

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON**

**UM 1716**

In the Matter of

OREGON PUBLIC UTILITY COMMISSION

Investigation to Determine the Resource  
Value of Solar.

Joint Comments of Renewable  
Northwest, Environment Oregon,  
and Oregon Solar Energy  
Industries Association

**I. INTRODUCTION**

Renewable Northwest appreciates the opportunity to comment to the Public Utility Commission (“the Commission”) on the approach and elements to create a foundational methodology for assessing resource value of solar (“RVOS”) in Oregon.

Renewable Northwest’s most important request is that the Commission consider the RVOS from perspectives beyond those of ratepayers and utilities. A broader approach can enable development of a methodology that is useful for legislators and policy makers, as well as regulators. An element chosen for consideration in a broader RVOS methodology—for example, because it has value from the societal perspective—does not need to be used by the Commission in designing rates or regulatory policy. However, this docket was initially requested by the Legislature, making the citizens of Oregon and their elected representatives important audiences to the results of this RVOS investigation. Their perspectives should be included in the analysis.

Regarding the elements to be examined, Renewable Northwest applauds the process developed by Staff that led to a large degree of consensus among stakeholders. The level of agreement revealed in document “Table 2—Compilation of Parties’ Elements of Resource Value of Solar Investigation” is testament to the effectiveness of Staff’s process. Renewable Northwest urges the Commission to credit the significant degree of consensus among stakeholders and move forward *at least* with the elements Staff recommends. In particular, most stakeholders—including some utilities—supported inclusion of environmental compliance costs in the RVOS investigation. Renewable Northwest strongly supports Staff’s recommendation to include environmental compliance costs.

The remainder of these comments will explain the importance of considering the RVOS from a variety of perspectives (Section II) and our view of Staff’s recommendations on select elements (Section III). Following concluding remarks (Section IV), we attach an appendix in which we respond to each element and concept (Section V).

## II. THE IMPORTANCE OF CONSIDERING DIFFERENT PERSPECTIVES IN OREGON'S RVOS INVESTIGATION

Renewable Northwest disagrees vehemently with Staff's recommendation that different customer and societal perspectives should not be considered as part of this RVOS investigation. The importance of recognizing and acknowledging differing perspectives when considering the solar resource value should not be underestimated. The solar resource value will contain different components when considered from different stakeholder perspectives: the utility; participating customers; non-participating customers; and society as a whole. These perspectives are those that would typically be examined in cost-effectiveness tests of energy efficiency programs, and are roughly equivalent to the following cost tests: Program Administrator Cost Test; Participant Cost Test; Ratepayer Impact Measure Test; and the Societal Cost Test.<sup>1</sup>

A robust, comprehensive solar resource value investigation should consider each of these diverse perspectives. Such perspectives will be valuable to a broad spectrum of stakeholders, including policy makers and legislators. Renewable Northwest does not make this recommendation lightly; this docket was originally set into motion by legislation (HB 2893), and therefore the legislature—and society as a whole—are an audience for this RVOS investigation.

Renewable Northwest is not advocating for the Commission to consider benefits or costs for rate-making purposes that are outside of its remit; rather, Renewable Northwest is recommending that the Commission enable the consultant to consider the RVOS both broadly and from a variety of perspectives. Such an investigation will engender valuable results: some of which will be appropriate for the Commission to use for rate-making purposes, during integrated resource planning, or solar policy analysis; some of which will be invaluable to legislators in designing solar policy; some of which will be useful for utilities as they consider their future business models; and, some of which will be informative to customers as they consider their options.

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<sup>1</sup> See, e.g., California Public Utility Commission, "California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects", October 2001.  
[www.cpuc.ca.gov/nr/rdonlyres/004abf9d-027c-4be1-9ae1-ce56adf8dadcd0/cpuc\\_standard\\_practice\\_manual.pdf](http://www.cpuc.ca.gov/nr/rdonlyres/004abf9d-027c-4be1-9ae1-ce56adf8dadcd0/cpuc_standard_practice_manual.pdf)

### III. ELEMENTS TO EXPLORE IN OREGON'S RVOS

Renewable Northwest concurs with Staff's general understanding that exploring an element does not necessarily mean that it will ultimately be included in the RVOS; it is for the consultant to investigate whether or not the elements can be quantified and should be included in the methodology. If an element is included in the Request for Proposal ("RFP") for the consultant, the consultant may or may not design a methodology that is able to quantify an element. Furthermore, even if a RVOS methodology includes an element beyond the Commission's traditional scope—such that one that may be useful from a legislator's or societal perspective—this does not affect the Commission's discretion regarding what to consider or include when designing rates or deliberating policy.

