Meeting Summary and Feedback Report

Integrated Resource Plan (IRP) Stakeholder Webinar on Gas Utility IRP: Inflation Reduction Act, final scenarios and gas alternatives, Conservation Potential Assessment (CPA) results, and Climate Commitment Act (CCA) pricing Summary.

Meeting Information

- Thursday, September 22 from 1-4 p.m.
- Virtual webinar hosted by PSE, facilitated by Triangle Associates
- Links to:
    - Meeting materials (e.g. hot sheet and presentations)
    - Meeting recording

Meeting Summary

Recap from August 24 Resource Adequacy Meeting

This information can be found on slides 7-8 of the presentation

- Phillip Popoff, PSE Director of Resource Planning Analytics, recapped the results and feedback from the August 24 Resource Adequacy Meeting:
    - IRP stakeholder participation in conservation planning.
    - Commitment to achieve 2030 Clean Energy Transformation Act (CETA) requirements.

Inflation Reduction Act Impacts

This information can be found on slides 9-10 of the presentation

- Jennifer Coulson, PSE Manager of Operations and Gas Analysis, provided an overview of how the Inflation Reduction Act (IRA) will impact the PSE gas utility:
    - IRA expands Production Tax Credit (PTC), Investment Tax Credit (ITC), and renewable technologies.
    - For 2023, the Gas Utility IRP will include PTC.
    - For future IRP cycles, the Gas Utility IRP will include Methane Emissions Reduction Program, Energy Efficiency Home Rebates, and Alternative Fuel Tax Credit (AFTC).

Final Scenarios and Sensitivities

This information can be found on slides 11-16 of the presentation

- Jennifer Coulson, PSE Manager of Operations and Gas Analysis, addressed results from the March meeting including scenarios and sensitivities for the IRP portfolio and analysis. She provided updates on the following:
    - Climate Commitment Act (CCA) rules released.
    - Clarifications and incorporation of stakeholder feedback.
- Input components considered for scenario development: traditional and decarbonization factors.
- Jennifer provided additional details regarding the 2023 Gas IRP scenarios and sensitivities.

2023 Gas IRP: Conservation Potential Assessment Results

This information can be found on slides 17-41 of the presentation

- Aquila Velonis, Senior Associate at Cadmus Group, presented the results of the Energy Efficiency Potential study and covered the following topics:
    - Comparison of 2021 Conservation Potential Assessment (CPA): Cumulative Achievable Technical Potential (MMTherm), Vulnerable Population Potential, Top Residential Measures, Top Commercial and Industrial Measures.
- Aquila provided an overview of the Gas to Electric Conversion:
    - Alternative supply curves, technologies, and hybrid/back-up assumptions.
    - Adoption supply curves, impact on the baseline forecast, and added peak demand.
    - Potential results of scenarios.

Final Climate Commitment Act Pricing and Gas Alternatives

This information can be found on slides 43-56 of the presentation

- Gurvinder Singh, PSE Consulting Energy and Resource Planning Analyst, provided updates on CCA:
    - Allowance pricing forecast, annual carbon price adders, natural gas and carbon price assumptions, carbon price scenarios.
    - Resource alternatives in supply and demand
    - Emerging renewable fuel options: Green Hydrogen and Renewable Natural Gas (RNG)
- Steve Schueneman, PSE Hydrogen Development Manager, provided an overview of green hydrogen:
    - Hydrogen hub, Inflation Reduction Act (IRA) impacts, pilot projects, research and development, and price assumptions.
- Bill Donahue, WFD Consulting, discussed a map of PSE's gas transportation system including pipeline and peaking resources, and shared details regarding:
    - Portfolio of pipeline capacity renewals and energy efficiency
    - RNG in the 2023 Gas Utility IRP and Attributes

Next steps:

Sophie Glass closed the meeting and shared the next steps for the IRP stakeholder feedback process.

