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March 6, 2018

Puget Sound Energy % Steven King
Executive Director and Secretary
Washington Utilities and Transportation Commission
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~~Subj: Dockets UG-141169 and UE-141170~~

RE: Puget Sound Energy's Integrated Resource Plan

Dear Chairman Danner and Commission Members:

I hope it is not too late to comment. Please forward this letter to the decision-makers at Puget Sound Energy!

I have read all the Plan and all of Appendices M and O, plus the final 15 pages of N, and taken copious notes. It seems you are not ready to implement the plan because it dives right into scenarios, costs, and risks before stating the goal set by I-937, which is a carbon-pollution-free Washington by 2045. Adopting this kind of goal yourselves would make anaysis much simpler. Also, it seems there is a lot of political pressure for a carbon tax, but most opf the Plan's scenarios don't account for this.

The most startling point comes from Appendix N, Page 179, Table N-144, which seems to say that the Plan would only reduce carbon emissions by 0-2% in 20 years. If this is what it means, the Plan is simply unacceptable. If I read it correctly, the Plan calls for the construction of five new gas-fired plants in the next 20 years. It leaves open the continued operation of Colstrip Plants 3 and 4 for 10 or 20 more years. It notes that PSE's emissions will still be within legal limits. It seems to set the bottom line as the lowest cost to ratepayers.

In fact, we are in an emergency right now. Any 20-year plan is not likely to be carried out because of rapidly-changing conditions. The primary goal of anyone's plan now should be to match the renewable standard set by Washington Initiative 937; that is, 25% reduction in carbon emissions by 2025, 50% reduction by 2035, and zero carbon emission by 2045.

Before my analysis, I want to quote three e-mails that arrived today and support this point of view:

- Published Today (March 6, 2018): New York State's deputy comptroller suggested that fossil fuel stocks are in jeopardy of a quick nosedive. Capital spending in the sector has dropped indicating that oil companies themselves see a limited future.
- Dahr Jamail "The Arctic Is Melting Down as the Antarctic Food Chain Is Breaking." March 05, 2018. Truthout Report: Our world has changed. Massive parts of the biosphere are collapsing before our eyes. This is our new reality, and each of us must ask each day, "How then, shall I live my life?"

- "City pensions are too oily and gassy" by Tom Sanzillo, New York Daily News, December 4, 2017: Last month, Norway's $1 trillion pension fund announced plans to drop oil and gas stocks from its core benchmark stock portfolio...Such holdings have lost their status as mainstream investments and are now considered speculative.

The Attachment contains my comments on specific items in PSE's 2017 Plan. Please have the persons who prepared and approved the Plan read these comments. If you can enlighten me on the final plan adopted, I'd appreciate a letter if time permits.

Sincerely,

Joseph M. Hiss

Olympia resident and customer,
retired local fish and wildlife biologist, and
volunteer environmental educator.

Attachment (1)

Attachment 1:

Comments on PSE's 2017 Integrated Resource Plan

Joseph M. Hiss

March 6, 2018

Page 2-5:

- Why only "meet RCW targets?" A Plan as wide-ranging as this ought to consider, in addition, all PSE emissions, not just those from the new plants it plans to build.
- Why stop at the "least-cost solution?" The ratepayers may want more drastic measures, considering the world's condition. "Least cost" is also mentioned on Pages 2-10 and 2-12.

Page 2-7 Figure 2-4: Why is there no wind power at all in the new builds? Is it always far away from being cost-effective?

Page 2-8: Washington wind was dismissed as "not as cost-effective as other alternatives." I wonder if this was a premature judgment. The Plan seems not to give amy numbers to justify this.

Page 2-10, Figure 2-5: If you used both Montana wind and Washington solar, would you be able to decrease gas use more than you would otherwise?

Page 2-14 says "no new thermal" would raise the cost by 24%. Is that really something rate-payers could not accept?

Page 2-17 advises against adding solar with its existing risk, but rather only if the price of solar power falls. I wonder if the current level of risk might be acceptable to rate-payers. I also did not find any projection of how much the price of solar might keep falling. I think this is very important. I see that you considered building codes in an appendix. Could this reduce dependence on fossil fuels?

Page 2-18 You say additional conservation does not reduce the risk of solar. I say it might still be worth the risk anyhow. In another place you say that conservation would reduce the risk of peaking power plant construction. Fine, but is risk the main consideration? I think not.