Renewable Northwest agrees to a significant extent with Staff's recommendations on which elements should be explored and which excluded. All elements have been addressed in detail in an appendix (Section V) attached at the end of these comments. The comments in this section will focus on where Renewable Northwest's views differ from Staff's and where Renewable Northwest supports strongly a particular staff recommendation and urges the Commission to retain that element in the RVOS investigation.

#### **Elements Staff Recommended for Exclusion That Should Be Included**

Renewable Northwest disagrees with Staff's recommendation to exclude economic development (element 16), health (element 17), and environmental externalities (element 26) from the RVOS investigation.

#### *Economic Development (element 16) and Health (element 17)*

When considering the solar resource value from different perspectives, previous studies into distributed generation in other states—such as New Jersey, Pennsylvania and Rhode Island—have taken into account the economic development value associated with solar.<sup>2</sup> Furthermore, there is value in requesting the consultant to consider health impacts as well, either explicitly or implicitly as part of another societal element. While the Commission may not be situated to assign a recoverable monetary value to such benefits—especially when considering the solar resource value from the utility perspective—it could still be accounted for when considering cost-effectiveness from other perspectives and developing other forms of solar policy. Such perspectives will be valuable to a broad spectrum of stakeholders, including legislators and policy makers.

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<sup>2</sup> See Clean Power Research, "The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania", 2012 <http://mseia.net/site/wp-content/uploads/2012/05/MSEIA-Final-Benefits-of-Solar-Report-2012-11-01.pdf> and see Rhode Island Office of Energy Resources, "Distributed Generation Standard Contracts and Renewable Energy Fund—Jobs, Economic and Environmental Impact Study", April 2014 [www.energy.ri.gov/documents/DG/RI%20Brattle%20DG-REF%20Study.pdf](http://www.energy.ri.gov/documents/DG/RI%20Brattle%20DG-REF%20Study.pdf)

### *Environmental Externalities (element 26)*

Renewable Northwest acknowledges that ocean acidification, ocean warming, water usage, and water pollution are all important societal considerations, and to the extent that they can be quantified, they should be investigated and their ultimate inclusion or exclusion should be decided by the consultant. The potential quantifiable value of avoided environmental harms certainly will be of interest to many stakeholders.

### **Elements Staff Recommended for Inclusion That Could Be Excluded**

Renewable Northwest disagrees with Staff's recommendation for the inclusion of interconnection impacts (element 9), natural gas pipeline impact (element 14), and impacts on demand side management ("DSM", element 24) in the RVOS investigation. To the extent that natural gas pipeline impacts are included, the effects should be considered as part of avoided capacity additions as it may already be included in calculating the avoided capacity cost.

### *Interconnection Impacts (element 9)*

The participating customer is responsible for the cost of interconnection, making this element directly relevant only if the RVOS is examined from the participating customer perspective. However, if the consultant is to explore impacts beyond those traditionally included in a RVOS investigation, Renewable Northwest can see value in exploring any potential non-linear relationship in Oregon between increasing solar penetration and interconnection costs, e.g. investigating the level of solar penetration on a feeder line that triggers the need for transformer upgrades and therefore increased interconnection costs. This topic is likely to be explored during Investigation 3, Reliability Impacts of Solar, and is not necessary to include here.

