

**2019 Integrated Resource Plan Technical Advisory Group Meeting #6****Hilton Bellevue****King County Room****300 NE 112 Avenue Southeast, Bellevue, WA 98004****May 29, 2019****9:30 a.m. – 5:00 p.m.****Attendees****Members**

- James Adcock, TAG member at large
- Larry Becker, Northwest Power Consulting
- Joni Bosh, NW Energy Coalition
- Charlie Black, Invenergy
- Rachel Brombaugh, King County
- Rob Briggs, Vashon Climate Action Group
- Brad Cebulko, Washington Utilities and Transportation Commission (WUTC)
- Carla Colamonici, Public Counsel\*
- Nancy Esteb, Renewable Energy Coalition\*
- Orijit Ghoshal, Invenergy
- Brian Grunkenmeyer, Flex Charging
- Vlad Gutman-Britten, Climate Solutions\*
- Kelly Hall, Climate Solutions
- Warren Halverson, Coalition of Eastside Neighborhoods for Sensible Energy (CENSE)
- Norm Hansen, Bridle Trails Neighborhood
- Mike Hopkins, FortisBC\*
- Doug Howell, Sierra Club
- Fred Heutte, NW Energy Coalition\*
- David Howarth, National Grid
- Amanda Jahshan, Renewable Northwest\*
- Virginia Lohr, Citizens' Climate Lobby
- Don Marsh, CENSE
- Kate Maracas, Western Grid Group\*
- Nicholas Matz, City of Bellevue
- Tomas Morrissey, Pacific Northwest Utilities Conference Committee (PNUCC)\*
- Greg Nothstein, Washington State Department of Commerce (WCOM)\*
- Court Olson, Optimum Building Consultants
- Bill Pascoe, Orion Renewable Energy Group and Absaroka Energy\*
- Deborah Reynolds, WUTC\*
- Noah Roselander, Vashon Climate Action Group
- Marty Saldivar, Northwest Pipeline
- Nate Sandvig, National Grid ventures
- Mark Sellers-Vaugh, Cascade Natural Gas\*
- Kathi Scanlan, WUTC
- Bill Westre, Union of Concerned Scientists
- Tyler Pebble, Alliance of Western Energy Consumers (AWEC)

**Public Observers**

- Cody Duncan, TransAlta
- Angela LaSalle, Puget Sound Energy (PSE)
- Matt Malloy, NW Energy Coalition
- David Morton
- David Perk, 350 Seattle
- David Plummer
- Robert Schuster
- Ruth Sawyer, Sierra Club
- Scott Williams, PSE\*
- Amy Wheelless, NW Energy Coalition

## Project Team

- Diane Adams, EnviroIssues
- Bill Donahue, PSE
- Kara Durbin, PSE
- Keith Faretra, PSE
- Elizabeth Hossner, PSE
- Elise Johnson, EnviroIssues
- Michele Kvam, PSE
- Jennifer Magat, PSE
- Irena Netik, PSE
- Phillip Popoff, PSE
- Gurvinder Singh, PSE
- Allan Vann, EnviroIssues

\* Indicates remote attendance

## Meeting objectives

- PSE and TAG members review and discuss an overview of the Clean Energy Transformation Act (CETA).
- TAG members provide input on IRP modeling framework of CETA.
- PSE and TAG members discuss upstream gas emission methodology.

## Welcome and introductions

Facilitator Diane Adams of EnviroIssues opened the meeting at 9:30 a.m. by welcoming attendees and providing safety information. Members of the TAG and PSE project team introduced themselves. Diane reviewed expectations for respectful meeting dialogue, provided an overview of the meeting objectives and reminded attendees of the guidelines for the public comment period following the TAG meeting.

Irena Netik, PSE director of energy supply planning and analytics, provided a brief update on events transpiring after the previous TAG meeting, including the passing of CETA. The third IRP advisory Group (IRPAG) meeting and IRP listening session was held on May 22. The IRPAG meeting had approximately 150 attendees and 66 public commenters. Irena also noted the PSE IRP website was updated, providing a clear location for public files and a method for submitting comments to the project team. All comments submitted on the website will be periodically published online.

Irena Netik gave updates on action items from previous IRP meetings. For details, refer to the *Open action items from previous IRPAG and TAG meetings* as distributed in the meeting packet (also available on slides 5 to 9 of the meeting materials posted at [www.pse.com/irp](http://www.pse.com/irp)). Irena noted several tracked action items will need to be listed as open until they are completed in the IRP book, meaning several will stay open through the entire IRP process until the 2019 IRP is filed. These action items will be included in an appendix at the end of the meeting materials (available on slides 66 to 67 of the meeting materials posted at [www.pse.com/irp](http://www.pse.com/irp)). The TAG discussed the action item list, making the following key points:

- Virginia Lohr asked if action item 2, requesting PSE include carbon impact in scenarios or sensitivities, will be marked as complete by PSE and clarified that in her view this should remain open. Irena noted the scenarios and sensitivities will be discussed at this TAG meeting, meaning the action item can likely be marked as complete at the conclusion of the meeting. Virginia requested PSE confirm completed action items with the TAG before removing them from tracked action items. *Update since meeting: action item 2 will remain open until the 2019 IRP book is filed.*
- Irena Netik noted Action item 6, requesting PSE consider methodology for posting TAG questions and answers publicly, is marked as complete with the development of the new online portal for TAG members to post questions. Virginia Lohr asked if previous emails submitted by the TAG will

also be posted, and Irena explained they are already posted online. Virginia will view the posted emails and will identify if any are missing and still need to be posted.