Page 2-19:

- This refers to another IRP in 2019, that it will depend less on fossil fuel, which, combined with batteries, can push fossil fuel plant construction past 21025. This is good, but better to plan no fossil fuel plants at all. Given our uncertain future, I recommend you do not make any irreversible commitment of resources until you get more clarity in regulations; rather, concentrate on what can be done to reduce emissions now, and admit you may have to change the plan drastically.
- I advise you to get your staff into thinking big! If they are bound by law into producing as many graphs and tables as they do, let them do so, but please remind them that time is limited, the future is fluid, and we don't have the luxury of the cheapest legal solution any more.

Page 2-20 says that "transportation redirection" could make up for construction of one peaking plant, so I recommend it. The less you burn natural gas, the better!

Page 2-23: If peakers are included in the Plan now but you also hope to keep the need for fossil fuel as far as possible into the future, aren't you betting on something that may not happen?

Page 2-26:

- Why not set "highest possible conservation" for both supply side and demand side as Goal 4?
- Scenario No. 9, and some scenrios between it and No. 14 imply that less conservation is more cost-effective. I am sure that some ratepayers think that conservation in itself is a worthy goal.

Page 2-28: Thank you for explaining the advantages of conservation! I just don't see how you are keeping this as a goal in your planning!

Page 3-3: I understand King County wants zero fossil fuels by 2025! That's only 7 years from now! Hope it happens. But would that mean different rates for the other counties PSE serves?

Page 3-13: Very good to see you admit flexibility. Again, how does the Plan stay flexible?

Page 4-5: I'm glad you're not just going on economics. But it seems you have not incorporated broad social benefit into the Plan.

Page 4-16 says you can't model economic impact of carbon pollution because no model yet exists. This may be true, but if you fear continuing carbon pollution, you ought to somehow plan for it just the same. A thing's risk doesn't depend on us knowing exactly how to model it!

Page 4-33 argues for attempting to import Montana wind power. I agree with this stance, but I don't see it reflected in the Plan.

Page 4-36: The "applicable load of 15% renewable energy by 2020" seems low to me, given the urgency of our situation. This may be what PSE thinks they can achieve, but is it in tune with the world's situation?

Page 5-18 Figure 5-20 indicates that the proposed level of conservation only saves a little bit of energy. I advise you to seek more conservation, and not to pay too much attention to its cost.

Electric Analysis

Page 6-5: Your list of conservation questions seem too narrow to me. I suggest you amend to No. 2 to read "cost-effective or not too far from it," and amend No. 3 to read "meet or exceed state standards."

Page 6-12, Figure 6-7 shows that we'll be just as reliant on natural gas 20 years from now as we are now, but that we'll run out of energy only 4 years into the plan. I know you're in a bind, but running out of energy so soon doesn't seem responsible to your ratepayers. I advise planning a path to carbon-free fuels by 2045, as Initiative I-937 requires. Then see what the least risky sources and most acceptable rates are to achieve that goal.

Page 6-14 Figure 6-8: Does this mean demand will outstrip supply by 2025? That's only 7 years into the Plan.

Page 6-15 says we will meet the Renewable Portfolio Standards only until 2022. Then what happens?

Page 6-16 Figure 6-9 shows we need to increase the Renewable Energy Credits by 2022. Is this likely to happen?

Page 6-21 Figure 6-12:

- I see that Portfolios A and B go beyond the Recommended Portfolio Standards. This is good. Does Portfolio C do likewise? Did you recommended one alternative?
- Portfolio G: Do your emissions now comply with the Washington Clean Air Rule?
- Portfolio J: Gas Conservation. did you use all the measures contained here?
- Portfolio K: Cost-effective Conservation. Was this modeled?

Page 6-29 Section 2: Were emissions modeled in this scenario?

Page 6-30: This summarizes your choice in a few words.

Page 6-34 Figure 6-15 seems to indicate that by 2037 Portfolios 4 and 7 have the lowest cost at $1,575 million, and Portfolio 14 costs $1,854 million. How was this figure incorporated into you final Plan?

Page 6-37 Figure 6-16: Carbon emissions start to decrease in 2019, bottoming out in 2022, then increasing until 2033, the declining substantially from 2035 to 2036. How do you explain this behavior?

