PSE IRP Consultation Update
Webinar 5: Social Cost of Carbon
July 21, 2020

8/11/2020

The following consultation update is the result of stakeholder suggestions gathered through an online Feedback Form, collected between July 14 through July 28, 2020 and summarized in the August 4, 2020 Feedback Report. The report themes have been summarized and along with a response to the suggestions that have been implemented. If a suggestion was not implemented, the reason is provided.

PSE thanks Kyle Frankiewich (WUTC) for providing the recently updated inflation adjustment of the social cost of carbon pursuant to docket U-190730 Order 01 referenced below.

PSE also thanks Charlie Black and Orijit Ghosal of Invenergy, Joni Bosh of Northwest Energy Coalition (NWEC), Rob Briggs of Vashon Climate Action Group and Eleanor Bastion of Washington Environmental Council for meeting with PSE on August 10 to help further clarify their questions and suggestions concerning Invenergy's proposal for an environmental externalities approach to the modeling of the social cost of carbon in the 2021 IRP.

Special thanks to Joni Bosh of NWEC who alerted PSE that we missed the feedback form submitted by NWEC in the feedback report. The letter from Joni Bosh and Fred Huette of NWEC has been uploaded to the PSE IRP website and will be addressed separately via addendums to the feedback report and this consultation update. The referenced letter is available here:
https://oohpseirp.blob.core.windows.net/media/Default/2021/meetings/July_21_webinar/Attachment_9_NWEC_Comments_on_SCC_in_IRP.pdf

Social cost of carbon inflation adjustment

An inflation adjustment of the social cost of carbon was referenced by Kathi Scanlan of the WUTC at the July 21 meeting. On July 30, the commission published docket U-190730 Order 01 “Adopting an Adjusted Cost of Greenhouse Gas Emissions Reflecting the Effect of Inflation”. The Order is attached to this consultation update. PSE will update the numbers used for the 2021 IRP modeling. The “Emission Price Calculations workbook.xls” spreadsheet has been updated on the PSE IRP website to reflect this latest guidance from the WUTC. The updated spreadsheet name is “Emission Price Calculations workbook (Inflation Update)” and is available here: https://pse-irp.participate.online/meeting/july-21-2020-social-cost-of-carbon-and-upstream-emissions.

Upsteam emissions

PSE received feedback from Rob Briggs and Virginia Lohr of the Vashon Climate Action Group, Joni Bosh and Fred Heutte of NEWC and Doug Howell of Sierra Club concerning PSE’s assumptions around upstream natural gas emissions. PSE appreciated the feedback. The modeling protocols described during the webinar will remain consistent with prior modeling efforts and accepted regulatory criteria, and in addition PSE proposes to model a portfolio sensitivity which utilizes the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) global warming potential (GWP) for greenhouse gas emissions included in upstream emissions.

Social cost of carbon modeling approach

PSE received feedback from James Adcock, Vlad Gutman-Britten (Climate Solutions), Kevin Jones, Virginia Lohr and Rob Briggs (Vashon Climate Action Group), Charlie Black and Orijit Ghosal (Invenergy), Doug Howell (Sierra Club), Joni Bosh and Fred Heutte (NWEC) and Kyle Frankiewich (WUTC) concerning the social cost of carbon modeling approach.

PSE is modeling the social cost of carbon (SCC) as a post-economic dispatch cost. However, PSE proposes to model several portfolio sensititivites and electric price scenarios modeling the SCC as a variable dispatch cost as requested by stakeholders.