- In relation to Action Item 8, for PSE to host a presentation on the Energize Eastside project and invite TAG members, Don Marsh asked if he could submit twelve questions to be answered at the presentation in August. CENSE developed these questions in response to the Energize Eastside public hearing, which they felt did not address their questions. Irena Netik replied Don is welcome to email those questions to the IRP team, but noted she could not commit to answering them at the presentations until she knows what the questions are. Irena stated if Don does not feel the questions are addressed at the Energize Eastside meeting, the IRP team is willing to work with Don on their resolution. James Adcock requested the CENSE questions be distributed to all TAG members, and Diane noted that if the questions are submitted through the online portal they will be posted publicly. Doug Howell recommended Don send his questions to the TAG through the IRP listserv for distribution to TAG members, and Irena reminded attendees that TAG members are welcome to communicate freely with each other to share information.
- Warren Halverson noted that while PSE added the Energize Eastside topic to the TAG #7 meeting agenda and will likely post presentation slides for the topic in response to action item #8, posting materials and giving a presentation does not allow for the two way dialogue intended with the original request to hold an Energize Eastside specific forum. Warren expressed an interest in the discussion from the Energize Eastside portion of TAG #7 be incorporated as part of the IRP for transmission planning.
- James Adcock asked PSE when TAG members can anticipate a written response to CENSE's twelve questions. Irena explained she doesn't anticipate the team writing responses, but the questions will inform the presentation and subsequent dialogue on Energize Eastside. James asked if TAG members will be reviewing the Energize Eastside project in the context of planning for implementation of CETA as part of TAG #7, or PSE is viewing Energize Eastside outside of CETA 2% compliance category. Irena assured James they are in alignment on the 2% cost cap and explained the TAG #7 meeting will discuss Energize Eastside and how it fits into IRP planning and CETA.
- Court Olson thanked PSE for scheduling time for the TAG to discuss energy efficiency in response to Action Item 9, "Consider providing an energy efficiency dialogue around policy and implementation of energy efficiency." Court asked if he could make a presentation on energy efficiency during the discussion, noting he has expertise in energy efficiency and PSE frequently brings consultants to TAG meetings to make presentations. Irena Netik agreed and offered to add an hour to the TAG #7 agenda for Court's presentation and noted the project team will coordinate with Court to distribute his presentation slides ahead of time.

Diane Adams invited TAG members who attended the May 22 IRPAG meeting and listening session to share any thoughts or key takeaways with meeting attendees.

- Warren Halverson noted he found the listening session very useful and thinks it will be useful to PSE. Warren highlighted the event was a listening session but not a dialogue and requested future meetings include questions and answers and supports an exchange of information, rather than a reporting of information by both sides. Irena replied the project team will consider this feedback in how they design future meetings for the next IRP, noting effective stakeholder and public engagement has been a topic of discussion for the team.
- James Adcock noted his key takeaway was how the liquefied natural gas (LNG) plant connected to CETA and asked if the TAG can review the LNG plant again in relation to the new law. James also expressed surprised at some components of David Mills' presentation at the IRPAG meeting, which he felt were minimizing the impact of CETA on PSE. Irena replied PSE recognizes CETA will have a huge impact on PSE's work, and PSE is committed to CETA and compliance with it.

## Clean Energy Transformation Act overview

Phillip Popoff, PSE Manager of Resource Planning & Analysis, provided the TAG with a presentation on CETA and how it will be incorporated into work on the 2019 IRP. The presentation provided an overview of CETA's requirements and provisions, adjustments PSE will need to make to comply with the law, current and needed rules governing IRPs, compliance options and a timeline for the development of PSE's first clean energy implementation plan (CEIP). For details, see the *Washington Clean Energy Transformation Act* presentation as distributed in the meeting packet (available on slides 10 through 24 of the meeting materials posted at [www.pse.com/irp](http://www.pse.com/irp)).

TAG members asked questions and discussed various topics throughout the presentation, making the following key points:

### What CETA means for PSE

Phillip Popoff explained PSE plans to expand conservation programs for their customers, remove coal from their energy supply portfolio, acquire significant amounts of CETA-compliant resources and begin developing new transmission corridors to renewable energy zones.

Doug Howell highlighted there is some remaining uncertainty on how coal-fired energy relates to CETA, noting PSE has previously asserted they need to continue to put money into Colstrip units 3 and 4 to support their operations and maintenance budget even after no longer receiving electricity from them. Doug expressed frustration with this, and requested PSE no longer infuse ratepayer money into the maintenance of Colstrip units 3 and 4 to continue the plant's operation.

Don Marsh asked if planned future conservation efforts impact the load forecasts used to justify the construction of Energize Eastside. Philip replied the IRP project team focuses on transmission as it is used to connect to additional resources, while the Energize Eastside project is intended to connect electricity to customers. Phillip encouraged Don to ask the Energize Eastside project team at TAG #7 about how conservation efforts connected to CETA may impact the justification of the Energize Eastside project. James Adcock asked what PSE's position is on situations where general transmission lines might be useful for bringing new renewable energy sources to consumers, and if that would fall under the 2% cost of compliance. Phillip replied some of these details are still unclear, but the law currently defines the transmission as "bulk transmission." Phillip noted in his professional opinion this refers to a long-lead long-haul transmission line with a clear connection to bringing new renewable resources online.

Bill Westre asked PSE what scale of increases to their conservation efforts are being considered. Phillip replied this depends on factors still to be determined, including the impact of the incorporation of the social cost of carbon into the IRP and conservation methods and technology which have yet to be developed. Bill asked if gas usage is part of PSE's conservation efforts, and Phillip replied it is. Kate Maracas asked if PSE has begun the transmission planning certification process, or if that will also be a component of future IRPs. Phillip replied that planning for bulk transmission will likely be developed after the completion of their first 10-year clean energy action plan (10 yr CEAP).

### Rules governing IRPs

Phillip highlighted current rules which govern IRPs and showed a flowchart of the development and implementation of new rules for IRPs to comply with CETA.

James Adcock noted the flowchart displayed on slide 14 of the meeting materials showed implementation of CETA taking place after state agencies develop rules for implementation, when CETA clearly states implementation of the law needs to begin prior to the completion of rulemaking. Phillip agreed with this, noting the flow chart was to show the role of the rules to be developed by the agencies, rather than a linear timeline.

Noah Roselander asked if the rules displayed on slide 14 of the meeting materials were the former rules governing IRPs or if they are the new rules changed by CETA. Phillip replied they are the old rules but still apply to PSE, noting CETA did not change the description of the IRP and PSE is still required to plan to the lowest reasonable cost as efficiently as possible under the new law. Noah highlighted that PSE is still obligated to provide power at the lowest reasonable cost, but now while including the social cost of carbon and other planning factors. Phillip agreed, noting PSE will follow the law as efficiently as possible.