Figure 6-17 shows a big decline in emissions when Colstrip Plants 1 and 2 are retired in 2022, then an increase from there to 2035. Is this because more fossil fuels will be burned then?

Page 6-39: Only Scenarios 5 and 7 seem to keep pollution below 1990 levels. How was this imcorporated into the Plan?

Page 6-47:

- If, as the Plan says, the cost of a renewable resource is no more than 4% higher than a non-renewable resource, then the utility will be in compliance with Washington's Annual Renewable Target. This seems this lets PSE keep burning non-renewable fuel as long as the renewable resource costs over 4% more. Do I understand this correctly? If so, this seems a very weak rule, and the Utility ought to do better.
- Figure 6-23 seems to say that PSE can afford as much as double its current investment in renewable fuels. If so, who wasn't this put into the Plan?

Page 6-50: I am glad to see the early retirement of Colstrip 3 and 4 is being considered.

Page 6-51 seems to say that with CAR in place, the "relative value" of Colstrip 1 and 2 increases. Is this a good thing or not? Did you model this possibility?

Page 6-53: Why wait until 2031 to retire all thermal baseload plants? What is the future likelihood of taxing old and new plants the same? In this case, would the results be different?

Page 6-54: What is the cost to replace all future needs with carbon-free resources? I understand this would require Montana wind and pumped hydro, but would add only $1.3 Billion to the base cost of about $12B? This doesn't seem prohibitive to me.

Page 6-55 Figure 6-28: It looks like pumped storage is cheaper than peakers. Is ths right?

Page 6-56 Figure 6-29: I understand this scenarioi would require $2.8 Billion over the $12B base cost at the risk factor of Tvar90, but would add only $2.0 Billion at the median risk level. Have I got this right?

Page 6-57:

- Stakeholder Scenario No. 2: With higher thermal capital costs, would you still have to buy more gas plants in 2027 and 2037?
- Stakeholder Scenario Nos. 3 and 4: It seems like the goal of both scenarios is the "optimum" portfolio, as opposed to carbon savings. I would recommend against them.

Page 6-69: I am glad you acknowledged the environmental concerns regarding pumped storage. My experience with fish passage at dams strongly suggests this will be an implortant issue. However, I would not entirely rule out pumped storage at this time.

Page 6-61: in the Renewable Energy plus Storage scenario, you considered bundling a 50 MW battery with 200 MW of solar. However, you dismissed this as not being cost-effective. Could we imagine a much larger solar contribution at a reasonable cost?

Page 6-66: You state that electric vehicles would need an additional 50,000 MW peaking capacity, which could only be filled by more gas plants to be built in the 2027-2037 period. Do I have this right? If so, wouldn't it be better to invest in more compact cities, more public transportation, and better building codes rather than plan on more electricity?

Pages 6-67, 6-70, and 6-72: Demand-side measures are required to be cost-effective to be in the Plan. I think this is too restrictive for the Plan with so much uncertainty. As with supply-side measures, going a little over the cost should be acceptable.

Page 6-75 says Montana wind would not be cost-effective even if it were permitted. By how much? You seem to be considering it elsewhere in the document.

Page 6-77 Figure 6-46 seems to indicate that 5 new gas plants will be needed by 2037, including 2 by 2027.

Page 6-85, Figure 6-52: I am heartened to finally see conservation proposed! In general, the graph shows that spending money will save more carbon than saving money, although it can only benefit to save, too. From this graph I'd recommend Alternative H, early retirement of Colstrip Plants 3 and 4 as my first choice, and Alternative F, increasing the Washington Renewable Portfolio Standard to 50%, as my second. Alternative B, adding 300 MW more Washington solar, would also be helpful but to a lesser degree. I see that Alternative K, cost-efficient gas conservation, and Alternative E, cost-efficient electric conservation, are also presented. The small amounts of energy these two save shows how little liberty you have to adapt if you confine yourself to strict cost-effectiveness.