### *Demand Side Management (element 24)*

Renewable Northwest acknowledges the important role of DSM, but its consideration (and any comparison to solar) should take place after the RVOS investigation, not during. Staff's perspective is that this should be included because, "as utility revenues fall, less funding will go to the public purpose charge resulting in less investment in energy efficiency."<sup>3</sup> This argument could also be extended to energy efficiency itself, and thus to the public purpose charge itself, leading to the conclusion that such endeavors are self-defeating. Energy efficiency and load reduction through on-site generation are not self-defeating endeavors; Renewable Northwest recommends that this element should not be included as part of the RVOS investigation.

### **Elements Staff Recommended for Inclusion That Are Important to Retain**

Renewable Northwest agrees strongly with staff's recommendation to include current environmental compliance costs (element 26) in the RVOS investigation, including carbon costs (associated with the imminent regulation of emissions from

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<sup>3</sup> Staff Memo, Investigation to Determine the Resource Value of Solar, UM 1716, 15 July 2015, p 10.

existing fossil fuel plants through section 111(d) of the Clean Air Act), costs associated with existing regulation of NO<sub>x</sub>/Sox/Particulates, and other current regulation (such as Mercury Air Toxics). The quantifiable value of avoided environmental costs and harms certainly will be of interest to many stakeholders including utilities, rate-payers, citizens and legislators.

Renewable Northwest also agrees strongly with staff's recommendation to include environmental compliance costs from future carbon regulations. Exploring the RVOS under a range of future carbon prices would be an informative exercise. Even so, Renewable Northwest agrees with staff's recommendation to exclude future regulation of NO<sub>x</sub>/SO<sub>x</sub>/Particulates and other potential as yet unknown future environmental compliance requirements from the RVOS investigation as such elements would be highly speculative and likely uninformative.

Renewable Northwest notes that in discussing solar benefit estimates, the Commission's "Investigation into the Effectiveness of Solar Programs in Oregon" ("Solar Report") relied heavily on the 2013 Rocky Mountain Institute ("RMI") survey of sixteen solar resource value studies other states.<sup>4</sup> Eleven out of those sixteen investigations examined environmental attributes.<sup>5</sup> If the Commission determines that it is inappropriate for environmental values to be incorporated, Renewable Northwest recommends that the Commission provide a detailed explanation as to why.

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<sup>4</sup> Oregon Public Utility Commission, "UM 1716—Scope Development for Investigation Oregon's Resource Value of Solar", pp19–20, April 2015.

<sup>5</sup> Rocky Mountain Institute, "A Review of Solar PV Benefit and Cost Studies", p2.  
[www.rmi.org/cms/Download.aspx?id=10793&file=eLab\\_DERBenefitCostDeck\\_2nd\\_Edition&title=A+Review+of+Solar+PV+Benefit+and+Cost+Studies](http://www.rmi.org/cms/Download.aspx?id=10793&file=eLab_DERBenefitCostDeck_2nd_Edition&title=A+Review+of+Solar+PV+Benefit+and+Cost+Studies)

#### IV. CONCLUSION

In order for UM 1716 to deliver a robust, comprehensive RVOS methodology, the Commission should incorporate the elements recommended above into a consultant RFP. The perspectives of the utility, participating solar customers, non-participating customers, and society as a whole should be considered when determining and quantifying the elements of the RVOS. Furthermore, Renewable Northwest recommend that it is appropriate to consider environmental impacts—whether compliance costs or as-yet-unquantified externalities or both—especially given the importance and validity of different perspectives on the RVOS.

We note that UM 1716 comprises three investigations: #1 the RVOS; #2 fixed cost recovery; and, #3 reliability impacts of solar. Renewable Northwest appreciates Staff's attempts to untangle the interaction among these investigations and UM 1719, as presented in Attachment A to the Staff Memo. Renewable Northwest believes that this complicated web of policy, data, intra-docket investigations, and inter-docket connectivity can be navigated successfully.

Renewable Northwest again applauds the process developed by Staff that led to a large degree of consensus among a broad spectrum of stakeholders. Renewable Northwest looks forward to participating in the remainder of Investigation 1 (resource value of solar), and the forthcoming Investigation 2 (fixed cost recovery) and Investigation 3 (reliability impacts of solar).

RESPECTFULLY SUBMITTED this 20th day of July, 2015.