Deborah Reynolds pointed out the statutes have a different definition of IRP than what is in WUTC rules, and they have been inconsistent for longer than 10 years. The Revised Code of Washington (RCW) 19.280.020(9) defines an IRP as “an analysis describing the mix of generating resources, conservation, methods, technologies, and resources to integrate renewable resources and, where applicable, address overgeneration events, and efficiency resources that will meet current and projected needs at the lowest reasonable cost to the utility and its ratepayers and that complies with the requirements specified in RCW 19.280.030(1)”, which differs from the Washington Administrative Code (WAC) regulations cited in the presentation slides.

### **IRP’s role in the regulatory process**

Phillip explained CETA changes the role of the IRP within the state’s regulatory process. PSE’s 10-year CEAP is completed with the IRP, which is then used to develop a four-year clean energy implementation plan (4 yr CEIP). The 4 yr CEIP is a separate regulatory process that must be approved by the Commission, and impacts the resource acquisition process and rate case for PSE’s future work.

Doug Howell requested PSE clarify the sequencing of events in the regulatory process, noting the flowchart implies the resource application process begins after the IRP is filed, when PSE is currently acquiring gas plant resources and CETA applies to that current process as well. Phillip explained it is challenging to acquire resources while the rules are changing, and existing gas plants and future acquired gas plants still fall under CETA which requires PSE to meet 80% of their load with CETA-compliant resources by 2030. Current and future gas plants will need to be ramped down prudently to meet these requirements.

Kelly Hall asked if PSE anticipates the 10 yr CEAP being developed from the IRP process, or being developed as a separate plan to inform the IRP. Phillip replied the IRP informs the 10 yr CEAP, as CETA requires the 10 yr CEAP to be included in the IRP.

Tyler Pebble asked WUTC staff if they have an anticipated timeline for completing CETA rulemaking. Brad Cebulko replied WUTC is required to complete the rulemaking by January 2021 and is currently working to begin the rulemaking process and allocate resources. The WUTC will be requesting public feedback on rulemaking when the process begins.

### **IRP analytical process overview**

Phillip explained which components of the IRP analytical process will need to include new data and updates from CETA. Kelly Hall asked why demand side resources aren’t listed as an input which will require updates from CETA, as the law could change the calculation on what is cost effective. Gurvinder Singh, PSE Senior Resource Planning Analyst, responded there is not enough time in the 2019 IRP to redo the conservation potential assessment. PSE is working with a consultant to review the changes in compliance standards, which will be included in the 2019 IRP report. The changes will be fully incorporated in the next IRP.

### **Eligible resources**

Phillip presented how CETA-eligible resources include conservation, non-emitting resources and renewable resources. Joni Bosh expressed disagreement with PSE’s categorization of hydropower, stating according to the law it should be categorized as a renewable resource only, not a non-emitting resource. Non-emitting resources were defined as excluding renewable resources to accommodate the nuclear power Columbia Generating Station as non-renewable but still CETA eligible.

Fred Heutte also noted new large-scale hydro is classified as a renewable resource and asked why pumped storage is then classified as a non-emitting resource. Phillip responded pumped storage depends on the energy used to charge the water, which may come from non-renewable sources. Joni Bosh asked why a utility would use energy that is not renewable to create energy storage, when non-renewable energy rarely needs to be stored. Phillip noted battery storage is not listed as a renewable or a non-emitting resource, meaning utilities must be able to verify the source of battery-stored energy to have it qualify under CETA. This same requirement is not listed for pumped storage, which is classified as a non-emitting resource. James Adcock noted this is an area which requires clarification from agency rulemaking because utilities will otherwise be able to consider carbon-emitting energy as CETA-compliant if it is first used to charge pumped storage. Noah Roselander reminded attendees that grid energy will become cleaner over time, and as a develop of pumped storage offered his future input in the process of classifying system energy coming from the energy imbalance market. Joni Bosch highlighted a statement in CETA whereby energy should not result in GHG as a byproduct of production. Phillip expressed optimism that this statement may resolve the concern with pumped-hydro storage being a blanket renewable or non-emitting resource.

Warren Halverson noted Phillip qualified conservation resources as needing to be cost-effective, reliable and feasible, and expressed his interest in PSE studying conservation potential further as it could be an opportunity to reduce load and further CETA compliance. Phillip agreed and reminded Warren the TAG will discuss conservation further in August and expressed PSE's commitment to further conservation programs.

### **Eligible resources**

Phillip reviewed compliance options utilities have in CETA, citing section 4(1)(b) of the law. James Adcock asked if ratepayers or utilities are responsible for paying penalties for noncompliance, noting paying penalties is not prudent and expressing a preference for ratepayers to not pay these penalties. Phillip replied PSE is unlikely to recover penalties for noncompliance in scenarios where CETA-compliant resources were not acquired quickly enough. James asked when the cost cap compliance period begins, noting in his reading of CETA it is the start of 2022, meaning the first 2% annual increase in revenue begins and new renewable projects must be ready to build then. Phillip replied the IRP team is working to develop a cost compliance ramp towards acquiring new resources and can acquire new hydropower contracts for existing to comply by 2022 if PSE is not yet ready to build new renewable sources.

Tyler Pebble asked if PSE sees the 2% cost cap compliance being implemented on a forecast or retroactive basis. Phillip replied he foresees each 4 yr CEIP developing a planned amount of funding to spend on compliance, then PSE will spend up to that limit. Kelly Hall cautioned PSE from viewing cost cap compliance as a sum of money, as this ignores the incremental cost and does not use the least cost portfolio. Phillip agreed, noting the cost cap compliance is more complicated than what he initially described.

Deborah Reynolds explained WUTC staff are working to develop a recommendation on the 2% annual cost cap compliance for the 2019 IRP. CETA specifies that the cost increase refers to the four-year compliance periods, which do not begin until 2030. Deborah asked TAG members if they have input on whether the 2% cost cap compliance only begins applying in 2030, or if this is in reference to the 4 yr CEIPs. Kelly Hall noted this seems up for interpretation. Phillip shared his opinion that the 4 yr CEIPs are required to be developed for four-year periods to match the compliance periods, and PSE was interpreting the law to use the 2% cost cap compliance to ramp up CETA-complaint energy acquisition prior to 2030.

