

From: [Kelly Hall](#)
To: [UTC DL Records Center](#)
Cc: [Vlad Gutman-Britten](#)
Subject: Climate Solutions comments on UE-160918 and UE-160919
Date: Thursday, February 22, 2018 3:51:16 PM
Attachments: [UE-160918, UE-160919 Climate Solutions Comments.pdf](#)

Dear Records Center,

Please find attached comments from Climate Solutions on UE-160918 and UE-160919, Puget Sound Energy 2017 Integrated Resource Plans for Electricity and Natural Gas.

Sincerely,

Kelly Hall

Kelly Hall | Policy Manager
[Climate Solutions](#) – Accelerating Clean Energy Solutions to the Climate Crisis
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February 22, 2018

**Steven V. King
Executive Director and Secretary
Washington Utilities and Transportation Commission
P.O. Box 47250
1300 S. Evergreen Park Drive S.W.
Olympia, WA 98504-7250**

Re: Comments of Climate Solutions on Puget Sound Energy 2017 Integrated Resource Plans for Electricity and Natural Gas, Dockets UE-160918 (electricity) and UG-160919 (natural gas)

Dear Mr. Steven King,

Climate Solutions appreciates the opportunity to provide comments on docket UE-160918 and UG-160919, Puget Sound Energy 2017 Integrated Resource Plans for Electricity and Natural Gas. Climate Solutions is a Northwest-based clean energy nonprofit advocacy organization with the mission of accelerating clean energy solutions to the climate crisis. The Northwest has emerged as a center of climate action, and Climate Solutions is at the center of the movement as a catalyst, advocate, and campaign hub. For 20 years, we have cultivated political leadership in the Northwest for the proposition that clean energy and broadly shared economic prosperity go hand-in-hand, building a powerful constituency for local and state action on climate change.

Changes in the climate have already led to increased extreme and unusual weather in Washington that is likely to become worse over time. In 2017, Washington experienced forest fires that led to people's homes burning down and falling ash in many parts of the state, precipitated by record heat and dryness, which poses additional challenges to water security and the agricultural sector. Sea level is projected to continue rising, putting Washingtonians at increased risk of floods, and warmer seas have negatively impacted our salmon and the fishing industry that depend on them. Without an intentional focus on economy-wide deep decarbonization, we are likely to experience irreversible impacts that may pose significant threats to our public health and economy.

Utilities are the foundation of solving the climate crisis, and Puget Sound Energy's (PSE) Integrated Resource Plan (IRP) is one of the most important planning documents to set the direction for Washington's clean energy future. Climate Solutions supports the near-term direction of PSE's 2017 IRP, and appreciates the company's strong emphasis and prioritization of clean energy resources. Prioritizing energy efficiency, renewable energy, and energy storage provides an opportunity for PSE to delay, and potentially eliminate the need for, new investments in fossil fuel resources that pose economic risks to its customers. However, we have concerns with the company's long-term plan for meeting peak demand with fossil fuel resources, and do not believe the company is fully considering the risks that fossil fuel investments pose.

Preferred Action Plan

Climate Solutions is enthusiastic about the changes in PSE's 2017 IRP resource outlook, compared to the resource outlook in the 2015 IRP. The cost of solar photovoltaic generation and battery storage technologies have declined significantly since the company's previous IRP, providing an opportunity to delay short-term plans for new fossil fuel infrastructure. Prioritizing clean energy and delaying risky fossil fuel investments allow additional time for technological change, lower costs for clean energy resources, and a better understanding of the potential for climate legislation being contemplated in the Washington State Legislature. We believe PSE's short-term plan to prioritize clean energy resources instead of fossil fuel resources protects the company's customers and aligns with the state's vision of a decarbonized future.

