BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON

Docket No. UM 1716

In the Matter of PUBLIC UTILITY COMMISSION OF OREGON Investigation to Determine the Resource Value of Solar, Fixed Cost Recovery, and Reliability Impacts	Comments from the Green Energy Institute at Lewis & Clark Law School

The Green Energy Institute at Lewis & Clark Law School respectfully submits the following comments regarding the elements to be included in UM 1716's calculation of the resource value of solar power. The Green Energy Institute's mission is to facilitate a swift transition to a sustainable, carbon-free energy system. An accurate, comprehensive, and empirical methodology for calculating the resource value of solar power is an essential part of an optimal strategy to develop a carbon-free energy system in Oregon. The PUC's staff has so far done an excellent job facilitating a productive and collegial process for determining the appropriate elements to include in the solar resource valuation methodology. To help finalize that process, the Green Energy Institute offers the following comments.

I. The PUC should clarify that this docket's purpose is broader than creating a single tariff rate for distributed rooftop solar.

The PUC seems to intend for this docket to generate more than just a single value for distributed rooftop solar power. In the memo summarizing the scoping workshops in this docket, PUC staff indicated that "[t]he purpose of UM 1716 is to create methodologies that are transparent, predictable, and lead to the development of standardized calculations of the resource value of solar."[1] Similarly, PUC Staff indicated that "it was Staff's intention that this docket consider[] all solar, not just residential systems."[2]

It is appropriate and efficient for this docket to have a broader purpose than simply setting a tariff rate for some solar power producers. Most other solar resource valuations have aimed to produce only one number, essentially a tariff rate for distributed, rooftop solar power that includes all relevant avoided costs utilities would otherwise bear. This docket's broader goal of addressing "all solar, not just residential systems"[3] gives Oregon a valuable

[1] Memorandum from Cindy Dolezel, Senior Renewable Energy Analyst, Oregon Public Utilities Commission, to UM 1716 Parties, July 2, 2015, at 1 [hereinafter PUC Staff Memo].
[2] *Id.* at 2.
[3] *Id.*

opportunity to create a more complete methodology for valuing solar power than has existed in many other states.

A broad purpose for this docket is appropriate for two chief reasons. First, a broad purpose will enable the PUC to explore the value of solar arrays that use different technology types, operate at different scales, or serve different functions in the electricity system. These different projects will likely have significantly different resource values. For example, small residential arrays present different impacts on the power grid than utility-scale arrays, leading to a different set of costs and benefits.

Second, a broad purpose will allow the PUC to consider attributes of solar power that are relevant to Oregon's citizens and policy makers, even if those attributes are not necessarily germane to a particular tariff. Solar power has many benefits that Oregon's citizens and policy makers care about, but which are not eligible for inclusion in a tariff rate due to federal restrictions on states' abilities to set wholesale rates.

Federal law imposes significant constraints on states' abilities to set wholesale tariff rates. Because the Federal Power Act establishes exclusive federal jurisdiction over wholesale ratemaking,[4] states setting wholesale tariff rates must follow the limited authority granted to them in the Public Utility Regulatory Policy Act (PURPA).[5] Using this authority, states may set "avoided cost" rates for qualifying renewable energy generation that reflect the expenses a utility would otherwise face in obtaining the same amount of electricity.[6] However, states may not set tariffs higher than avoided cost, which are "real costs that would be incurred by utilities."[7] PURPA thus prevents states from imposing solar tariffs on utilities that include costs utilities would not face in procuring equivalent amounts of electricity from another source.

If this docket's purpose is merely to set a tariff rate for a limited set of solar power producers, then many of the elements discussed during this docket will not be relevant. The only elements that could inform such a tariff rate under PURPA would be those reflecting costs that utilities would otherwise face in procuring the same amount of power from other sources. Such elements could likely include avoided energy impacts, avoided capacity additions, avoided line losses, avoided transmission and distribution capacity, RPS compliance value, and financial market price responses.

