by PSE.**	
7/28/2020	Joni Bosh and Fred Heutte, NW Energy Coalition	Slide 17 – first point – this needs to be corrected to state "….at the lowest REASONABLE cost possible to ratepayers." Least cost is not defined as singularly the lowest cost, but the lowest cost considering a number of factors, per 19.280.020(9) and (11).	PSE acknowledges your suggested correction. Thank you.
7/28/2020	Joni Bosh and Fred Heutte, NW Energy Coalition	Slide 18 – Instead of adding the SCC to the fixed plant costs, we would argue that SCC should be added to variable costs, dispatch modeling and unspecified market purchases. We will trust that is what the second scenario PSE committed to run will do.	PSE will complete a modeling sensitivity where the SCC is modeled as a variable cost (dispatch cost).
7/28/2020	Joni Bosh and Fred Heutte, NW Energy Coalition	Slide 19 – out of curiosity, is there some reason the results in the fourth column do not match what the results would be multiplying the tons of CO2 times the SCC in $/ton? They are not far off, so is the difference due to rounding?	Thank you for your comment on this slide, we appreciate the attention paid to the details of our presentation and the accountability it brings. The difference in the fourth column is due to the rounding of values in the second and third columns. In the future, PSE will include the additional digits if possible.
7/28/2020	Joni Bosh and Fred Heutte, NW	Slide 21 – it is still not clear how DSR are incorporated into this methodology. Please explain more fully.	DSRs are incorporated into this methodology as a resource in the Long Term Capacity Expansion (LTCE) model.

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	Energy Coalition		The price of different DSR options are included as inputs into the LTCE. The AURORA model has an option to select a DSR as it would a supply-side resource. Once the selected DSR options are included in the portfolio, it has an effect on the forecasted load of the service territory during the hourly dispatch.
7/28/2020	Joni Bosh and Fred Heutte, NW Energy Coalition	Slide 24 – the conclusions listed on this slide are described as the conclusions that were presented in the December 11, 2019 Power point. However, this list leaves off the third conclusion 3. "With the CETA renewable requirement, significantly more conservation is added than the 2017 IRP. " Please explain why this conclusion was not included in the current presentation. While we would generally agree that an RPS standard is an effective driver of change, it seems a well-designed methodology for applying the social cost of carbon could have a significant effect on resource choices, especially of demand side resources and conservation.	This conclusion was not included because portfolio results for the 2021 IRP have not yet been modeled. This intent of the July 21 Social Cost of Carbon webinar was to explain and garner feedback on PSE's modeling strategy for the SCC.
7/28/2020	Joni Bosh and Fred Heutte, NW Energy Coalition	Upstream Emissions Slides 29-35 – NWEC believes that PSE should use the most current and well documented scientific and technical analysis of upstream methane emissions. Concerning the sources cited by PSE, neither the Canadian analysis using the GHGenius model, nor the EPA analysis for the US using GREET, are consistent with current observational data and analysis, and almost certain to understate the upstream emissions rate by a considerable margin. Our concerns are fully documented in a recent letter to the Northwest Power and Conservation Council (attached). In particular, we are concerned that the Canadian values greatly understate the upstream emissions for development and production areas in northeast British Columbia and northwest Alberta region that are the source for much of the natural gas used in Puget Sound region power plants as well as direct use. Several recent peer-reviewed studies cited in our letter summarize both field surveys and summaries of data provided to provincial regulators. Further, in the regulatory review of both the Tacoma LNG project and the proposed Kalama methanol facility, several organizations with significant expertise have reviewed the analysis by PSCAA relying on the same Canadian provincial sources and submitted extensive comments. In that regard, we attach a December 2018 letter from the Stockholm Environment Institute (SEI) US Center summarizing concerns about the vintage and limitations of the data and analytical methods used in the Canadian provincial assessments. The PSCAA values referenced on Slide 34 are 153.21 g/mmBtu for GHGenius (Canadian gas) and 221.05 g/mmBtu for GREET (US gas). According to the lookup table in the NW Council staff analysis (attached) at Tab 1, line 54, this approximates emissions rates of 0.85% and 1.25% respectively. In comparison, the EPA mid estimate is 1.82% (Council analysis, Tab 1, cell W24), and the EDF mid estimate is 2.84% (cell W23) and low estimate is 2.47% (cell X23). We recommended, and the NW Council staff proposed, to use the EDF low estimate for US gas (2.47%) because the EDF-led methane emissions study is by far the most substantial and extensive ever conducted. It involves a wide range of engineering, gas chemistry and atmospheric science experts, extensive use of direct and indirect data acquisition, and integrated analysis with results presented in numerous peer reviewed publications. While the project is continuing, the summary publication by Alvarez et al. ("Assessment of methane emissions from the U.S. oil and gas supply chain," Science, doi: 10.1126/science.aar7204, also attached) provides a comprehensive assessment including the recommended emissions metrics mentioned above. In conclusion, we recommend that PSE use the EDF low emissions rate of 2.47% as the most supportable overall value for aggregate upstream methane emissions from both US and Canadian sources. We also recommend that the Canadian values be further refined going forward, through consultation with relevant experts, especially those conducting the peer reviewed studies of Canadian methane emissions, to gain a consensus expert view on an appropriate upstream emissions rate for natural gas sourced in British Columbia and Alberta.	Thank you for your suggestions and providing background information. The NWPCC is recommending a derived rate upstream rate equivalent to 8,336 gCO2e/MMBtu in its modeling. PSE will use the derived rates from PSCAA. The PSCAA rates are 10,803 gCO2e/MMBtu for Canadian gas and 12,121 gCO2e/MMBtu for US gas. Concerning emission rate, assuming 1 MMBtu of natural gas contains 16,939 g of methane, the upstream fugitive rate will range from 0.90 to 1.31%. Thank you for your recommendation.