However, PSE's twenty-year forecast includes over 1900 megawatts of investments in fossil fuel gas plants. Gas plants have a useful life of approximately thirty years (or more), raising concerns about the risks for customers with such long-term investments in fossil fuels. Washington State recently commissioned a Deep Decarbonization Pathways study to identify pathways for reducing Washington's greenhouse gas emissions by 80% by 2050.¹ The study demonstrated that Washington must nearly eliminate emissions from the electricity sector by 2050, with approximately 98% of all electricity generated from non-fossil sources by 2050. Because of electricity's growing energy role in a low-carbon economy, failure to achieve these reductions in the power sector will put Washington greenhouse gas ambitions out of reach. Capital investments in new gas infrastructure exposes customers to significant regulatory risk and fuel price volatility risk, while hindering the development of new emerging technologies that can address peak demand without greenhouse gas emissions. Long-term commitments to gas would lock in carbon emissions and methane emissions that preclude achieving the state's science-based climate goals, which must be considered in utility planning processes. In the 2019 IRP, Climate Solutions recommends that PSE more adequately consider the risk of fossil fuel resources and stranded assets, and prioritize carbon-free resources for meeting future peak demand.

Carbon Price Assumptions

As preferences for clean energy continues to grow and Washington prioritizes decarbonization strategies, incorporating a carbon adder into IRPs can help mitigate risks associated with fossil fuel resources. In response to PSE's 2013 IRP, the Commission provided guidance that PSE include in the base scenario a non-zero cost of CO₂ emissions.² Because the base case scenario underlies all other scenarios and sensitivities, it is critical that the base case reflect the most accurate assumptions, to the extent possible. Climate Solutions agrees with the Commission that not having a carbon adder applied in the base case would fail to adequately incorporate costs and risks associated with resources that emit greenhouse gases.

¹ Evolved Energy Research: Deep Decarbonization Pathways Analysis for Washington State. 2016. http://www.governor.wa.gov/sites/default/files/Deep_Decarbonization_Pathways_Analysis_for_Washington_State.pdf

² Commission acknowledgement letter on PSE 2013 IRP, Attachment A, UE-120767.

In PSE's 2017 IRP, the base case scenario incorporated a carbon adder based on Washington's Clean Air Rule (CAR) and the federal Clean Power Plan (CPP). Washington's CAR is a multi-sector greenhouse gas regulation that requires annual greenhouse gas reductions from the largest emitting facilities in Washington, and the CPP is an electric-sector only federal law that requires greenhouse gas reductions from baseload generating facilities. Both of these regulations inherently apply a carbon adder, but because the way the laws are structured, a carbon adder is not uniformly applied to all of PSE's generating facilities. The CAR, which PSE assumed would be in effect on the electric sector until 2022, would only apply to large emitters that are physically located in Washington State. The CPP, which would replace the CAR as an electric-sector regulation in 2022, would apply to both in-state and out-of-state resources, but only on baseload generation. Using the CPP as an assumption for a carbon adder fails to incorporate any cost of carbon emitted from peaking facilities, which is the primary resource that PSE projects to use for meeting peak demand in long-term forecast. Due to the shortfalls of these two regulations, the base case scenario fails to incorporate any risk of new investments in peaking place by omitting a carbon adder for those resources. Because of this, Climate Solutions believes the base case scenario in PSE's 2017 IRP fails to truly incorporate a non-zero cost of carbon on all resources, and therefore does not meet the Commission's guidance from 2013.

Climate Solutions is also concerned about the transparency in how PSE is applying a carbon adder in the base case. Because the public and other stakeholders are less informed about the details of the CAR and CPP regulations, the assumption that the base case includes a carbon adder is misleading. For example, in Chapter 6, PSE examines the potential costs and benefits of an early retirement for Colstrip Units 1&2 and Colstrip Units 3&4, with and without the base case carbon assumption. The results of the analysis indicate that retiring Colstrip Units 1&2 in 2018 is not cost-effective, adding an additional \$30 million in costs. However, this result is misleading because the carbon assumption that PSE applies between 2018-2022 has no impact on out-of-state generation, therefore omitting any financial impact on Colstrip. Applying a uniform carbon price adder to all four Colstrip Units beginning in 2018 would likely lead to very different economic results. Climate Solutions recommends that PSE clarify the assumptions in Chapter 6 in order to increase transparency around the results of the Colstrip retirement analysis.