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## **V. APPENDIX—DETAILED COMMENTS ON ELEMENTS TO EXPLORE FOR OREGON'S RVOS**

The comments below clarify Renewable Northwest's position on which elements should be explored for Oregon's RVOS and why, as well as the extent of agreement with Staff's recommendations.

### **1. Avoided Energy Impacts**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. Solar resource value investigations typically include avoided energy impacts. The net effect of distributed solar is to displace the highest variable cost generators that are on the dispatch margin and able to reduce their output. The energy related costs of that avoided marginal generation comprise the avoided energy impact.

### **2. Avoided Capacity Additions**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. A significant fraction of a customer's bill consists of costs associated with building power plants. The ability of solar to reduce or defer these costs is based on its capacity value, which allows it to defer investments in generation capacity. The methods used to calculate the capacity value are being discussed in UM 1719, but commonly involve an Effective Load Carrying Capability calculation or an equivalent approximation.

### **3. Line Losses**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. Distributed solar is typically located at, or close, to the load it serves, providing value by avoiding the line losses that would otherwise have been incurred in transmitting and distributing power from a central station power plant.

### **4. Avoided Transmission and Distribution**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. Distributed solar typically relieves the requirement to supply some of the load at a particular location through the transmission and distribution network, effectively reducing or deferring the need for additional transmission and distribution capacity.

### **5. Compliance value: reduced RPS procurement due to reduced utility sales**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. Solar PV that is capable of serving customer load has the effect of reducing the total energy demand that a utility has to meet. Concomitantly, this reduces the associated renewable energy that would have to be procured as mandated by the Renewable Portfolio Standard.

### **6. Security: Reliability, Resiliency, and Disaster Recovery**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. Generation located close to demand can lead to reduced transmission and distribution congestion, as well as minimizing the probability of outages through a dispersal of diverse generation. The increased penetration of solar and distributed generation in general could lead to a significant increase in system resiliency and stability.

Looking into the near future, the colocation of electricity storage with solar PV offers up the possibility of increasing the solar resource value in various categories. As well as enabling solar PV systems to be able to better respond to demand, storage combined with solar has a future role in emergency preparedness. Solar PV could provide power to customers safely during a power outage, whether that is a private residence, hospital, school emergency shelter or other public building. Renewable Northwest recommends the impacts of storage on the RVOS, in particular with regard to this element and element 11 (ancillary services and grid support), for consideration by the consultant.

#### **7. Utility: Integration Impacts**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. While current integration costs are likely low owing to the low penetration of solar in Oregon, investigation of this element should explore the effect (if any) of increasing penetration of solar on integration costs (for solar exported to the grid) and benefits of reduced reserve margins (for solar that reduces load).

#### **8. Utility: Administration Impacts**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. Utilities should be allowed to recover reasonable administrative costs in situations where the administrative cost associated with behind-the-meter generation exceeds the comparable metering and billing costs for regular utility customers.

#### **9. Utility: Interconnection Impacts**

Renewable Northwest disagrees with staff's recommendation to include this element in the RVOS investigation. The participating customer is responsible for the cost of interconnection. However, if the consultant is to explore impacts beyond those traditionally included in a RVOS investigation, Renewable Northwest can see value in exploring any potential non-linear relationship in Oregon between increasing solar penetration and interconnection costs

#### **10. Financial: Market Price Response**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. In markets where the wholesale electricity price is largely based on the variable costs of the most expensive generator required to meet demand in any hour, solar lowers net demand during the hours it is generating and



can suppress market clearing prices by pushing out the supply curve and reducing the need for more expensive generation assets to be dispatched in any given hour.

### **11. Ancillary Services and Grid Support**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. Ancillary services and grid support represent a broad array of services that can help system operators maintain a reliable grid with sufficient power quality. The impact of solar will be based on the penetration level. As solar penetration is expected to increase, it would behoove this docket to investigate the extent of this value and how it can be maximized. Furthermore, as discussed in element 6 (Security: Reliability, Resiliency and Disaster Recovery), Renewable Northwest recommends that the combination of solar and storage, and the resulting increased ability to deliver ancillary services and grid support, be considered by the consultant.

