From:	Kate Maracas
To:	UTC DL Records Center
Subject:	UE-161024
Date:	Thursday, February 22, 2018 5:04:49 PM
Attachments:	180221 WGG Comments to PSE 2017 IRP.docx

Dear Staff, Please find enclosed the comments of Western Grid Group to the WUTC Dockets UE-160918 and UG-160919.

We very much appreciate the opportunity to provide comments to this important matter.

Kind regards,

Kate Maracas
Director,
Western Grid Group

February 22, 2018

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

Subject: Puget Sound Energy's 2017 Integrated Resource Plans,
Dockets UE-160918 and UG-160919

Dear Mr. King:

Western Grid Group is pleased to enclose for filing in the above-referenced dockets our comments to Puget Sound Energy's 2017 Integrated Resources Plans. We appreciate the opportunity to provide input in this matter.

Sincerely,

Kate Maracas
Director
Western Grid Group
7730 78th Loop NW
Olympia, AZ 98502
kate@westerngrid.net

(360) 688-1105 Direct
(602) 370-1089 Cell

Introduction: Western Grid Group

Western Grid Group (WGG) is a Public Interest Organization whose efforts are focused on developing plans, systems, rules and operations necessary to support a low carbon future. WGG works throughout the Western Interconnection (WI) on evolving grid operations to integrate and support clean energy, ensure markets and market services are built to improve electricity reliability, existing transmission systems are used more efficiently, and flexibility becomes a key planning and operations criterion.

Overview & Summary

In general, WGG commends Puget Sound Energy (PSE) for carrying out a robust and thoughtful Integrated Resource Planning process. We appreciate the numerous IRP Advisory Group workshops that PSE convened, the transparency of both stakeholder input and responses to their detailed questions. Overall, WGG finds PSE's resulting 2017 IRP document to be thorough, inclusive of prudent and low-risk resource alternatives throughout the 20 year planning horizon, and for the most part, compliant with IRP requirements as specified under the Washington Administrative Code (WAC) and Revised Code of Washington (RCW). WGG offers both some commendations and concerns about the IRP:

Some Key Positive Provisions of the IRP:

- PSE's current proposal to refrain from acquiring any fossil fuel resources until beyond 2024, and its accompanying view that this near term strategy will allow time to determine if technological advances in energy efficiency, demand response, energy storage and renewable resources can obviate the need for additional fossil-fuel peaking generation plants in the future.
- PSE's recognition of the increasing competitiveness of wind and solar resources.
- PSE's commitment to maintaining its participation in the Western Energy Imbalance Market (EIM), and to work with others in the region to explore options for PSE to join or to help develop functioning wholesale markets that incorporate, energy, capacity and flexibility services.
- The use of a robust scenario development process, as well as state-of-the-art power flow and security-constrained economic dispatch models.
- PSE's commitment to continued deployment of conservation and demand response as cost-effective solutions to near-term resource needs.
- PSE's commitment to helping advance energy storage technology by installing a small-scale flow battery to gain experience with the operation of this energy storage system in anticipation of greater reliance on flow batteries in the future.

Some Key Concerns about Provisions of the IRP:

- Outdated and conservatively high renewable resource cost estimates utilized in the modeling and planning processes.

Some Key Concerns about Provisions of the IRP, continued:

- Insufficient attention to impending carbon constraints and social carbon cost impacts to consumers.
- Insufficient recognition of the essential reliability services and flexibility that can be provided by (a) inverter-based renewable technologies, and (b) a "suite" of resources across aggregated distributed generation, transportation electrification, home and commercial heating/cooling storage, and other electric sectors.
- Unexplained limitations to future wind and solar procurement amounts; limited discussion of the effect of expected forward pricing curve reductions for renewables.
- Lack of information regarding provisions for closure of Colstrip Units 3 and 4 earlier than its planned retirement date of 2035, while the IRP findings indicate that the units could very well become uneconomic by 2025.
- Uncertainty in PSE's Action Plan that could allow PSE to adopt "rapid build" fossil resources in the near term as a market-risk mitigation alternative, without conducting a thorough, transparent, stakeholder process.

Current Landscape Relevant to this IRP

Because the IRP process requires a two year process, inevitably some of the starting assumptions about resource costs, technology advances, market conditions, regionalization, fracturing of the West's Reliability Coordinator, newly emerging seams issues, and other key variables can change dramatically between the start and conclusion of the process. WGG addresses the change in resource cost assumptions in the following sections.

In addition, WGG calls attention to the lack of recognition in PSE's IRP document of the value of essential reliability services and flexibility that can be provided by renewable energy resources. Recent research conducted by GE Consulting and updated by WGG in late 2017, as shown below.