When applying a carbon adder to all facilities that emit greenhouse gases, it is critical that the adder adequately reflect projected costs associated with emitting resources. In 2014, Governor Inslee signed Executive Order 1404, which requires public acquisition processes for buildings and vehicles to consider the cost of greenhouse gas emissions. In considering emissions, state agencies are directed to use the social cost of carbon as identified by the EPA in its technical support document from 2013.³ Climate Solutions recommends that utilities adhere to the same recommendations when considering resource choices, and apply the social cost of carbon pollution in the base case scenario to reflect potential costs and risks.

It is also important to note that all greenhouse gas contribute to climate change, regardless of whether the emissions occur during extraction, transport, or combustion, and should be reflected in the carbon adder. Rather than limiting the cost of greenhouse gases to emissions from combustion, PSE should also factor in emissions from methane leakage in both the electric and

³ Washington State Energy Office Recommendation references the 2013 Technical Support Document, which was updated in 2016: https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf

gas sectors. Methane is the primary component of natural gas and has a global warming potential 80 times stronger over a 20-year timeframe. Research has estimated leakage rates throughout the natural gas supply chain to be equal to about 2.55%⁴, a volume that approximately doubles the emissions intensity of gas generators.⁵ Applying the cost of greenhouse gases only at the point of generation fails to fully capture the cost and risk of emissions and new regulatory frameworks for fossil fuel gas. While no investments in fossil fuels are forecast over the next three years, gas plays a large role in addressing peak demand long-term in PSE's 2017 IRP. Climate Solutions strongly encourages PSE to more fully incorporate the costs of greenhouse gases, both at the point of generation and throughout the supply chain, and prioritize clean energy options for meeting new capacity needs.

State, Local, and Business Climate Policy

Current IRP rules require that utilities consider state and federal public policy preferences. Economic impacts of existing state and federal policies are considered in PSE's IRP, however, the legislative intent and increasing preference for clean energy resources is often overlooked. Climate policies and greenhouse gas laws provide strong intent from our governing body that utilities in Washington should strive to reduce greenhouse gas emissions at the lowest reasonable cost. In 2016, Washington commissioned a Deep Decarbonization Pathways study, identifying pathways for Washington to reduce greenhouse gas emissions by 80% below 1990 levels in order to align with the most recently available science. Under the electrification scenario, the analysis showed that the state's share of energy from electricity will grow, making up a significantly larger share of Washington's energy use over the next three decades, while aggressively reducing greenhouse gas emissions until the electric sector is nearly carbon-free. In order to achieve deep decarbonization and avoid the risk of stranded assets, Washington must prioritize non-emitting facilities and avoid investments in new fossil fuel resources, to the extent possible, to avoid unnecessary risks.

In RCW 70.235, the legislature put into law a requirement that the state reduce greenhouse gas emissions to 1990 levels by 2020, 25% below 1990 levels by 2035, and 50% below 1990 levels by 2050. Neither PSE's electric sector, nor gas sector, is on track to meet the greenhouse gas limits established in law. At a minimum, PSE's IRP should plan to meet the greenhouse gas limits in order to comply with Washington law. In 2016, the Department of Ecology submitted a report to the legislature recommending updated greenhouse gas limits of 40% below 1990 levels by 2035 and 80% below 1990 levels by 2050. These recommendations by Ecology are consistent with the most up-to-date science, and will potentially be adopted as Washington's States updated limits. Because the updated limits are not currently in state law, Climate Solutions recommends that PSE incorporate the existing state greenhouse gas limits into the base case scenario for planning, and additionally model a scenario to reflect meeting Ecology's recommendation for updated greenhouse gas limits.