### **Social cost of carbon**

Phillip provided an overview of how the social cost of carbon is being included in the IRP process. Rachel Brombaugh shared King County is considered implementing a social cost of carbon in their work, and asked if PSE could share the inflation rate used for their future commerce so King County can be in



alignment with WCOM and PSE. Elizabeth Hossner noted the PSE inflation rate will be set by the WUTC in the future when they have completed CETA rulemaking, but until then PSE is using the U.S. Bureau of Labor Statistics number to inflate to 2019 dollars, then used a 20-year average inflation rate of 2.5% through to 2039 dollars.

James Adcock asked if there are barriers to PSE acquiring additional CETA-qualifying resources prior to the WUTC rulemaking, aside from purchasing Montana wind due to the uncertainty if it qualifies for CETA. Phillip responded the main barriers are related to balancing future need with current cost, which dictates the speed at which PSE can proceed.

Don Marsh asked how significant PSE views the impacts of CETA on their IRP work. Irena Netik replied PSE sees this as a big transformation, and the team is still grappling with what this means and how to model it. Irena noted it is a transformation not just for PSE but how Washington works with regional partners.

## Scenarios and sensitivities with the Clean Energy Transformation Act

Elizabeth Hossner, PSE Consulting Energy Resource Planning Analyst, provided a presentation on scenarios and sensitivities previously presented to the TAG in October 2018, and the new or revised work completed since CETA was signed into law on May 7, 2019. Elizabeth discussed if or how CETA will affect market price scenarios which will create and influence future power market conditions. Elizabeth provided an overview of a draft list of six sensitivities for the 2019 IRP and received feedback on each of the sensitivities from members of the TAG. For details, see *the Scenarios and sensitivities with the Clean Energy Transformation Act* presentation as distributed in the meeting packet (available on slides 26 through 48 of the meeting materials posted at [pse.com/irp](http://pse.com/irp)).

TAG members asked questions and discussed various topics throughout the presentation, making the following key points:

### 2019 IRP scenarios

Elizabeth explained PSE is looking at how new requirements under CETA will affect power prices and their power price modeling for the next 20 years. Elizabeth noted that future power market conditions are also influenced by different market price scenarios, such as gas prices, regional loads across the Western Interconnection and other regulations across the region.

Elizabeth provided an overview of the scenarios and sensitivities work that was presented to the TAG in October. Each of the scenarios accounted for several existing policies at the time, including some carbon price policies such as Washington's RPS requirements, California Assembly Bill 32 (Global Warming Solutions Act of 2006) and British Columbia's Carbon Tax. Elizabeth explained that CETA will help further clarify and refine requirements for utilities during the IRP process.

Bill Westre asked if power purchase agreements (PPA) were included in the whole sale market prices. Elizabeth replied that market clearing prices are included, and the prices look at all the resources available which may or may not include PPAs. The resources are lined up and the resource stack is analyzed, which sets the market clearing price.

### 2019 IRP electric & gas price scenarios

Elizabeth described three electric and gas scenarios (base, low and high) and one gas-only scenario, base + carbon dioxide (CO<sub>2</sub>) tax, for the 2019 IRP. All scenarios incorporated the social cost of carbon. Charlie Black commented that models typically simulate the dispatch of resources and do not reflect the fixed costs of building or owning resources. Kelly Hall asked for an explanation of the CO<sub>2</sub> price in the gas IRP only scenario. Elizabeth replied that the CO<sub>2</sub> price includes the social cost of carbon, the upstream costs and the \$15 per metric ton of CO<sub>2</sub> carbon tax as described in Senate Bill (SB) 5971.

James Adcock asked for clarification on what factors are being included in the social cost of carbon, such as dispatch of resources. Elizabeth clarified that the social cost of carbon includes the new resources that should be added to the portfolio – it is not based off the tons of emissions.

### **Modeling updates to the electric price forecast**

Elizabeth shared three updates to the modeling of electric price forecasts. The social cost of carbon as a planning adder – including upstream emissions – will start at \$86/US ton in 2020 and grow up to \$184/US ton in 2039. Gas prices were updated to the Wood Mackenzie gas forecasts from fall 2018, levelized to \$3.50/MMBtu. The Renewable Portfolio Standard (RPS) and Clean Energy Standards were updated to include California SB 100, New Mexico SB 489, Nevada SB 358, and Washington SB 5116 in the modeling updates.

Fred Heutte commented that the supply-demand relationship of gas is underpinning flat gas prices moving forward and he is questioning what the future of the Mid-C electricity hub region will look like. He stated that there is a significant upside risk to gas prices and PSE should not assume a levelized price forever. Elizabeth replied that PSE does not know what the Mid-C market will look like, but the Wood Mackenzie gas prices that are used in the updated models build in factors such as LNG export energy. Elizabeth also explained that PSE does not use a levelized gas price from Wood Mackenzie, we are just using it for illustrative purposes—the Aurora model uses monthly gas prices. Fred noted that industry and analyst groups such as Wood Mackenzie are optimistic with their projections and that utilities may want to keep a closer eye on supply and demand, gas prices, and LNG exports.

Doug Howell asked why the CO2 tax for the gas-only IRP is only \$15. Elizabeth and Phillip Popoff explained that the \$15/US ton is an additional tax on the upstream natural gas greenhouse gas emissions (GHG) and the social cost of carbon. The social cost of carbon applies to the direct combustion of gas in addition to the upstream. Elizabeth also clarified that the price of dispatching is not charged to PSE customers and that the social cost of carbon is only being considered in the resource planning and acquisition process. The tax identified will be in addition to the social cost of carbon for the gas utility IRP.

Charlie Black asked if PSE's simulations include the social cost of carbon in the market. Charlie stated if the social cost of carbon is not being applied to the market, then it is not being used consistently. James Adcock agreed with Charlie and stated that PSE is making a mistake in the interpretation of the law. Brad Cebulko clarified that CETA applies to intermediate or long-term decisions, not dispatch or operations of resources on the market.