### **12. Financial: Fuel Price Hedge (Adjustable mechanism)**

Renewable Northwest agrees with staff's recommendation to include this element in the RVOS investigation. The fuel price hedge is driven by assumptions about natural gas price volatility, and the difficulty of accurately predicting price changes.

Renewable Northwest recommends that the RVOS methodology capture the benefits of avoiding volatility and long term increases in fuel price. Furthermore, as solar does not require the purchase of any fuels, and has modest operating costs, it also provides a hedge against inflation in general.

The uncertainty in future fuel prices is demonstrated by the range, and changing range, of gas prices as forecast by the Northwest Power and Conservation Council ("Council"). For example, Figure 1 shows that in the Council's Sixth Power Plan, gas price forecasts for 2025 ranged from a low of about \$5.5/mmBTU to a high of about \$11/mmBTU, while the draft Seventh Power Plan forecasts a range of about \$3.75/mmBTU to \$7/mmBTU. This snapshot is a clear indication of how difficult to forecast natural gas prices can be, and of the value of solar resources in providing a hedge against this volatility.

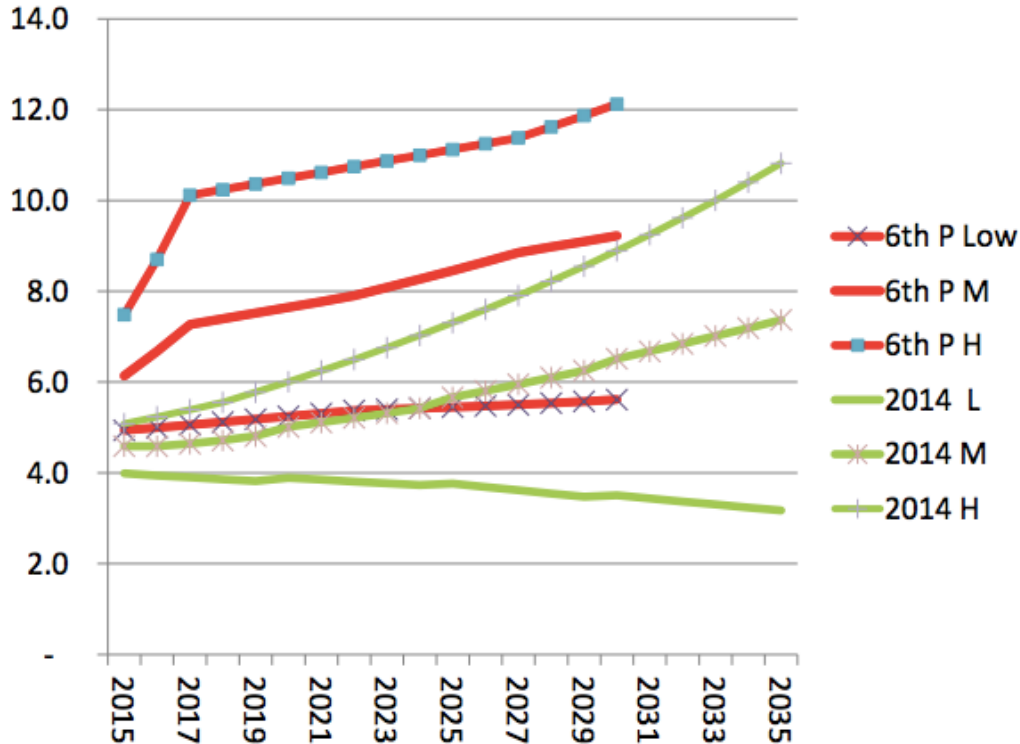


Figure 1—Northwest Power and Conservation Council Sixth Power Plan Henry Hub Natural Gas Price Forecast compared to Draft Forecast for the Seventh Plan [\$2012/mmBTU].<sup>6</sup>

### 13. Operational Impacts—Enhanced forecasting, scheduling, resulting from availability of solar.

Renewable Northwest agrees with staff’s recommendation to include this element in the RVOS investigation. Increasing penetration of solar could result in a reduction in variable operating costs (such as pollution controls) and/or fixed operating costs (such as planned maintenance activities) of other power plants. Furthermore, an increase in regional solar would lead to an increase in regionally specific solar data. Such data would improve the integration of solar into the utility IRP process, potentially increasing solar value and decreasing solar costs.