In contrast, if this docket's purpose is more broadly to consider the value of solar power in Oregon, then the PUC can and should consider most of the elements proposed so far. This docket's broader purpose should be to examine and quantify solar power's impacts on electricity reliability, Oregon's utilities, ratepayers, society, and environment. Many elements that are not relevant to an avoided cost rate under PURPA are nonetheless quite

[4] 16 U.S.C. § 824(b).

[5] 16 U.S.C. § 2601 et seq.

[6] Order Granting Clarification and Dismissing Rehearing, 133 FERC ¶ 61,059 (2010).

[7] *Id.* at 15.

relevant to Oregon's policy makers and citizens. Oregon has many options for promoting solar power outside PURPA's strictures, including tax credits, grants, or solar power procurement mandates.[8] Solar arrays can also help promote grid management, resiliency, and reliability and may therefore serve as transmission or distribution resources. A broad purpose will enable this docket to reveal the extent to which the actual value of solar power in Oregon exceeds the tariff rate that the PUC can currently establish for solar power under PURPA. In other words, a broad purpose will enable this docket to show Oregon's citizens and ratepayers where the PUC's current authority to set solar tariffs ends, and what other values the state may obtain from solar power. This information will help Oregon's legislators and citizens evaluate which policies are appropriate for promoting solar power in the future.

The PUC is the appropriate agency to conduct this comprehensive solar valuation, and this docket is the appropriate forum. The PUC is the appropriate agency because it has significant expertise regarding many of the elements to be considered. This docket is the appropriate forum because its parties can supplement the PUC's expertise as it considers elements that are less within its traditional purview, such as valuation of societal benefits or environmental externalities. This docket has already convened relevant organizations with necessary knowledge and experience to allow this docket to achieve a robust, comprehensive valuation of the impacts of solar power in Oregon. It will prove far more efficient to pursue this goal in this docket with these parties than to reconvene the parties later in another docket or before another agency.

For these reasons, the PUC should clarify that the goal of this docket is to create methodologies to evaluate and quantify solar power's impacts on Oregon's utilities, ratepayers, society, and environment. The PUC should further clarify that the elements considered in this docket will not necessarily be used to set any particular tariff rate.

II. The following concepts should guide the consultant's development and application of relevant elements.

To fulfill the laudable goal of developing transparent, predictable, and standardized methodologies for solar valuation, the PUC should employ the following concepts to guide the consultant. Although these concepts are not elements of the resource value itself, they will help the consultant determine the optimal way for each element to apply in the methodologies.

A. Type of Technology

[8] The Federal Energy Regulatory Commission has made clear that a state requirement for utilities to procure a certain type of power, such as solar power, can allow the state to establish multi-tiered avoided cost rates. *See id.* at 13. In effect, a solar power procurement mandate would allow the PUC to establish avoided cost rates specific to solar power.

Different solar technologies have different resource values. For example, solar arrays that track the sun's movement have a different capacity value than fixed-tilt arrays. Similarly, some modern, "islandable" inverters allow solar arrays to continue to generate power locally even during a grid outage. Such technological differences have important implications for the value of the power that different types of arrays will produce. For example, arrays with islandable inverters will see a greater value for the element of "Security: Reliability, Resiliency, and Disaster Recovery."

The PUC should ensure that the consultant takes these different technology types into consideration when developing methodologies. At a minimum, the consultant should take into account the impact of tracking versus fixed-tilt technologies and the impact of modern inverters. The consultant should also explain how each element's application varies, if at all, between solar arrays with different technology types.

B. Solar PV Scale

Solar arrays of different sizes also have different resource values, and this docket's methodologies should reflect these differences. Certain elements may apply only to distributed rooftop arrays. For example, the element "Behind-the-Meter Production During Billing Month" applies to many distributed rooftop arrays but not to utility-scale solar installations. Other elements may have distinct values for arrays of different sizes. For example, integration and interconnection impacts are likely to be more pronounced for utility-scale installations than for rooftop solar arrays. The PUC should require the consultant to take the different scales of solar development into consideration when developing solar resource valuation methodologies. At a minimum, the consultant should consider three size classes: small rooftop arrays up to 10 kW; medium commercial or community solar installations up to 100 kW; and large installations above 100 kW.