Cities and counties in Washington have also adopted policies to limit greenhouse gas emissions, increase renewable energy penetration, and increase rates of transportation electrification. King County has a goal of achieving 90% renewable energy to serve the county; the Mayor of

⁴ Berkeley Earth, <http://static.berkeleyearth.org/memos/Brandt-Memo-Final.pdf>

⁵ Sanchez and Mays, *Climactic Change*, 2015: <https://link.springer.com/article/10.1007/s10584-015-1471-6>

Olympia has made a pledge to 100% clean energy; and the City of Kirkland has adopted a greenhouse gas emission reduction goal of 80% below 1990 levels by 2050. PSE also acknowledges that long-term growth in its electric system will be driven by large companies, such as Microsoft, Amazon, Costco, REI, Boeing, and Starbucks. All of these companies have strong sustainability goals, with Amazon and REI already committing to 100% renewable energy, and many others have contracted with PSE to increase renewable energy through its Green Direct program. PSE's largest customers, both businesses and local governments, have a strong desire for clean energy. We appreciate PSE's efforts to offer customers a product for clean energy, but also believe all PSE customers should be able to benefit from consuming clean energy. State policies, local government policies, and customers' increasing desire for clean energy should not be overlooked. These changing preferences should be reflected in the utility IRP process because not doing so creates a risk that customers will pursue alternative options for procuring clean energy, which could negatively impact PSE and its customers.

Resource Cost Assumptions

With an IRP planning cycle of two years, the costs of emerging technologies are likely to decrease significantly between the time that resource cost assumptions are finalized and the time that the company concludes its modeling. According to a new International Renewable Energy Agency report, all types of clean energy will fall within the cost range of fossil fuels over the next two years, and that cost reductions are set to continue through 2020.⁶ Wind energy costs have declined by 90% since the 1980s⁷ and installed solar costs have declined by over 50% since 2010.⁸ With such rapid declines in cost over a short period of time, having the most updated assumptions for resources is critical when evaluating various scenarios in an IRP.

Transparency around renewable resource costs

Numerous stakeholders expressed concerns regarding PSE's resource cost assumptions in the 2015 IRP, and stakeholders continued to have concerns on the cost assumptions in the 2017 IRP. During the stakeholder process, PSE originally presented thermal resource costs based on a study from Black and Veatch, but presented renewable resource cost assumptions with very little transparency regarding the source of the assumptions. Stakeholders raised concerns that PSE assumed the lowest reported cost for thermal resources, but selected renewable energy resource costs that were above the market average. After significant pushback from the advisory group, PSE agreed to update the assumptions and hire the consultant DNV-GL, a firm that specializes in renewable resource cost assumptions. We thank PSE for undergoing additional analysis on the resource cost assumptions, and believe that it provided a more accurate depiction of the resources available to the company.

However, we remain concerned that thermal and renewable resources are not being compared in a consistent manner. PSE adds 30% to resource costs to incorporate owner's costs, and claims

⁶ International Renewable Energy Agency: Renewable Energy Generation Costs in 2017: https://cms.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018_summary.ashx?la=en&hash=BF612908692C1CC73C2D97D19C971E7B34F94742

⁷ <http://www.awea.org/falling-wind-energy-costs#CostofWindEnergy>

⁸ Lawrence Berkeley National Lab, Utility-Scale Solar 2015: An Empirical Analysis of Project Cost, Performance, and Pricing Trends in the United States, 2015.

that the resource costs represent the total cost to deliver a resource to customers, including plant, siting, sales tax, system upgrades and financing costs. Because the two consultants may have used different methods to calculate their total resource cost assumptions, it remains unclear what exact costs were intended to be incorporated into owner's costs, and whether or not double-counting of the costs occurred in the final cost assumptions. In the 2019 IRP, Climate Solutions recommends using third party consultants for both renewable and thermal resources, and further identifying what is included in the 30% adder for owner's costs.

When possible, we also recommend that PSE use cost assumptions that reflect local projects when available. PSE assumes a \$2400/kw-year cost of pumped storage based on national averages, but as National Grid highlights, these cost assumptions are significantly higher than the projected cost of two projects that are currently being analyzed in the Pacific Northwest. Given that pumped storage is likely to play a valuable role in deep decarbonization of the grid, we encourage the company to update assumptions in the 2019 IRP based on local project and further evaluate pumped storage as a viable capacity resource.