		Synchronous Generation						Inverter-Based Generation			
		Coal	Natural Gas Simple Cycle	Natural Gas CC	CSP with Storage	Nuclear	Hydro	Grid Scale Wind	Grid Scale PV	Distributed PV	Distributed Battery Storage
Volt/VAR Control		5	5	5	5	5	5	5	5	1	1
Short Circuit Contribution		5	5	5	5	5	5	1	1	1	1
Frequency Control	Inertial Response	5	3	5	4	5	5	2	0	0	0
	Primary Frequency Response	3	2	3	4	0	5	1	1	0	1
	Regulation	4	5	5	5	0	5	2	2	0	4
	Load Following Ramping	3	5	5	5	0	4	2	2	0	4
	Spinning Reserve	3	5	5	5	0	5	2	1	1	4
Short Term Fuel Availability		5	4	4	4	5	4	2	2	1	3
Long Term Plant Availability		4	4	4	4	5	5	4	4	2	2
Black Start		2	4	4	4	0	5	0	0	0	0

Sources: GE: Contributions of Supply and Demand Resources to Required Power System Reliability Services, and SEG, LLC, April 2017

Overview of WGG Recommendations

Resource Cost Assumptions (page 4-31, Appendix N)
Notably, PSE commissioned an independent, external consultant - DNV-GL KEMA (Norway, Netherlands) to update its resource cost estimates for solar and onshore and offshore wind resources. However, many of their assumptions and databases have already been rendered obsolete by newer sources, as well as empirical results of very recent bids tendered in the United States.

DNV-GL's Balance of Plant (BOP) cost assumptions are based on projects constructed in the last 7 years, while BOP costs have fallen dramatically over that period of time. Further, solar capital costs were based on DNV-GL's own solar project database, which includes actual component cost data for solar projects located through the United States, and Greentech Media (GTM) Research Reports. There is no indication of the age of DNV-GL's solar project database, but cited GTM research is dated August 2015 and July 2016. Moreover, DNV-GL's cost assumptions for eastern WA wind were based on a project scale of 100 MW_{ac}, while the eastern WA solar costs were based on a project scale of only 20 MW_{ac}. These project scales are small, relative to likely deployments of wind and solar during the IRP planning horizon.

The Lazard Levelized Cost of Energy (LCOE) Analysis, Version 11.0 was released in November 2017 and demonstrates significant LCOE reductions since 2016 – especially for utility scale wind and solar resources[1].

Another important indicator of renewable resource costs in today's Western market is revealed in the results of a recent Request for Proposal proffered by Xcel Energy. The report[2], issued to the Colorado Public Utility Commission on December 28, 2017, revealed the median bid prices for 14 different generation technologies, as shown below.

RFP Responses by Technology

Generation Technology	# of Bids	Bid MW	# of Projects	Project MW	Median Bid Price or Equivalent	Pricing Units
Combustion Turbine/IC Engines	30	7,141	13	2,466	$ 4.80	$/kW-mo
Combustion Turbine with Battery Storage	7	804	3	476	6.20	$/kW-mo
Gas-Fired Combined Cycles	2	451	2	451		$/kW-mo
Stand-alone Battery Storage	28	2,143	21	1,614	11.30	$/kW-mo
Compressed Air Energy Storage	1	317	1	317		$/kW-mo
Wind	96	42,278	42	17,380	$ 18.10	$/MWh
Wind and Solar	5	2,612	4	2,162	19.90	$/MWh
Wind with Battery Storage	11	5,700	8	5,097	21.00	$/MWh
Solar (PV)	152	29,710	75	13,435	29.50	$/MWh
Wind and Solar and Battery Storage	7	4,048	7	4,048	30.60	$/MWh
Solar (PV) with Battery Storage	87	16,725	59	10,813	36.00	$/MWh
IC Engine with Solar	1	5	1	5		$/MWh
Waste Heat	2	21	1	11		$/MWh
Biomass	1	9	1	9		$/MWh
Total	430	111,963	238	58,283		

These all-in costs reflect all CapEx, fixed and variable O&M, interconnection, gen-ties, wheeling charges, development costs, tax incentives, and all other owner's costs. However, it is important to note that Xcel Energy is still in discussions with some bidders, whom they believe were less sophisticated than others about the variability of these cost categories. However, the pool of bidders also represents some very experienced and sophisticated entities, and thus the median prices tendered are instructive of what is available in today's market.