C. Levelization Period

In their joint comments circulated to this docket's parties on June 29, Idaho Power, PacifiCorp, and Portland General Electric ("the utilities") proposed renaming this concept from "Levelized over 25 years" to "Levelization Period. " The utilities reasoned that this change would "reflect that costs for each of the elements may be levelized over a range of time periods." The Green Energy Institute endorses the utilities' reasoning and proposed change, with the following caveats.

Levelization Periods should be no shorter than the average length of warranties for solar panels. Because most solar manufacturers offer warranties that last 20 or 25 years, this docket should treat these figures as the low end of the range of levelization periods. Indeed, solar panels may last significantly longer than 25 years. The National Renewable Energy Laboratory reports that "there are now products in the field for more than 25 years and

because the average degradation rate still allows reasonable performance after 25 years."[9] Indeed, this study suggests that solar PV systems may retain 80% of their average capacity after 40 years.[10] Because solar panels can last well beyond the average 20-25 year warranties, the consultant should consider levelization periods greater than 20 or 25 years.

D. Perspectives

The PUC should direct the consultant to develop methodologies that take four key perspectives into account when calculating solar resource values: the utility perspective: the solar customer perspective; the non-participating customer perspective; and the societal perspective. The parties to this docket agree unanimously that the consultant should consider the first two perspectives. Only Idaho Power believes the consultant should not consider the perspective of non-participating customers. However, this docket invites consideration of non-participating customers' perspectives, because the docket intends to determine the extent to which solar power may shift costs onto non-participating customers. That analysis will require consideration of the non-participating customers' perspective. Because the non-participating customers' perspective must thus be considered in part of this docket, the remainder of the docket should do so as well, both for the sake of fairness to those customers and for the sake of a thorough evaluation of the solar resource value. Finally, considering the non-participating customers' perspective may prove quite useful, because solar programs can confer benefits to non-participating customers by reducing utility costs. Disregarding the non-participating customers' perspective would risk ignoring this possible benefit in Oregon.

The societal perspective will prove crucial to a methodology for a thorough and accurate valuation of solar power. This docket's parties show strong agreement that the consultant should consider the societal perspective; only Idaho Power and the Citizens Utility Board disagree. The societal perspective is important because solar power has significant societal benefits that the other perspectives fail to consider. Although some of these societal benefits may not be germane to ratemaking proceedings due to the constraints of federal law, the societal benefits are relevant to Oregon's citizens and policy makers. The goal of this docket, as articulated by PUC Staff, includes generating a catalog of elements that may be used "as appropriate, for different rate making processes *and policy exploration*."[11] Thus, it is sensible to consider the societal benefits for the sake of the legislators and regulators who will shape subsequent policies and the citizens who must abide by those policies. Additionally, it will prove more efficient to consider the societal perspective in this docket as opposed to a subsequent proceeding (or an analysis in a different venue), because the parties already contributing to this docket offer a representative range of perspectives on the relevant issues.

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[9] Dirk C. Jordan & Sarah R. Kurtz, National Renewable Energy Laboratory, *Photovoltaic Degradation Rates –An Analytical Review*, June 2012, at 17.

[10] *See id.* at 16 (reporting a median capacity degradation rate of 0.5% per year, which yields a 20% loss in capacity over 40 years).

[11] PUC Staff Memo, at 2 (emphasis added).

E. Duration and Frequency of Reassessment of Values and Methodology

Over time, the resource value of solar power is likely to change. For example, as solar penetrations increase, they will offset a greater amount of generation and transmission. The avoided costs that result may not increase in an easily predictable manner. Predicting these changes accurately will likely be far more difficult than measuring them once solar penetrations have increased. Similarly, solar technology is evolving, suggesting that capacity factors may change in ways that are easier to measure after the fact than to predict beforehand. Thus, the docket should create triggers for re-evaluating the solar resource value.