Several TAG members held a group discussion on the interpretation of the law and where it would be possible to include the social cost of carbon. Fred Heutte and Joni Bosh stated that the discussion of the interpretation of the law and the social cost of carbon is crucial to the IRP process and should continue in future meetings, as a consensus would not be able to be reached at the meeting. Elizabeth agreed and noted that this was the first time PSE has modeled the social cost of carbon, and further discussions can help influence future IRPs. PSE acknowledged the discussion of this very complicated analytical process was not clear, so would clarify in future discussions.

### **Renewable Portfolio Standard (RPS)/Clean Energy Standards**

Elizabeth shared the updated RPS and Clean Energy Standards for Washington, California, Nevada, and New Mexico. The RPS goal in the 2019 IRP Draft is at least 15% of delivered load from non-emitting resources by 2020. A graph of the minimum renewable energy needed in the Western Electricity Coordinating Council (WECC) for compliance can be found on slide 32.

Joni Bosh noted that the non-emitting and non-renewable resources should be more clearly defined on the slide to show they are distinct types of resources and note their differences. PSE acknowledged Joni's request and agreed to clarify in future presentations.



## **Renewable energy needed in Washington to support Clean Energy Transformation Act**

Elizabeth presented a graph showing the renewable energy needed in Washington to support both RCW 19.285 and CETA. The graph shows the renewable need for 2020 – 2028 is based off RCW 19.285. Starting in 2029, the incremental renewable need is higher to meet the requirement of 80% of sales under CETA in 2030. The renewable need by 2045 is required to be 100% to comply with CETA. James Adcock asked for clarification on whether the existing non-emitting/renewable resources included hydro and nuclear. Elizabeth replied that the existing resources include hydro and nuclear, and that the figures have been adjusted for energy that stays in Washington. They do not include energy resources that are exported.

Joni Bosh asked if the definitions of non-emitting and non-renewable resources on slide 34 matched the definitions on slide 33. Joni suggested that PSE's definitions need to be clarified and do not follow what is written in the law. Jennifer Magat from Puget Sound Energy noted that non-emitting and renewable resources were combined as "eligible energy" for the purpose of the graph.

Court Olson asked if PSE's demand forecast was used for the data. Elizabeth replied that the demand forecast is based off a percentage of the Northwest Power and Conservation Council's regional load forecast, explaining the graph is using statewide data. Rachel Brombaugh requested a graph that would show PSE's specific renewable energy need as required by CETA. Elizabeth explained that PSE is working on that data, but for now, she will present the amount of non-emitting/renewable energy resources needed by 2030 for the region, and then share what percentage of those resources PSE will need to provide. Kelly Hall then asked why this graph would be useful since it may not recognize that some utilities may already be meeting the energy resource requirements as stated in RCW 19.286 or CETA. Phillip Popoff explained that the graph is showing the bigger picture and is trying to reflect how many additional resources will need to be built or acquired in Washington as whole, not just by PSE. Kelly Hall then explained it appeared PSE's assumptions meant that hydro-based utilities would essentially be back-sliding; that is, if a utility is currently 85% renewable, under PSE's statewide modeling, that utility could then backslide down to 80%. She pointed out utilities are not allowed to backslide under CETA. PSE agreed and will update to add more renewables to Washington for the power price forecast.

## **Draft power prices with update gas prices and California SB 100**

Elizabeth shared a graph showing that an increase in zero variable cost renewable resources is causing power prices to decrease. The graph shows that there is a \$13.79 difference between the 2019 IRP Draft base and the gas prices with the gas price update and California SB 100 applied. It is expected that the power prices will decrease even more once the updated clean energy laws are added for Nevada, New Mexico, and WA.

Charlie Black asked about the volatility of the prices and how they might change. Elizabeth noted that the figures in the graph are a flat average that reflects the deterministic run with normal weather conditions, normal hydro conditions, average solar and wind generation, etc. and she can investigate further volatile pricing in September with updated clean energy laws.

## **PSE's estimated need for non-emitting and renewable energy by 2030**

Elizabeth shared the estimated amount of renewable/non-emitting energy needed in Washington to support CETA. After existing resources, PSE would still need over 10.8 million MWh of new renewable/non-emitting resources to get to at least 80% of electric sales by 2030 as required under CETA. Under CETA, 100% of electric sales must be met by renewable/non-emitting resources by 2045. Elizabeth will provide numbers for the estimated need for 2045 in future meetings.

## **Portfolio sensitivities**

Elizabeth discussed updated portfolio sensitivities to share how different resources or environmental regulations have the potential to change PSE's portfolio. An updated draft list of six sensitivities were presented and discussed with the TAG. These sensitivities were narrowed down from a list of 16 sensitivities originally presented in January 2019. CETA addressed several of the original sensitivities and they are now included in the scenarios.

Kelly Hall noted Sensitivity #12, alternative resource costs, was removed from the draft list and shared she thought it was important to stay on the list. Elizabeth clarified that PSE is mainly focused on complying with the Clean Energy Standard/CETA as the baseline, and then an alternatives analysis would be used later. Irena agreed that the alternative resource cost sensitivity be added back to the draft list since it considers long-term planning efforts.

Joni Bosh asked how to get some more sensitivities added to the list. Joni wanted to add increased electric vehicle adoption and load shaping to the list, in addition to increased electric vehicle adoption without load shaping. Elizabeth reiterated that PSE is focused on compliance with CETA and the big picture is looking at how many new resources will be required and the sensitivities surrounding that. Phillip added that PSE has an update to the electric vehicle forecast which may be able to be incorporated as part of the load forecast. Load shaping may be explored as a sensitivity before the next IRP. Fred Huette commented that the IRP should not become a CETA-compliant exercise but should rather explore more topics to find the lowest cost, including looking at electric vehicle adoption/usage.

### **Sensitivity 1: 100% non-emitting resources by 2030**

Nate Sandvig noted that PSE should highly consider timing for the retirement, acquisition or construction of resources when looking at the overall timeline for compliance with CETA. RFPs may adversely affect timelines for compliance.