- September 26: A recording and transcript of the chat will be available.
- September 29: Feedback forms are due.
- October 20: A feedback report of comments and summary will be posted to pse.com/irp

Feedback Report

The following table records the IRP stakeholder unanswered questions and PSE responses from the Gas Utility IRP discussion with IRP stakeholders and the meeting's feedback form. Meeting materials are available on the project website.

Date	Stakeholder	Comment	PSE Response
9/22/22	Kelly Hall	Are you not doing any sensitivities on the SES scenario?	We currently do not plan on running sensitivities on the SES scenario. Please see answer #3 below for more detailed information.
9/29/22	Kelly Hall, Brad Cebulko; Climate Solutions	Climate Solutions appreciates the opportunity to comment on the September 22, 2022, Gas Utility IRP Stakeholder presentation. As Puget Sound Energy looks towards innovating the gas sector and meeting state policy goals, it is important that the Company develop an accurate and viable Integrated Resource Plan. Consequently, the Company must ensure that their modeling approach, resource scenarios, and assumptions accurately reflect the conditions and evolutions of the gas sector. We address four areas of PSE's Integrated Resource Plan that we believe need to be developed and refined before the Company issues it draft Gas IRP and draft Electric IRP Update. **1. The Gas IRP needs to account for the impacts of the Inflation Reduction Act (IRA)** Consistent with our comments on the September 13, 2022, IRP presentation, we are concerned that PSE is not accounting for all of the impacts of the IRA. In particular, the impacts to the electric and natural gas load forecasts, electric demand-side resources, and gas to electric conversions. First, the Company has indicated that it will not be applying IRA impacts to some demand-side resources, such as energy efficiency appliances. During the meeting, PSE agreed with a statement that because the IRA will not affect the total conservation potential available, it is thus not important to account for the impacts to conservation measures. However, even if the total conservation potential remains unchanged, the IRA will undoubtedly accelerate the adoption of energy	**1.** Thank you for your comment. As discussed in the stakeholder meetings on September 13 and 22, 2022, PSE is unable to incorporate the IRA into the conservation potential because the rules for the IRA are not currently developed. Therefore, the impact on the CPA is unknown. The full impacts of the IRA will be incorporated in future IRP cycles.

Date	Stakeholder	Comment	PSE Response
		efficiency. In the immediate term, including the time period in which PSE will set its conservation targets, there will be an increase in the adoption of conservation measures that must be accounted for to develop an accurate IRP. **2. PSE needs to account for the impacts of building electrification to its natural gas load forecast** We are disappointed that the Company is falsely accounting solely for the increase in electric load caused by building electrification measures, such as heat pumps, and not the decrease in natural gas load. During the September 22, 2022, stakeholder presentation, PSE's consultant Cadmus acknowledged that its gas-to-electric assessment[1] did not account for the impacts to the Company's natural gas load forecast, both in its gas-only and combination service territories, from the impacts of customers who convert their heating from gas to heat pumps. As we identified in our Demand Forecast comments from the July 12, 2022, when the customer switches to an electric heat pump, this impacts both the electric and gas demand. PSE needs to modify its natural gas load forecasts to properly account for the load impacts of building electrification. **3. PSE should develop an alternative reference case based on the State Energy Strategy accompanied by a portfolio of sensitivities** We recommend that PSE develop a portfolio of sensitivities based off the State Energy Strategy (SES) Scenario. The SES is a blueprint for how the state can reduce its greenhouse gas (GHG) emissions to achieve its GHG emissions goals. We appreciate that the Company intends to include a SES scenario, The Company should also include a handful of sensitivities that will help evaluate the optimal resource portfolio and potential	**2.** Thank you for the opportunity to clarify; it appears our response in the meeting was unclear. The electrification scenario will have an impact on both the electric and gas demand forecast. The reduction on the gas demand forecast and increase on the electric demand forecast will be modeled through their respective portfolio models. These impacts are being added/subtracted from their respective demand forecasts. Both the electric and the gas results will be published in the gas IRP. **3.** The emission goals from the SES reflect state level targets; this is not specific to the gas utility. Therefore, PSE will not be running multiple scenarios and/or sensitivities pertaining to the SES. In contrast, the Climate Commitment Act is taking the work from the SES and making it gas utility specific as referenced in RCW 70A.65.005. PSE believes scenarios and sensitivities evaluating the various impacts of the CCA will provide greater insight for PSE's customers. One of the