The PUC should set both substantive and temporal triggers for the reassessment of the values and methodology considered in this docket. Substantively, the PUC should reconsider the value of solar power if solar technology changes significantly, or when solar penetrations in Oregon reach greater than a certain percentage. Temporally, the PUC should reconsider the resource value of solar in at most five years. Given the current pace of cost reduction, it is quite possible that solar power will be cost-competitive in five years. As these prices decline, penetrations are likely to increase, with effects on the elements considered in this docket that are difficult to predict. Accordingly, a five-year period for reassessment of the issues in this docket is appropriate.

IV. The following elements are relevant and should contribute to the solar resource valuation methodology.

1. **Avoided Energy Impacts:** Avoided energy costs have been a prominent component of every solar resource valuation. Because distributed solar can replace high-cost energy, avoided energy costs can be significant, and thus should be a component of this resource valuation.
2. **Avoided Capacity Additions:** Solar power can avoid the need to build additional generating capacity, thus reducing costs for utilities and ratepayers. Depending on the capacity value of solar and the scale of deployment, this effect can be quite significant. Accordingly, avoided capacity costs should be part of this resource valuation.
3. **Line Losses:** Because distributed solar power is located at or near the site of energy consumption, it avoids losses of energy over transmission and distribution lines, unlike energy from central power stations. Line losses can be significant, indicating that this value should be part of the resource value of solar power.
4. **Avoided Transmission and Distribution:** Because distributed solar power is located at or near the site of energy consumption, it does not require additional transmission or distribution capacity, unlike the addition of centralized power stations. This avoided cost can be significant and thus should be part of this resource valuation.

5. **Compliance Value** (reduced RPS procurement due to reduced utility sales): Solar power can reduce customers' energy demand, thus reducing a utility's load, in turn reducing the utility's RPS requirement. Because solar power can thus reduce the cost of RPS compliance, this value should be part of this docket.
6. **Security: Reliability, Resiliency, and Disaster Recovery:** Solar power can promote grid reliability and resiliency, as well as disaster recovery, by generating electricity during peak hours and even when the grid is down. Generating energy during peak hours can reduce grid congestions, which reduces the likelihood of outages, thus improving reliability. Resiliency and disaster preparedness are linked to the ability of modern inverters to allow solar arrays to generate energy locally during grid outages. Given the likelihood of large earthquakes in this region, resiliency and disaster preparedness are especially valuable attributes of solar power.
7. **Utility Integration Impacts:** The impacts of integrating solar power onto the energy grid are likely to be minimal or even negligible until solar penetration reaches a significantly greater level. However, for the sake of thoroughness, it makes sense to include this cost in this docket.
9. **Financial: Market Price Response:** Solar power reduces market clearing prices by offering low cost power into the wholesale market. The net effect is a reduction in wholesale power prices, thus reducing power costs for utilities and ratepayers. This effect should be part of this docket.
10. **Utility Administration Impacts:** If utilities incur administrative costs in managing solar power greater than their administrative costs for regular customers, these excess costs should receive consideration in this docket.
11. **Operational Impacts (Enhanced forecasting and scheduling due to solar power):** Development of solar power may lead utilities to alter the way they operate existing power plants, potentially reducing operations and maintenance costs as a result of reduced operating hours or fuel consumption. Utilities may experience savings of both variable and fixed operating costs. Conversely, utilities may experience greater costs associated with forecasting weather conditions and energy demand, and with scheduling power delivery. These impacts should receive consideration in this docket.
12. **Ancillary Services and Grid Support:** Solar power can generate energy during peak hours, improve the stability and reliability of energy provision by generating energy during grid outages, and respond to changes in voltage and frequency, thus providing ancillary services and grid support. Ancillary services, especially disaster preparedness, have great potential value for Oregon. As such, they should be part of this resource valuation
13. **Financial Fuel Price Hedge (adjustable mechanism):** Solar power does not require fuel. Over the long term, fossil fuel prices increase and suffer from volatility that is difficult to predict. Although utilities often hedge against this volatility with futures contracts, the useful life of solar facilities is greater than

the life of typical futures contracts. Thus, solar power provides a better hedge against price volatility, and should be a part of this docket.