### **Sensitivity 2: declining market reliance**

Charlie Black encouraged that PSE investigate this sensitivity in more depth and shared information on a white paper written by Randy Hardy titled "Future Northwest Capacity Shortages." He shared how CETA will have significant impacts on the Pacific Northwest's capacity output. The paper states that analysts are starting to see signs of a capacity shortage even before the closure of power plants. The paper also stated that there is a 30-50% chance of a major outage in the next 10 years. PSE's baseline is becoming increasingly risky and Charlie would like to see a more robust analysis of those risks, including updating the price forecasts to reflect a variety of scenarios that are causing concern throughout the region, such as cold winters, high load events, etc. Charlie stated that PSE is a high-visibility utility and should be looking at and working with others in the region to analyze these risks.

Nate Sandvig echoed Charlie's point and added that pump storage is a viable solution to meeting capacity needs. The updated loss of load probability numbers presented by John Fazio shows that there is a clear risk and good opportunity for PSE and others to intervene.

Fred Huette noted that PSE is also not paying enough attention to the demand side. The demand side can help with normal peak demand response.

In response to winter peak concerns, James Adcock would like to see more energy resource imports from California, noting that energy imports are currently low/non-existent but have been used historically.

### **Sensitivity 3: extended DSR potential**

Brad Cebulko asked for clarification on the conservation potential assessment (CPA) if the sensitivity assumes a continued pace of conservation. The baseline assumption is that the ten-year CPA is accelerated from a 20-year timeline, where there is a conservation ramp for the first ten years and the following ten years remain at a stable pace of conservation. Brad noted that conservation would continue to occur after the first ten years and was questioning the data that would be provided for the subsequent

ten-year period. Gurvinder Singh clarified that PSE is accelerating the acquisition of discretionary resources in the first ten years. The second ten years consists of resources that PSE cannot accelerate the acquisition of, such as new construction or unknown new technologies that cannot be modeled. Brad noted that similar ten-year exercises are included in many different IRPs and it appears that the exact same models simply shifts a few years to fit into the new timeline. Gurvinder explained that the figures change with each IRP, even though it appears as if they are simply shifting forward. With new codes and standards appearing, the requirements in the models change.

Fred Huette noted he would like a more in-depth discussion of this sensitivity.

#### **Sensitivity 4: alternative discount rate for DSR**

An overview of this sensitivity can be found on slide 46.

#### **Sensitivity 5: early Colstrip 1&2 retirement**

Fred Huette asked why this sensitivity was being considered within the IRP context, which focuses more on long-term planning. Elizabeth replied that, in terms of long-term resources, the earliest PSE could get an alternative resource online would be 2022. The period between 2019 and 2022 cannot be answered by the IRP, so PSE would need to consider a short-term power bridging agreement to get PSE to 2022 when a long-term resource can come online.

Joni Bosh asked for further clarification about why this sensitivity would be included in this IRP. A short-term power bridging agreement may not fall under the requirements of the IRP. Irena posed the question if this sensitivity should be removed from the draft list. Doug Howell noted that there is a strong possibility for Colstrip to be retired by the end of 2019 and the IRP needs to reflect reality to some degree. Irena reiterated points made earlier by Fred and Joni that if Colstrip were to retire early, a short-term bridging agreement would need to be put in place and may not fall under this IRP. Removing this sensitivity may allow PSE to focus more time and effort on other sensitivities. Brad Cebulko pointed out that this IRP will be filed in January of 2020, so it will not even be a question by the time the IRP is filed. Doug responded that the issue itself is important and needs to be discussed and reflected in the IRP, whether it is a sensitivity or not. Doug ended the discussion by reiterating the importance of including the discussion in the IRP. PSE agreed to include the discussion the IRP book and remove the sensitivity.

#### **Sensitivity 6: no LNG**

No comments were provided on this sensitivity.

#### **Additional comments**

Virginia Lohr proposed that an interagency high-impact social cost of carbon also be modeled. CETA requires that only one specific value be modeled, but she would like PSE to model a variety of low-probability/high-impact values that were included in an interagency working document. Phillip noted that this proposal may be covered by sensitivity 1. Virginia insisted that the additional high-impact social costs of carbon be included in a new, separate sensitivity.

Virginia also requested that the Sierra Club have access to the model that PSE is using to increase transparency with the data.

Kelly asked if and how the social cost of carbon would be applied to other states. Philip and Elizabeth clarified that the social cost of carbon will be applied to resources in Washington and market purchases in Washington and that PSE will work on being clearer with their messaging. Social cost of carbon will be applied to the decision to build or retire resources. Elizabeth expanded upon Colstrip – a resource outside of Washington – as an example. Since the sales from Colstrip are coming into Washington, the social cost of carbon would apply.

Jim asked if PSE was including the social cost of carbon in the calculation of market prices when it comes to the dispatch of Washington state resources to the market. Elizabeth confirmed that PSE is not

including the social cost of carbon as a dispatch cost for determining market prices, because it is applied as a planning adder. While the social cost of carbon will not be reflected as a dispatch cost, PSE will apply the social cost of carbon to purchases from wholesale market. That is, each MWh of market purchase has a carbon intensity. That carbon intensity will be multiplied by the social cost of carbon, so the social cost of carbon will be included in the analysis, but not as a dispatch cost.

Irena noted that the IRP team will revise and clarify their messaging on the social cost of carbon for future meetings.

### Additional analysis for Washington legislation

Phillip Popoff provided a brief update on the cost cap compliance pathway and analysis as defined through CETA. Phillip and Irena Netik reminded TAG members they are looking to the WUTC to help provide guidance on the 2% cost cap, and this initial analysis is only initial thinking to inform the process. PSE has not committed to anything presented. For details, see the *Additional analysis for Washington legislation* presentation as distributed in the meeting packet (available on slides 49 through 51 of the meeting materials posted to [www.pse.com/irp](http://www.pse.com/irp)). Phillip noted due to a lack of WUTC rulemaking for the 2019 IRP, PSE is considering calculating baseline and cost cap implications both with and without the social cost of carbon to inform future rulemaking. TAG members asked questions and discussed topics throughout the brief update.

Kate Maracas expressed concern with PSE's statement they may incorporate the social cost of carbon in the incremental cost calculation in the 2019 IRP, noting the social cost of carbon in CETA is intended to be a comparative weighting factor to help PSE make planning decisions, not a cost passed to ratepayers. Doug Howell reiterated Kate's concern and also expressed concern the social cost of carbon may not be incorporated in the baseline, noting it would not make sense for the social cost of carbon to be incorporated as cost of compliance in scenarios when PSE is not complying with CETA. Phillip agreed the analysis options are confusing and up for interpretation, which is why PSE is considering conducting multiple calculations for the 2019 IRP so WUTC can be informed in their rulemaking.