PSE models the SCC as a **fixed cost adder** using the following methodology (also described during the July 30th webinar):

1. A long-term capacity expansion (LTCE) model is run to determine portfolio build decisions over the modeling timeframe. Within the LTCE model, the SCC is applied as a penalty to emitting resources (i.e. fossil-fuel fired resources) during each build decision.
    a. The fixed cost adder is calculated as such:
        i. AURORA generates a forecast of dispatch for the economic life of the emitting resource. This dispatch forecast is not impacted by the SCC to simulate real-world dispatch conditions.
        ii. The emissions of this dispatch forecast are summed for the economic life of the emitting resource and the SCC is applied to the total lifetime emissions.
        iii. The lifetime SCC is then applied as fixed cost amortized over the life of the project.
        iv. A new build decision is made based on the total lifetime cost of the resource.
2. The LTCE model results in a portfolio of new builds and retirements. Since the LTCE runs through many simultions a sampling method is used to decrease run, so the final step is to pass the portfolio to the hourly dispatch model, which is capable of modeling dispatch desisions at a much higher time resolution. The hourly dispatch model is not capable of making build decisions, but will more accurately assess total portfolio cost to rate payers. Since the SCC is not a cost passed to rate payers, the SCC is not included as part of this modelling step.

The strengths of this modeling approach include:

- accurate representation of real-world emitting resource dispatch as defined by current regulation
- accurate representation of cost to customers in the build decision
- inclusion of the SCC in all long-term planning build decisions
- distinction between build decisions and dispatch decisions (SCC is not double counted)

The weaknesses of this modeling approach include:

- emissions from thermal resources are not reduced but total portfolio emissions are reduced by less thermal resource builds

Stakeholders have requested that the SCC be included as a **dispatch cost** at all modeling levels. PSE understands this approach as:

1. A long-term capacity expansion (LTCE) model is run to determine portfolio build decisions over the modeling timeframe. Within the LTCE model, the SCC is applied as a penalty to emitting resources duing each build decision as a dispatch cost.
    a. The variable dispatch cost is calculated as such:
        i. AURORA generates a forecast of dispatch for the economic life of the emitting resource. This dispatch forecast is impacted by the SCC which would increase the cost to dispatch the emitting resource, thereby reducing the number of dispatches of the emitting resource.
        ii. The emission costs of this dispatch forecast which already contain the SCC are summed for the economic life of the emitting resource.
        iii. A build decision is made based on the lifetime cost of the resource.
2. The LTCE model results in a portfolio of new builds and retirements. Since the LTCE runs through many simultions a sampling method is used to decrease run, so the final step is to pass the portfolio to the hourly dispatch model, which is capable of modeling dispatch desisions at a much higher time resolution. The hourly dispatch model is not capable of making build decisions, but will more accurately assess total portfolio cost to rate payers. The SCC can either
    a. be included in dispatch decisions to remain consistent with the LTCE model, or
    b. not be included in the hourly dispatch.

The strengths of this modeling approach include:

- inclusion of the SCC in all long-term planning build decisions

The weaknesses of this modeling approach include:

- possible double counting of SCC as both a build and a dispatch decision
- the dispatch of the resources will be optimized to minimize total costs which will result in a change in dispatch that is lower than expected in the real-world
- not reflective of real-world dispatch decisions which can result in a sub-optimal portfolio by underestimating the resource costs
- increased cost to customers

Given the strengths and weaknesses of each modeling approach PSE proposes to model several sensitivities to diagnose the impact of modeling approach on the social cost of carbon. PSE recognizes that there are several variations on these two general approaches and looks forward to discussion with stakeholders on the August 11th webinar to clarify details various sensitivities.

Summary of all updates

PSE appreciates the feedback provided by stakeholders. In summary, the following changes will be implemented into the portfolio model or included in the proposed portfolio sensitivities with stakeholders at the August 11, 2020 webinar:

- Update inflation adjustment of the social cost of carbon consistent with docket U-190730 Order 01 published by the WUTC on July 30, 2020.
- Proposed inclusion of a portfolio sensitivity to model upstream emissions consistent with AR5.
- Proposed inclusion of several portfolio sensitivities to diagnose impacts of various social cost of carbon modeling approached (e.g. cost adder, dispatch cost, externality, tax).

PSE is committed to keeping our stakeholders informed of our progress toward incorporatating feedback into the 2021 IRP process.