14. **Rate Impacts – Net Metering Credits:** The direct cost of net metering credits, calculated as the difference between the retail value of a net metering credit and a utility's avoided-cost rate is a rate impact commonly included in solar resource valuations.

15. **Societal – Economic Development:** Several other solar resource valuations have included employment and economic benefits from solar power. Although this benefit inures to society generally, rather than utilities specifically, it will be of interest to Oregon's citizens and policymakers as they contemplate future solar policies. Because this docket offers an opportunity to develop a thorough valuation of solar efficiently, these benefits should be a component of this docket.

16. **Avoided Natural Gas Pipeline Impacts:** Solar power may reduce demand for other forms of energy, thus reducing the need for fossil fuel purchases, including natural gas. In turn, this effect may include reducing the need for additional natural gas pipelines or the expense of operating and maintaining current pipelines.

17. **Health and Other Societal Impacts:** By reducing emission of pollutants from the electricity sector, solar power can reduce the health impacts of air pollution. The resulting cost savings can be significant. Because the health impacts and cost savings associated with their reduction result from attributes of the electricity sector, the PUC's choices have significant influence over them. Thus, the PUC should consider these impacts as part of this docket.

18. **Capital Risk:** Utilities incur financial risks when investing in large, costly, centralized power plants. In contrast, the development of solar power may proceed in smaller batches, leading to less financial risk. Additionally, the fact that entities other than utilities often pay for solar development also mitigates utilities' financial risks. The magnitude of this effect is uncertain, but a consultant in this docket could offer a valuable empirical assessment of it.

20. **Behind-the-Meter Production During Billing Month:** Load-reduction benefits are real and measurable, and existing mechanisms for valuing energy efficiency and demand response should make it fairly straightforward to value this benefit from solar power.

25. **Environment: Compliance Impacts:** Improved environmental quality is a key feature that distinguishes solar power from fossil fuel-fired electricity. Unlike the combustion of fossil fuels, the production of electricity through photovoltaic systems does not emit greenhouse gases or other pollutants.[12] The PUC itself has

[12] PUBLIC UTILITY COMMISSION OF OREGON, INVESTIGATION INTO THE EFFECTIVENESS OF SOLAR PROGRAMS IN OREGON 19, July 1, 2014, *available at* http://www.puc.state.or.us/electric_gas/Solar%20Report%202014.pdf [hereinafter PUC Solar Report]; Oregon PUC,

acknowledged that avoided environmental costs are "legitimate components of the resource value of [solar photovoltaic] systems."[13] If the PUC declines to include environmental attributes in this docket, it should offer a thorough explanation.

The PUC has defined the solar resource value as "the benefits from solar generation that accrue[] to the utility system and its ratepayers."[14] The PUC went on to list several "potential benefits" of solar power, including "[r]educed cost of complying with current or anticipated environmental regulations."[15]

Power plants incur significant costs of compliance with environmental regulations, and those costs are likely to increase. For example, existing Clean Air Act regulations limit emissions of various pollutants, and the United States Environmental Protection Agency plans to issue final rules limiting carbon emissions from new and existing power plants in the summer of 2015.[16] These environmental regulations impose significant compliance costs on utilities and ratepayers.