Learning cost curves

There are understandable challenges in accurately estimating the projected cost of emerging technologies, but applying an adequate learning curve for emerging technologies can help safeguard against assumptions based on outdated data. With the expanding penetration of renewable energy, advances in battery storage, and increasing pressure to reduce fossil generation, the cost of clean energy continues to decline rapidly. PSE applied declining cost curves to resources based on the Energy Information Administration's Annual Energy Outlook in their resource cost assumptions. Climate Solutions appreciates the intent in using a declining cost curve, but highlights that the Annual Energy Outlook projection for emerging technologies has historically underestimated price reductions.⁹ In future IRPs, we recommend that PSE consult with a third party that specializes in renewable energy costs and learning curve trends over time to have a more accurate projected cost assumption.

Battery storage technologies have also fallen more rapidly than predicted, and costs are likely to continue declining, especially with strong transportation electrification efforts that use similar technologies. Climate Solutions recommends that PSE also consider using a more rapid cost decline curve for battery storage, as well as consider second-use batteries as a low-cost distributed storage option. After a battery no longer meets the requirements necessary to power an electric vehicle, up to 80% of the battery capacity remains, and Bloomberg Energy Finance projects that approximately 95 gigawatt-hours of lithium-ion batteries may come out of cars by 2025. This creates an opportunity for aggregating recycled batteries from electric vehicles or other electric fleets as a potentially cost-effective option for utility-scale or distributed storage. Rather than limiting the analysis to the costs of new batteries designed especially for utility-scale storage, we recommend that PSE expand its analysis to include assumptions around the cost and characteristics of second-life batteries as a deployment option.

⁹ Gilbert, Alexander and Benjamin Sovacool. Looking the wrong way: Bias, renewable electricity, and energy modelling in the United States. 2015.

Montana transmission

Climate Solutions strongly supports recommendations from other advisory group members to treat the Colstrip Transmission System and the Montana Intertie as a sunk cost when evaluating the cost of resources from Montana. PSE included all transmission costs into the cost assumptions for Montana wind, but failed to acknowledge that PSE will pay for the transmission rights regardless of continued Colstrip operations. This issue was raised numerous times by Climate Solutions and other stakeholders during the IRP process, highlighting the existence of additional capacity on the transmission line when Colstrip 1&2 retire. Despite the fact that PSE has had excess transmission capacity in the past, PSE declined to run a sensitivity including this assumption, but instead ran a tipping point analysis for Montana wind. We appreciate the tipping point analysis, but recommend that PSE acknowledge the possibility that the Colstrip transmission may be a sunk cost, should there be no other user for capacity on the transmission line. PSE treats this line as an opportunity cost in the IRP, but it is not clear that the same logic applies with other assets, such as the development rights to the Lower Snake River Wind Project.

Capacity Credit

As in previous IRPs, PSE modeled utility scale solar PV assuming 0% capacity credit. PSE justifies this assumption based on being a winter peaking utility, and that the winter peak load hour is after the sun has set and solar is not contributing firm capacity without being paired with storage. However, the National Renewable Energy Laboratory identified operational capacity value and system adequacy capacity value as measures of analyzing how various resources can contribute to capacity needs. Operational capacity value seeks to determine how much capacity a variable generator will produce on a certain date or time, and system adequacy capacity value seeks to determine whether there is enough installed capacity in a certain year to reliably serve load.¹⁰ Even if a resource is not generating energy during peak demand hour, that resource may still contribute to resource adequacy. Moving forward, Climate Solutions recommends that PSE explore additional measures for how solar and other renewable resources can contribute to capacity, both operationally and in terms of system capacity.

Modeling Storage

In 2016, the Commission issued a policy statement and opened an investigation on the challenges and opportunities for energy storage modeling for Washington utilities, encouraging utilities to model the full range of capabilities and value that storage resources may provide. For the 2017 IRP, PSE invested in a new model, PLEXOS, that has the capability of modeling storage on a subhourly basis. The 2017 IRP incorporates PLEXOS into the planning process and drastically improves PSE's evaluation of storage, and we appreciate PSE moving forward with a model that has more granular capabilities. We acknowledge the complexity of subhourly modeling, but note the long-term benefits with more granular modeling tools, including more accurate modeling of renewable energy integration and other valuable services that may be left unrealized with traditional models.