WGG also recognizes that topology, transmission constraints, and other factors that contribute to overall energy costs are very project-specific. Nevertheless, PSE's all-in costs (reflected in IRP Appendix N) of $73/MWh for utility-scale solar, $89/MWh for utility-scale solar plus transmission, $104/MWh for eastern Washington wind, and

[1] See Lazard's Levelized Cost of Energy Analysis, Version 11.0, November 2017.
[2] See https://www.documentcloud.org/documents/4340162-Xcel-Solicitation-Report.html

$90/MWh for Montana wind seem unrealistically high compared to both the latest Lazard report and the very recent Xcel bid results.

RCW 19.285.050 (Resource costs) provides that:
(1)(a) A qualifying utility shall be considered in compliance with an annual target created in RCW 19.285.040(2) for a given year if the utility invested four percent of its total annual retail revenue requirement on the incremental costs of eligible renewable resources, the cost of renewable energy credits, or a combination of both, but a utility may elect to invest more than this amount.
(b) *The incremental cost of an eligible renewable resource is calculated as the difference between the levelized delivered cost of the eligible renewable resource, regardless of ownership, compared to the levelized delivered cost of an equivalent amount of reasonably available substitute resources that do not qualify as eligible renewable resources, where the resources being compared have the same contract length or facility life.*

Therefore, in order to determine incremental cost, it is imperative that the most recent available RE cost information be utilized. PSE's proposed All-Source RFP, to be issued this first quarter of 2018, should provide the most current and accurate information about resource costs.

Insufficient attention to impending carbon constraints and social carbon cost impacts to consumers.
PSE rightfully examined the potential for carbon regulation to have an impact on its near and longer term resource portfolio economics. However, their assumption that the Clean Air Rule would be the sole constraint through 2022, and the Clean Power Plan would not get footing until 2022 or after are questionable.

A measure to tax fossil fuel emissions to fight climate change cleared a Senate policy committee on February 19th and has had a public hearing before a key fiscal committee. The bill proposes a new tax of $12 per metric ton of carbon emissions, lower than the $20 per ton originally proposed by Gov. Jay Inslee. The tax would begin in 2019 and in 2021 would increase $1.80 per ton each year until it is capped at $30 a ton. Because the bill has a potential fiscal impact, it is not subject to deadlines that other non-budgetary bills face.

PSE President Kimberly Harris testified[3] on the opening day of the 2018 Legislative session (January 9, 2018) that Inslee's plan is "an important step forward." Harris said PSE is attempting to reduce its carbon footprint 50 percent by 2040 and that "reaching our full potential will require policy changes this year at the state level to update our regulatory environment and put a price on carbon."

[3] See http://www.thenewstribune.com/news/politics-government/article193750759.html

The most recent news suggests that the bill has a greater than 50% chance of passing. And whether or not the bill does pass, this is one of several attempts to pass carbon legislation in the last four years, and it seems that the possibility should be weighed more heavily in PSE's IRP.

With respect to the Societal Cost of Carbon, PSE's IRP document asserts that the societal cost of carbon is an externality, to which the IRP rule does not apply. The IRP document contends that reducing carbon emissions may produce a global benefit, but that their customer base represents only 0.04 percent of world population.

WGG strongly disagrees with this assertion on two major planks:

1) PSE customers clearly experience higher heating bills in the winter, increased cooling bills in the summer, increased storm patterns and associated outages, and the costs incurred by those events.
2) WAC 480-100-238(2)(b) provides that: (b) "Lowest reasonable cost" means the lowest cost mix of resources determined through a detailed and consistent analysis of a wide range of commercially available sources. At a minimum, this analysis must consider resource cost, *market-volatility risks*, demand-side resource uncertainties, resource dispatchability, resource effect on system operation, the risks imposed on ratepayers, public policies regarding resource preference adopted by Washington state or the federal government and the cost of *risks associated with environmental effects including emissions of carbon dioxide*.

WGG contends that WAC 480-100-238(2)(b) gives the Commission full authority to require that regulated utilities not only include risks associated with environmental effects of carbon dioxide emissions, but also the market volatility risks associated with investments in fossil resources – particularly natural gas facilities.

There is indeed regulatory precedent in other states that ratifies the notion of utility planning requirements associated with the Societal Cost of Carbon (SC-CO2). The Colorado Public Utility Commission rendered a decision in April 2017 that required Public Service Company of Colorado (PSCO) to consider the SC-CO2 when planning its electricity generation. This followed a landmark decision of the New York Public Service Commission in August 2016, which not only put a price on SC-CO2, but also used that price in mandating long-term contracts to support at-risk nuclear power generation[4].