However, solar power does not emit regulated air pollutants. By meeting load with solar power, utilities reduce the need for fossil-fuel-fired electricity and thus reduce the cost of complying with environmental regulations. Thus, avoided costs of compliance with environmental regulations are a benefit from solar power that accrues to Oregon's utility system and ratepayers, meeting the definition the PUC set forth in its Solar Report.[17] This reasoning likely explains why the PUC acknowledged in 2012 that "avoided CO_2 costs are legitimate components of the resource value of [solar photovoltaic] systems."[18] The same holds true for every regulated pollutant for which solar power helps reduce emissions.

This docket presents a uniquely appropriate opportunity to comprehensively consider solar power's environmental benefits for several reasons. Valuations of solar power in other states reveal that avoided environmental costs are significant components of the overall value of the solar resource. Enacted tariffs based on valuations of solar power in Austin, Texas and Minnesota both include environmental benefits as some of the largest components of the resource

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Scoping Document UM 1716, at 6.

13 IN THE MATTER OF PUBLIC UTILITY COMMISSION OF OREGON INVESTIGATION INTO THE APPROPRIATE CALCULATION OF RESOURCE VALUE FOR SOLAR PHOTOVOLTAIC (PV) SYSTEMS, Docket No. UM 1559, Order No. 12-396, at 5 (Oct. 18, 2012) [hereinafter PUC Order 12-396].

14 PUC Solar Report, *supra* note 12, at 19.

15 *Id.*

16 United States Environmental Protection Agency, *FACT SHEET: Clean Power Plan & Carbon Pollution Standards Key Dates*, http://www2.epa.gov/carbon-pollution-standards/fact-sheet-clean-power-plan-carbon-pollution-standards-key-dates.

17 PUC Solar Report, *supra* note 12, at 19.

18 PUC Order 12-396, at 5.

value.[19] A study of distributed solar power in Maine concluded that avoided pollutant emissions were among the top three components of the overall value of solar power. [20] Finally, a study from the National Renewable Energy Laboratory noted that environmental impacts are among the "seven main components" of most prior solar valuation efforts.[21] Environmental benefits consistently rank among the most important components of the solar resource value. Accordingly, the Oregon PUC should include environmental benefits in its appraisal of the value of solar power.

Appraising the environmental attributes of solar power as part of the solar resource value is particularly important in Oregon. This state's low retail prices for electricity make it difficult for solar power to offer competitive prices based solely on the costs of materials and installation. Excluding environmental attributes from the solar resource value risks significantly undervaluing solar power, which would inhibit the solar industry from competing fairly on the basis of the full values of its resource.

This docket presents the PUC's best opportunity to assess the value of solar power's environmental benefits. The docket already includes relevant stakeholders, so considering environmental benefits in this docket will prove more efficient than creating another docket in the future. Moreover, evaluating the environmental benefits of solar power in this docket will signal to all stakeholders that the PUC is conducting a comprehensive, not a piecemeal, solar valuation.

Finally, the PUC should include environmental benefits in this docket because both the legislature and the citizens of Oregon would benefit. Oregon's legislators are clearly interested in solar power, at least in part for its environmental benefits. In creating the VIR program, the Oregon legislature authorized the study of the effectiveness of paying for the "non-energy attributes" of solar power.[22] The legislature's interest in "non-energy attributes" of solar power indicates an interest in environmental benefits. Oregon's citizens and ratepayers are also interested in the environmental benefits of renewable energy, including solar power, as evidenced by the robust growth of solar installations in the last 10 years, full enrollment in VIR programs and ETO rebate programs, and the willingness of many ratepayers to pay increased utility bills for renewable energy. In sum, this docket is an appropriate opportunity for the

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19 *See* Babu Chakkar, Austin Energy, *Value of Solar Methodology*, May 28, 2014, *available at* http://www.austintexas.gov/edims/document.cfm?id=210805; Minnesota Department of Commerce, Division of Energy Resources, *Minnesota Value of Solar: Methodology*, April 2014, *available at* https://www.cleanpower.com/wp-content/uploads/MN-VOS-Methodology-2014-01-30-FINAL.pdf.