### Upstream gas emission methodology

Keith Faretra, PSE Senior Resource Scientist, presented on upstream gas emission methodology. Keith reviewed the data previously presented at TAG #2 on October 11, 2018, reviewed the upstream gas emission rate scope, provided new information to supplement the derivation of the upstream rate, and explained how the emission rate will be applied in the 2019 IRP. For details, see the *Upstream natural gas emission methodology* presentation as distributed in the meeting packet (available on slides 52 through 60 of the meeting materials posted to [www.pse.com/irp](http://www.pse.com/irp)). TAG members asked questions and discussed various topics throughout the presentation.

Doug Howell asked if PSE knows what percentage of gas delivered never makes it to the consumer because it is leaked upstream. Bill Donahue, PSE Manager of Natural Gas Resources, responded the numbers shown in the presentation slides include all GHGs from extraction through delivery, including combustion emissions released through compressors, converted to CO<sub>2</sub>. Fred Heutte asked if he could find the emissions factors PSE used by going to the Puget Sound Clean Air Agency (PSCAA) report. Keith responded the PSCAA has gas lifecycle spreadsheets available on their website for download and that all of the factors are available in that documentation.

Bill Westre noted the PSCAA valued methane as 25x more potent of a GHG than CO<sub>2</sub> and expressed concern this equivalency is lower than more recent estimates of methane's equivalency to CO<sub>2</sub> and would underestimate the impact of methane leakage in the atmosphere. Doug agreed, noting the PSCAA used the equivalency factor published in the Fourth Assessment Report (AR4) by Intergovernmental Panel on Climate Change (IPCC). AR4 estimated the equivalency at 25x CO<sub>2</sub>, while the Fifth Assessment Report (AR5) estimates the equivalency of methane at 30x CO<sub>2</sub>. Doug requested PSE's support in using the most recent science in their calculations to ensure the impact of methane leakage is not underestimated.

Doug Howell also expressed concern the analysis assumes all PSE natural gas being sourced from British Columbia (BC), when the use of BC gas pushes other buyers of natural gas to other sources in the western portion of North America. Doug proposed an assumption of western regional sourcing would provide a more accurate estimate of GHG.

Fred Heutte shared he appreciated the lifecycle approach PSE was using for determining emission rates but noted more work may need to be done in the future on CO<sub>2</sub> equivalence factors and gas sourcing. Fred agreed with PSE's approach to use the PSCAA report for the time being because it is a report from a state agency, but this will need to evolve to get a more accurate understanding of methane impacts. Doug Howell expressed hope that PSE will support a rigorous public process in rulemaking to determine emissions factors.

Rob Briggs expressed frustration TAG members had not yet received two pieces of information requested at TAG #2: the global warming potential factor PSE is using, and the percentage of leakage of methane as a percentage of methane delivered. Rob noted these numbers were requested so they can be compared to the Science Magazine study released on natural gas impacts on climate change. Keith explained the global warming potential factor used was the factor from AR4, meaning TAG members could use AR4 and the numbers provided in the upstream presentation materials to calculate the leakage of methane as a percentage of methane delivered. Keith also offered to provide a link to the PSCAA lifecycle spreadsheets mentioned earlier in the presentation. *Update since meeting: the links and other references are provided in the meeting notes as Appendix A. This will also be posted on [www.pse.com/irp](http://www.pse.com/irp) under "action items."*

Virginia Lohr expressed frustration that TAG members were being asked to calculate numbers the TAG requested at TAG #2. Keith asked for clarity on the percentage being asked for, and Virginia specified they would like the amount of methane leaked through the entire natural gas process as a percentage of methane delivered. Bill Donahue offered to work with Keith and members of the Vashon Climate Action Group to develop the percentage requested so Virginia could compare PSE's leakage rate with the scientific literature she mentioned.

### Next steps and action items

Irena reviewed the future planned meeting dates for the IRP process and the upcoming timeline for the distribution and finalization of meeting notes. PSE will distribute meeting notes on June 12. June 19 is the deadline for TAG attendees to provide comments on meeting notes to PSE. PSE will post the final meeting notes on the IRP website: [www.pse.com/irp](http://www.pse.com/irp) by June 26.

Don Marsh provided comments on the TAG meeting, expressing gratefulness to the Washington legislature for bringing PSE and environmental groups into better alignment with the passing of CETA. Don expressed a desire for increased transparency through the IRP process and better dialogues between PSE and community and environmental groups. Don noted the day's TAG meeting was one of the most hopeful and exciting meetings he has been involved in.

Virginia Lohr commented on the action items discussed at the start of the meeting and asked if the high impact value of the social cost of carbon will be used for the carbon scenarios and sensitivities. Irena responded PSE is including no fossil fuels beyond 2030 as a sensitivity instead, which goes further than the high impact value of the social cost of carbon. Virginia requested this point be made clear in the

meeting summary. *Update since meeting: Virginia Lohr also followed up with an email and PSE responded. This is provided in the meeting notes as Appendix B. This will also be posted on [www.pse.com/irp](http://www.pse.com/irp) under “action items.”*

Brian Grunkenmeyer requested to see an updated set of electric vehicle projections Phillip Popoff mentioned during the meeting. Brian would use these projections to compare and contrast the impact of increased efficiencies to the electric system.

### IRP comment period

No meeting attendees signed up for the comment period. After a final call for commenters, the meeting adjourned at 5 p.m.



## Appendix A: Additional resources concerning natural gas emissions, including GHGenies and GREET model links.

The PSCAA Lifecycle Assessment Calculations can be found on the “Current Permitting Projects” here: <https://www.pscleanair.org/460/Current-Permitting-Projects>

**Document Location:** The Final SEIS (and Appendices) can be accessed below. Hard copies of the FSEIS can be reviewed at the Agency office (office hours are 8am-4:30pm, Monday-Friday). Hard copies of the FSEIS can also be reviewed at all open branches of the Tacoma Public Library and at The Center at Norpoint (4818 Nassau Ave N.E.) in Tacoma. In addition, a limited number of complementary hardcopies or flash drives of the FSEIS will be made available from the Agency (while the supply lasts). Due to the size of the FSEIS, some appendices are only available electronically and can be downloaded at the link below. A limited number of flash drives containing the full document and appendices will be available by request at the Agency office.