[4] See: https://www.hklaw.com/energyblog/colorado-utilities-commission-requires-consideration-of-social-cost-of-carbon-05-02-2017/

PSE Action Plans

In order to prepare for the resource forecast presented in its 2017 IRP, PSE has proposed an action plan consisting of seven components. WGG finds that two of the seven actions allow for options that are not consistent with PSE's stated intent to not pursue fossil resource capacity additions prior to 2024. The actions of concern are:

- *Action Item #4: Supply-side Resources: Issue an All-source RFP*

  PSE conveys their assumption that demand response and storage resources will be sufficient to meet its needs for renewable resources and capacity through 2022. However, they indicate that the all-source RFP to be issued in the first quarter of 2018 will be used in part to test that assumption, leaving open the possibility that PSE will deviate from the plans articulated in the 2017 IRP. WGG understands that the IRP is a resource forecast rather than a commitment to specific action. Moreover, we support the utilization of the most recent information on resource costs and market conditions that the all-source RFP will reveal. However, in the event that the RFP evaluation process leads to procurement decisions that differ significantly from the RFP, PSE should undertake a robust and transparent stakeholder process to ensure that all public policy considerations are identified and addressed.

  In discussing their Renewable Resource needs, PSE finds that eastern Washington solar power is more cost effective than wind, and notes that Montana wind could only be an "eligible renewable resource" (under RCW 19.285.030) if delivered into Washington state on a real-time basis without shaping, storage, or integration services. They further note that addressing that constraint would likely require a complex set of transmission studies. WGG recommends that PSE assess the costs of all renewable resources not only for their ability to meet renewable energy targets under RCW 19.285.040, but also because they are increasingly becoming the least cost resources. *(See Resource Costs discussion below.)*

- *Action Item #5: Develop Options to Mitigate Risk of Market Reliance*

  In Action Item 5 of its IRP, PSE discusses their substantial reliance on the short-term market to meet the energy and peak capacity needs. As such, this action item involves PSE's development of three key "strategies to mitigate the risk of redirecting transmission and increasing market reliance." These include:
  - Maintaining options to build capacity resources quickly;
  - Re-examining PSE policies with regard to how much of its market reliance should be managed via short-term purchases versus long-term contracts; and
  - Working with others in the region on options for PSE to join or to help develop functioning wholesale markets that incorporate, energy, capacity and flexibility services.

WGG commends PSE for its vision in recognizing both the benefits and flexibility offered by utilization of market resources as well as the risks that could be borne by customers in the absence of a market risk mitigation strategy.

However, WGG has concerns about the first strategy involving options to build capacity resources quickly. There is no discussion within the IRP that describes what resources would be considered for such quick capacity builds, but it is evident that PSE is considering natural gas peaking plants as a near-term market-reliance risk-mitigation option. PSE has already publicly announced their acquisition of permits and authorizations needed to construct a natural gas plant. Moreover, most scenarios examined in the IRP process show that dual fuel flame peakers will be the go-to capacity resource later in the planning horizon. These observations in turn raise the concern that PSE would have broad latitude to opt for "quick build" fossil resource construction to mitigate any near term market risks, without the necessity of a rigorous public process. WGG understands that any Balancing Authority must have the ability to undertake actions that abate risks to its customers, but we view any "quick" and non-public decisions to build new fossil facilities to be inconsistent with the implied plans conveyed in this IRP.

WGG urges the Commission to ensure that any such proposals for short-term, rapid capacity build-outs involve rigorous and transparent stakeholder processes.

Colstrip Unit Retirements

The 7th Power Plan from the Northwest Power & Conservation Council[5] demonstrates that replacement of the Colstrip units with 100% renewable energy and conservation is feasible.

Further, Northern Tier Transmission Group (NTTG) studies published in 2016[6] and 2107[7] as a result of public policy study requests by Renewable Northwest and Northwest

[5] See: https://www.nwcouncil.org/energy/powerplan/7/plan/

[6] See: https://www.nttg.biz/site/index.php?option=com_docman&view=download&alias=2532-appendix-e-nttg-report-for-the-2014-2015-public-policy-consideration-scenario-final-05-03-15&category_slug=appendices&Itemid=31

[7] See: https://www.nttg.biz/site/index.php?option=com_docman&view=download&alias=2917-2016-2017-nttg-public-policy-consideration-scenario-report&category_slug=supporting-documents-regional-transmission-plan&Itemid=31

Energy Council demonstrate that replacing Colstrip Units 1 and 2 completely with wind, and Units 3 & 4 with either wind or a combination of wind and natural gas is feasible on the basis of transmission stability.