20 Maine Public Utilities Commission, *Maine Distributed Solar Valuation Study*, at 82-84, 102-04, March 1, 2015, *available at* http://www.nrcm.org/wp-content/uploads/2015/03/MPUCValueofSolarReport.pdf.

21 Mike Taylor et al., NREL, *Value of Solar: Program Design and Implementation Considerations* 10, March 2015, *available at* http://www.nrel.gov/docs/fy15osti/62361.pdf.

22 ORS 757.365(1).

PUC to evaluate the environmental attributes of solar power, offering greater clarity to legislators, ratepayers, and citizens.

A decision to exclude environmental benefits from this docket would make Oregon an outlier. In the report it prepared in response to HB 2893, the PUC relied heavily on a review of solar valuation studies from other states by the Rocky Mountain Institute (RMI).[23] Of the 16 studies that RMI reviewed, 11 evaluated environmental attributes of solar power.[24] Both jurisdictions that have enacted a tariff rate based on the solar resource value have included environmental attributes among the most important value categories, as figures 1 and 2 illustrate. Thus, the clear trend both in studying the solar resource value and in enacting a tariff based on that value is to include solar power's environmental attributes. If the Oregon PUC chooses to act against this trend by excluding solar power's environmental benefits from this docket, it should offer a clear and thorough explanation of its reasoning.

The following categories reflect environmental regulatory compliance costs that either already exist or are reasonably foreseeable. An expert consultant should be able to quantify these compliance costs with relative ease.

- **Carbon – Current**
- **Carbon – Future**
- **NO_x/SO_x/Particulates – Current**
- **Other – Current (e.g. MATS)**
- **Other – Future**

26. **Environment: Externalities:** Environmental laws and regulations often do not address all impacts—or even all significant impacts—from regulated activities, despite the fact that unregulated impacts impose clear environmental and societal costs. In the energy sector, environmental regulations often fail to capture the full range of environmental impacts. However, planners should attempt to account for these impacts in order to make sensible policies that take account of a full range of costs. The following impacts are quantifiable and significant to Oregon's environmental quality. Because these impacts result largely from decisions about the energy sector, the PUC's decisions influence them considerably. Accordingly, the PUC should make an effort to quantify them and include them in the methodology for calculating the resource value of solar.

    - **Carbon – Societal Impacts of Carbon**
    - **Carbon – Ocean Warming and Acidification**
    - **NO_x/SO_x/Particulates – Societal Impacts**

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[23] *See* PUC Solar Report, *supra* note 12, at 19-22.

[24] *See* Lena Hansen et al., Rocky Mountain Institute, *A Review of Solar PV Benefit & Cost Studies*, Sept, 2013, *available at* http://www.rmi.org/Knowledge-Center%2FLibrary%2F2013-13_eLabDERCostValue.

- **Avoided Water Usage for Thermal Power Production**
- **Avoided Water Usage for Natural Gas Hydraulic Fracturing**
- **Avoided Pollution Associated with Hydraulic Fracturing**

V. The following elements are not relevant and should be excluded from this docket.

Utility –Interconnection Impacts: Generally, the owner of a solar array bears the cost of interconnection to the grid. As such, solar power interconnection does not present significant fiscal impacts to utilities or ratepayers. Thus, it should not be an element considered in this docket.