- [Cover Letter and Notice of Availability of FSEIS](#)
- [Final SEIS Tacoma LNG](#)
- [FSEIS Appendix C4 Part 1](#)
- [FSEIS Appendix C4 Part 2](#)
- [LCA Calculations](#)

\*\*\*\*\*

GHGenius model downloads can be found here: <https://ghgenius.ca/index.php>

\*\*\*\*\*

GREET model downloads can be found here: <https://greet.es.anl.gov/>

\*\*\*\*\*

EPA Subpart W reporting forms can be found here:

<https://ccdsupport.com/confluence/display/help/Reporting+Form+Instructions>

[Subpart W Introduction](#)

[Onshore Production Facility Level Requirements \(98.236\(aa\)\(1\)\)](#)

[Facility Overview \(98.236\(aa\)\(2-11\)\)](#)

[Natural Gas Pneumatic Devices \(98.236\(b\)\)](#)

[Natural Gas Driven Pneumatic Pumps \(98.236\(c\)\)](#)

[Acid Gas Removal Units \(98.236\(d\)\)](#)

[Dehydrators \(98.236\(e\)\)](#)

[Well Venting for Liquids Unloading \(98.236\(f\)\)](#)

[Oil and Gas Well Completions and Workovers with Hydraulic Fracturing \(98.236\(g\)\)](#)

[Gas Well Completions and Workovers without Hydraulic Fracturing \(98.236\(h\)\)](#)

[Blowdown Vent Stacks \(98.236\(i\)\)](#)

[Atmospheric Storage Tanks \(98.236\(j\)\)](#)

[Transmission Storage Tanks \(98.236\(k\)\)](#)

[Well Testing \(98.236\(l\)\)](#)

[Associated Gas Venting and Flaring \(98.236\(m\)\)](#)

[Flare Stacks \(98.236\(n\)\)](#)

[Centrifugal Compressors \(98.236\(o\)\)](#)

[Reciprocating Compressors \(98.236\(p\)\)](#)

[Equipment Leaks \(98.236\(q,r\)\)](#)

[Offshore Petroleum and Natural Gas Production \(98.236\(s\)\)](#)

[Enhanced Oil Recovery Injection Pump Blowdown \(98.236\(w\)\)](#)

[Enhanced Oil Recovery Hydrocarbon Liquids \(98.236\(x\)\)](#)

[Combustion Equipment at Onshore Petroleum and Natural Gas Production, Onshore Petroleum and Natural Gas Gathering and Boosting, and Natural Gas Distribution Facilities \(98.236\(z\)\)](#)

Appendix B: Email dated June 2, 2019 from TAG member concerning clarification of an action item and PSE response dated June 5, 2019.

**From:** Virginia Lohr <lohr@turbonet.com>  
**Sent:** Sunday, June 02, 2019 8:37 PM  
**To:** Netik, Irena <irena.netik@pse.com>; Kvam, Michele <michele.kvam@pse.com>; Popoff, Phillip <phillip.popoff@pse.com>; Diane Adams (dadams@enviroissues.com) <dadams@enviroissues.com>  
**Cc:** Kevin Jones <kevinjonvash@gmail.com>; Scanlan, Kathi (UTC) <kathi.scanlan@utc.wa.gov>  
**Subject:** Carbon Impact Action Item

Irena,

At the TAG 6 meeting, I brought up Action item #2 on slide 5 about including carbon impact scenarios or sensitivities. I don't believe this item is completed, even though legislation now requires that PSE to use a mandated social cost of carbon. I do not believe the legislation prevents PSE from using a higher social cost of carbon value to understand what is possible under unlikely but potentially more catastrophic conditions.

I requested that the High Impact value for the social cost of carbon also be run as an additional scenario or sensitivity. During the meeting, you expressed that it did not seem necessary. Since the meeting, I have had additional time to review materials, and I ask that you reconsider your initial rejection of my request. Slide 5 lists PSE's action in response to the action item as: "PSE will model **various** carbon impacts" (emphasis added). Thus, this action item is not completed if PSE only uses a single value for the social cost of carbon. I again request that this action item not be considered complete, and that you consider running at least 1 sensitivity using the High Impact value.

Thanks again,

Virginia

--

Virginia Lohr  
[Citizens' Climate Lobby](#) Volunteer  
[lohr@turbonet.com](mailto:lohr@turbonet.com)

**From:** Netik, Irena  
**Sent:** Wednesday, June 05, 2019 9:07 AM  
**To:** Virginia Lohr; Kvam, Michele; Popoff, Phillip; Diane Adams (dadams@enviroissues.com)  
**Cc:** Kevin Jones; Scanlan, Kathi (UTC); Netik, Irena; IRP -- mail --  
**Subject:** RE: Carbon Impact Action Item

Virginia,

PSE is excited to work on the first Clean Energy Action Plan for the 2019 IRP and implement the Clean Energy Transformation Act (CETA). Our intention is to stay focused on the critical path work that ensures that we deliver on this goal. CETA brought exciting changes to Washington state, the IRPs and our work.

CETA lays out a direction for Washington state utilities to incorporate carbon impacts utilizing the social cost of carbon. We intend to follow the direction of the law. In addition, we are planning on modeling a sensitivity that eliminates all fossil fuels by 2030. Thank you for your request during the TAG #6 meeting and again in your email below. Your comments and PSE's direction will be reflected in the TAG #6 meeting notes.

We will keep Action Item #2 from TAG #6 open until the IRP book is filed.

Kind regards,

**Irena Netik**

Director, Planning & Analytics

**Puget Sound Energy**

10885 NE 4<sup>th</sup> Street, PSE09N

Bellevue, WA, 98004

**D:** 425.462.3671 **M:** 206.434.2336

[irena.netik@pse.com](mailto:irena.netik@pse.com)

[www.pse.com](http://www.pse.com)