Date	Stakeholder	Comment	PSE Response
		costs, such as the allowance prices, the renewable fuel source location, and the gas prices. Climate Solutions would welcome a more robust discussion on the appropriate sensitivities to include.	sensitivities is evaluating the free allowance line, which is essentially an emission reduction target.
		4. PSE presupposes adoption of certain technologies in the Gas IRP We appreciate that PSE has agreed to include cold weather and ground source heat pumps in its IRP. However, we remain concerned with PSE's hybrid heat pump scenarios and the reliance on hybrid heat pumps. The Company is presupposing the adoption of hybrid heat pumps without considering other customer choices and adoption of other technologies. It is concerning that PSE is forcing the adoption of a technology without any guarantee that their assumptions are reflective of customer choices and preferences. The reality is that customers may or may not decide to use hybrid heat pumps. Forcing the adoption of hybrid heat pumps into the Company's analysis, severely restricts the Company's analysis and prevents the Company from properly evaluating technology adoption impacts.	**4.** As you noted in your comments, PSE is evaluating the impact of cold weather, ground source and hybrid heat pumps in the gas IRP. The reference case will be able to choose from all three options based on costs. Other scenarios are exclusively focused on electric heat pumps (which would include cold weather and ground source) while others are focused on hybrid heat pumps. The future regarding technology choices driven by codes or customer choice is not known. As such, it is appropriate to evaluate all of these alternatives in this gas IRP.
		5. The Company may not be sufficiently accounting for renewable natural gas (RNG) and hydrogen limitations in its IRP. The Company should include a carbon emissions abatement cost curve in its IRP. PSE is engaging with several project developers to invest in emerging renewable fuel options, including landfill and livestock RNG and green hydrogen. These investments and engagements indicate that PSE intends to rely heavily on RNG and green hydrogen to meet Climate Commitment Act (CCA) requirements. However, we are concerned that it may not be	**5.** Thank you for your comments regarding RNG and green hydrogen availability. PSE is committed to evaluating all decarbonization measures for our customers, which includes alternative fuels such as RNG and green hydrogen. PSE will be producing a carbon abatement curve as part of this IRP cycle.

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		realistic to expect to use these resources in high volume to meet CCA requirements, as these alternatives have significant technical and economic limitations. Regarding RNG, the 2018 Washington state RNG Inventory Study identified a RNG production equivalent of 3 – 5 percent of current natural gas consumption in Washington, at a price of $20-$30/MMBtu.[2] Even the more optimistic American Gas Association Study conducted by ICF, which PSE indicated that it is relying on for estimating RNG potential, identified only a limited potential of RNG as a replacement for traditional fossil gas. In an assessment of the ICF study, the Natural Resources Defense Council concluded that the ICF study could only sustainably replace only 3-7% of natural gas consumption in 2019.[3] Moreover, gas distribution utilities are not the only industries that demand RNG. At this time, the vast majority of RNG is used in the transportation sector to comply with the California and Oregon Low Carbon Fuel Standards and the federal Renewable Fuel Standard. As of May 2022, the average California LCFS credit price was $125/credit, with a three-year high in 2019 of $192/credit.[4] Depending on the quality of RNG, landfill gas can often qualify for the higher value D3 RIN, which has been trading for a price of around $3.20/RIN since the beginning of 2022.[5] As a PSE employee acknowledged during the meeting, the value for RNG for compliance with transportation policies greatly exceeds the estimated value of RNG for compliance with the Climate Commitment Act. It will be important for PSE to acknowledge in the IRP the limited technical and economic potential of RNG, the competing demand for RNG, and its relative ability to reduce the Company's emissions for achieving the state GHG emissions reduction requirements. At a minimum, these considerations must be incorporated into price assumptions for RNG.	