19. **Utility: Production Impacts (IRP Process) (Levelized cost of production over the lifetime of the project based on an annual capacity factor in $/MWh):** IRP analysis of levelized costs includes some of the elements already listed, but may not use the same analytical methodology as this docket. Moreover, IRP assumptions about capacity factors may not align with this docket's figures. Thus, including this element risks an inaccurate outcome due to the inclusion of a distinct methodology.
21. **Resource Need:** The Integrated Resource Planning (IRP) process typically considers the degree to which utilities require certain amounts of electricity to meet demand. As relevant to this docket, solar power may reduce utilities' overall resource needs. However, to the extent this utility need for energy resources is relevant to this docket, Elements 1 through 4 (avoided energy impacts, avoided capacity additions, line losses, and avoided transmission and distribution) already capture this effect. Otherwise, a utility's need for energy is not an attribute of any particular energy source and is accordingly not relevant to this docket. .
22. **Rate Impacts – Lost Utility Revenue:** Customers can reduce energy demand in various ways, including but not limited to installation of solar arrays. Utilities should not be compensated for customers' decisions to use less energy.
23. **Tax Credits (State and Federal):** Incentives paid through federal or state tax credits, like other incentives, are not part of the solar resource value, but instead reflect independent governmental efforts to encourage clean energy. Because incentives are not part of the resource value of solar, they should not be part of this docket.
24. **DSM Alternative Impacts:** Solar power does not generally have an impact on other consumers' energy choices, including demand-side management efforts such as energy efficiency. Instead, solar power itself often serves a role much like that of demand-side management by reducing the energy demand of ratepayers with solar arrays. Because solar power does not generally influence energy efficiency or other demand-side management strategies, DSM impacts should not be considered as part of the resource value of solar power.

VI. The PUC should retain a neutral consultant free from conflicts of interest.

PUC Staff has indicated that it plans to hire and manage "a neutral consultant" to develop a methodology based on the elements the PUC rules are relevant.[25] The PUC should confirm the commitment to hiring a consultant who is truly neutral and free from any conflicts of interest.

During this docket's Scoping Workshop on June 19, 2015, representatives for Portland General Electric (PGE) indicated that it had already retained Clean Power Research (CPR) to produce a methodology for valuing solar power that is similar to the methodology that this docket aims to produce. PGE further indicated that there is some overlap between the elements that CPR is considering for PGE, but that not all elements proposed in this docket appear in CPR's analysis. PGE also opined that because it has already paid for CPR's analysis, neither its ratepayers nor shareholders should be obligated to pay for the consultant that the PUC will hire and manage for this docket.

Because PGE has employed CPR and seems to have directed CPR's analysis for PGE's private methodology, CPR has a conflict of interest that should prevent the PUC from retaining it as the consultant under UM 1716. The only proper remedy for CPR's conflict of interest is full disclosure of all of PGE's influence over CPR's analysis and informed consent by all the parties in UM 1716. To remedy this conflict of interest, PGE's disclosure must include not only any payment to CPR, but also any instructions PGE gave to CPR regarding the substance or procedure of its work on PGE's behalf. It would likely prove much simpler for all parties to have the PUC choose a different consultant that has no conflicts of interest.

The PUC Staff has indicated that the consultant the PUC hires and manages will ultimately be paid for by the utilities. This is the proper outcome. Although PGE objects to this arrangement, PGE's actions in retaining CPR should not exempt it for its share of financial responsibility for hiring the consultant. This docket is the product Oregon House Bill 2893, which became effective May 18, 2013 and directed the PUC to "investigate the resource value of solar energy."[26] The investigation into the solar resource value would clearly require significant expertise of the type an outside consulting firm could furnish. Thus, it has been obvious for over two years that the PUC would hire a consultant as part of an investigation of the solar resource value. PGE should have foreseen that the docket would involve hiring a consultant and that neither PGE nor the utilities as a group would have free choice over which elements to consider in the resource value of solar. PGE's decision to hire its own consultant for its own private analysis should not exempt it from paying its fair share for a reasonably foreseeable consultant in this docket

[25] PUC Staff Memo, at 2.

[26] ORS 737.365 § 4; Oregon Legislative Information, *HB 2893*, https://olis.leg.state.or.us/liz/2013R1/Measures/Overview/HB2893.

VIII. Conclusion

Thank you for the opportunity to comment on the elements of the solar resource value, which provides a good foundation for a productive process moving forward. Incorporating the comments listed above will help ensure that the process is as comprehensive and accurate as possible.

Respectfully submitted July 20, 2015, by The Green Energy Institute at Lewis & Clark Law School.

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