¹⁰ Utility Variable-Generation Integration Group, Capacity Value of Variable Generation, June 2014, Slide 3, www.uwig.org/shortcourse2014/Session-6-Milligan.pdf

In the future, Climate Solutions would like to PSE continue to improve modeling capabilities and consider broader electrification infrastructure as an additional type of storage resource. As technology improves, vehicle-to-grid integration may reveal similar benefits as utility-scale battery storage through enabling demand-side management programs, providing ancillary services, and an opportunity for load-shaping. If planned in a proactive way, transportation electrification can be a significant opportunity for reducing emissions in the transportation sector, while also enhancing grid reliability and acting as a storage resource.

Distributed Energy Resources and Infrastructure

Rooftop solar, energy efficiency, demand response measures, and electric vehicles are, and will continue to have, a major impact on the distribution system in the future. Declining distributed resource costs, paired with increasing customer demand for cleaner energy and cleaner air, penetration rates of distributed energy resources will likely continue rising. Successful integration of distributed energy resources is a key component of realizing the benefits that distributed resources can provide. While PSE currently incorporates changes in demand forecasts as a result of distributed solar and energy efficiency, the company has placed less of an emphasis on proactive planning for strategic deployment. PSE indicates a need for six to eight new substations because existing substations are projected to exceed load. Climate Solutions does not take a position on these particular substations, but does encourage PSE to proactively identify optimal locations in which distributed resources can yield benefits to the grid and avoid the need for new infrastructure. As distributed energy penetration continues to increase, benefits will be left unrealized without proactive planning from utilities.

General Comments and Process

In previous years, stakeholders have commented on the lack of communication and transparency in PSE's IRP process. Commenting on the 2015 IRP, the Commission encouraged PSE to continue using an outside facilitator to manage the advisory group meetings, to provide written responses to all advisory group questions submitted to the company in writing, and to provide minutes for each advisory group meeting.¹¹ Climate Solutions thanks PSE for the extra time and effort the company put into the 2017 IRP process regarding communication and process improvements. PSE continued to use an outside facilitator to manage the meetings, and additionally hired an internal process manager to manage questions and communication throughout the IRP process. PSE created a listserv specifically for IRP communications, which increased transparency around stakeholder questions and responses to those questions from the company.

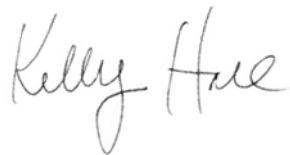
Although communication from the company improved, there are still remaining concerns that the company has agreed to address in order to facilitate more effective public engagement. One of the most common complaints from stakeholders is timeliness in distributing materials and information prior to advisory group meetings. The company often distributed materials only one day before the meeting, which prevented meaningful conversation and thoughtful stakeholder participation during meetings. Climate Solutions has communicated these concerns to the company, which has agreed to address the concern in the 2019 IRP cycle.

¹¹ Commission acknowledgement letter on PSE 2015 IRP, UE-141170.

Conclusion

Overall, Climate Solutions supports the near-term direction of PSE's 2017 IRP, but has concerns with the company's long-term plan for meeting peak demand with fossil fuel resources. As the state continues to focus on decarbonization strategies and renewable energy costs continue to decline, it is critical that PSE incorporate the risks that new fossil fuel investments pose to customers. Thank you for the opportunity to provide these comments, and we look forward to working with the Commission and PSE on improvements to the 2019 IRP.

Sincerely,

A handwritten signature in cursive script that reads "Kelly Hall".

Kelly Hall
Washington Policy Manager
Climate Solutions

A handwritten signature in cursive script that reads "Vladimir Gutman-Britten".

Vladimir Gutman-Britten
Washington Director
Climate Solutions