Page 6-87:
- Figure 6-53: Looking just at the electric portfolio, which emits about 335 tons of carbon, effects of any alternative seem dauntingly tiny. Alternative D reduces emissions most effectively (by 0.7%) but costs $697/ton. It's not shown on the graph because of its high cost. In contrast, Alternative H reduces emissions by 0.59% for $52/ton, and seems more reasonable to me. Alternative F would reduce emissions by 0.29%. Alternative E would reduce emissions by 0.07%.
- Just looking at the gas portfolio, which curently emits 60 tons, effects are no better. Alternative J reduces emissions by 2.45%, at a cost of $115/ton.

Page 6-90, Figure 6-57 says that "no new thermal" is the only scenario with a very high cost. I don't know how to get around the high cost. Perhaps PSE will have to admit the ratepayers can't get the best economic deal and explain why rates have to go up to save our planet.

Gas Analysis
Page 7-5, Figure 7-2: The model shows bigger and bigger deficit after 2024. Gas import relies partially on fracked shale—a very bad choice because of the many kinds of environmental damage in addition to carbon pollution.

Page 7-38 says program measures are chosen until system cost is minimized. Again, isn't it too late to count small costs?

Page 7-42 say conservation of gas has decreased over lasat two years. Why?

Page 7-55: It seems you don't save much until you reach the last conservation bundle, where you do save more significantly but at about 6 times what you'd pay for each of the other bundles. Have I got that right?

Electricity and Fuel Delivery
Page 8-5 again mentions cost-effectiveness, which I question as a goal.

Page 8-8 says the primary objective is to meet load growth. Can you really do this and still reduce emissions? Seems you ought to be planning along with architects, city planners, and mass transit officials to contain load growth.

Page 8-12 again mentions cost-effectiveness. Could the increasing popularity of distributed sourcing lead to significant carbon savingsd you haven't accounted for?

Page 8-18: Was transmission included in the portfolios? Might it be significant on conservation? If we expanded the grid, could we get more affordable solar and wind energy from more sources?

Page 8-62: Can the "conservation voltage drop" mentioned here save carbon emissions? Money for ratepayers?

Page 8-63: Why would tarriffs increase demand?

Appendix J: Conservation Potential Assessment
Pages x-xi
- What is "Distributed Energy Combustion."
- How can combustion account for 60% of conservation if it only saves 522 megawatts, whereas energy efficiency, which is only 38% of the energy sources, accounts for over 975 MW?
- Does the remainder go directly to consumers? Have you factored in the increasing efficiency of home furnaces?
- What is "whole building analysis?" Was this considered in planning?
- Were state standards expected to remain the same for the next 20 years, or are the standards liklely to increase?
- You say natural gas efficiency saves about 164 MW/yr, but only 1,700 MW over the next 20 years. This is only about half of 164 x 20. Why?

Page xii Figure 1 says changes in building codes plus distributed generation will save 1,700 annual MW, bringing the total down to 2,000 annual MW. Do I have this right?

Page xiii Figure 2 says that winter peak demand will decrease 2,000 MW over 20 years due to conservation.

Page xxi:

- The Plan seems to say the growing solar rooftop market will only reduce demand by 119 MW. Is that true?
- You also say the available technical potential savings has decreased from 263 MW in the 2015 Plan to 188 in the 2017 Plan. Doesn't this contradict all the potential savings described in the Figures?

Page xxiv

- Fig. 6: Which conservation bundle are you using for electricity? No. 1 would save 175 MW, Nos. 1-5, 400 MW, and Nos. 1-10, 1500 MW.
- Figure 7: Which conservation bundle are you using for gas? If one KWh = 0.034 therms, would Bundle 1 save 294 MW? Would Bundles 1-5 save 525 MW? Would Bundles 1-8 save 1,705 MW? Would Bundles 1-9 save 1,912 MW? Would Bundles 1-10 save 2,353 KW? With all this potential conservation, why do we need more thermal plants? Why do you say on Page xxi that demand will only go down by 188 MW?

Page xiv Table 5 seeems to say that demand response is expected to save only 188 MW during the winter. Is that correct?

Appendix N: Electrical Analysis
See my previous reference on Page 1.

Appendix O: Gas analysis
Page O-8 says that bundles above current cost-effectiveness become cost-effective. How many bundles would we have in all?

Figure O-4 says that from 244 to 1,500 mega dekatherms will have to be added. Please convert this to megawtts, so we can compare gas to electricity.

I had meant to continue this detailed anaysis of Appendices N and O but time did not allow it. My main points are in the cover letter.