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		Although green hydrogen does not face the same technical limitations as RNG, there are economic limitations of hydrogen currently. Like RNG, the emissions-free attributes of green hydrogen are in high demand from industries that want or need to decarbonize but are harder to electrify. As PSE identified in its presentation, the present cost of hydrogen is relatively high as compared to alternative resources. Moreover, the highest value of green hydrogen will be in hard to decarbonize sectors of the economy, such as industry and aviation, that are hard to electrify. Residential and commercial heating, on the other hand, have relatively low costs to electrify.[6] We are not confident that RNG and hydrogen will be used in great quantities for decarbonizing the natural gas distribution systems. In its IRP, the Company should include a PSE-specific greenhouse gas emissions abatement supply-curve that identifies the cost of each abatement measure (e.g., landfill gas RNG, anerobic digestion RNG, green hydrogen, residential electrification) and the potential for at each cost bundle. _22 Thank you for the opportunity to comment and we look forward to continuing to work with PSE on the 2023 Gas IRP and 2023 Electric IRP Update. Best, Kelly Hall, Washington Director, Climate Solutions Brad Cebulko, Manager, Strategen Consulting [1] Slide 27. [2] https://www.commerce.wa.gov/wp-content/uploads/2019/01/Energy-Promoting-RNG-in-Washington-State.pdf	

Date	Stakeholder	Comment	PSE Response
		[3] https://www.nrdc.org/experts/merrian-borgeson/report-renewable-gas-pipe-dream-or-climate-solution [1] https://ww2.arb.ca.gov/sites/default/files/2022-06/May%202022%20-%20Monthly%20Credit%20Transfer%20Activity_0.pdf [2] RIN trades and Price Information. *See* https://www.epa.gov/fuels-registration-reporting-and-compliance-help/rin-trades-and-price-information. Last checked on 7/13/2022. [3] https://rmi.org/all-electric-new-homes-a-win-for-the-climate-and-the-economy/	

Stakeholder Requests from September 22 Meeting

Request	PSE Response
Provide information on whether sensitivities will be conducted for the Electrification - State Energy Strategy (SES) scenario.	PSE is not conducting sensitivities for the Electrification SES scenario. Please see feedback report above for more detailed information.
Provide the heat pump survey as distributed from the Cadmus study.	PSE is working with Cadmus Group to provide additional information to stakeholders about the 2022 residential heat pump survey
Provide the source for the technical and economic potentials for RNG in Washington and in North America.	Please see feedback report above for more detailed information.

Attendees (alphabetical by first name)

1. Alondra Regalado
2. Amy Wheeless
3. Billy Hetherington
4. Bradley Cebulko
5. Court Olson
6. Derek Patches
7. Don Marsh
8. Gamze Gungor Demirci
9. Jennifer Snyder
10. Joel Nightingale
11. Kelly Hall
12. Nancy Shimeall
13. Rick Kunz
14. Stephanie Chase
15. Vassilisa Rubtsova
16. Virginia Lohr
17. Willard Westre

Puget Sound Energy Staff Observers (alphabetical by first name)

1. Alexandra Karpoff
2. Allison Jacobs
3. Bill Donahue
4. Bob Williams
5. Brett Rendina
6. Cindy Vu
7. Corey Corbett
8. Douglass Hart
9. Elizabeth Hossner
10. Garret LaBove
11. Gurvinder Singh
12. Hannah Wahl
13. Jennifer Coulson
14. Jennifer Magat
15. Jesse Durst
16. Jessica Zahnow
17. Kasey Curtis
18. Kelly Xu
19. Lorin Molander
20. Marc Alberts
21. Mark Lenssen
22. Meredith Mathis
23. Michelle W.
24. Nathan Critchfield
25. Nick Gemperle
26. Phillip Popoff
27. Renchang Dai
28. Roxana Vilchis
29. Sara Leverette
30. Steve Schueneman
31. Tyler Tobin

Consultant Staff (alphabetical by first name)

1. Aquila Velonis (Cadmus)
2. Claire Moerder
3. Kim Zamora Delgado
4. Seth Baker
5. Sophie Glass
6. Will Henderson