### 14. Avoided Natural Gas Pipeline Impacts

Renewable Northwest disagrees with staff’s recommendation to include this element explicitly in the RVOS investigation. To the extent that it is included, this element should be considered as part of avoided capacity additions, as it may already be included in calculating the avoided capacity cost.

### 15. Rate impacts: Net Metering Credits

Renewable Northwest agrees with staff’s recommendation to exclude this element from the RVOS investigation. This element is the sum of other elements for

<sup>6</sup> NWPCC, “Revised Fuel Price Forecast for the Seventh Power Plan”, July 2014. [www.nwcouncil.org/media/7113626/Council-FuelPriceForecast-2014.pdf](http://www.nwcouncil.org/media/7113626/Council-FuelPriceForecast-2014.pdf)

consideration in the RVOS—elements that Renewable Northwest recommends for consideration—so while it would be useful to calculate, it does not need to be considered separately. It is likely that many of the elements explored by the consultant will be used to explore the issue of rate impacts and net metering credits during Investigation 2 (fixed cost recovery).

#### **16. Societal: Economic Development**

Renewable Northwest disagrees with staff's recommendation to exclude this element from the RVOS investigation. When considering the solar resource value from different perspectives, previous studies into distributed generation in other states—such as New Jersey, Pennsylvania and Rhode Island—have taken into account the economic development value associated with solar.<sup>7</sup> While the Commission may not be situated to provide value for such a benefit—especially when considering the solar resource value from the utility perspective—it could still be accounted for when considering cost-effectiveness from other perspectives and developing other forms of solar policy. Such perspectives will be valuable to a broad spectrum of stakeholders, including legislators and policy makers.

#### **17. Health and Other Societal Impacts**

Renewable Northwest disagrees with staff's recommendation to exclude this element from the RVOS investigation. Renewable Northwest thinks there is value in considering this element, either explicitly here, or implicitly as part of another societal element.

#### **18. Capital Risk—Decreased risk of capital and cost due to system impacts of solar.**

Renewable Northwest agrees with staff's recommendation to exclude this element from the RVOS investigation. While investments in modular solar systems can avoid the need for a utility to expose large amounts of capital (through an investment in a large central station generation facility) to market and interest fluctuations, this value is likely to be difficult to quantify.

#### **19. Utility—Production Impacts (IRP Process)**

Renewable Northwest agrees with staff's recommendation to exclude this element from the RVOS investigation. While it is a valuable exercise to explore the levelized cost of production over the lifetime of a solar project, such an exploration is traditionally conducted outside of a RVOS investigation.

#### **20. Behind-the-Meter Production During Billing Month**

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<sup>7</sup> See Clean Power Research, "The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania", 2012 <http://mseia.net/site/wp-content/uploads/2012/05/MSEIA-Final-Benefits-of-Solar-Report-2012-11-01.pdf> and see Rhode Island Office of Energy Resources, "Distributed Generation Standard Contracts and Renewable Energy Fund—Jobs, Economic and Environmental Impact Study", April 2014 [www.energy.ri.gov/documents/DG/RI%20Brattle%20DG-REF%20Study.pdf](http://www.energy.ri.gov/documents/DG/RI%20Brattle%20DG-REF%20Study.pdf)

Renewable Northwest agrees with staff's recommendation to exclude this element from the RVOS investigation. This element includes all the other elements related to load reduction in this table (avoided energy, capacity, etc.), so may be more of a summary element than a distinct inquiry.

#### **21. Resource Need**

Renewable Northwest agrees with staff's recommendation to exclude this element from the RVOS investigation. The resource need is already accounted for in the existing IRP process, and the components that this element would be comprised of are already recommended, so this additional element is not required.

#### **22. Rate Impacts: Lost Utility Revenue**

Renewable Northwest agrees with staff's recommendation to exclude this element from the RVOS investigation. Whether through energy efficiency, customer-sited generation, or just a change in circumstances, customers should not be penalized for using less energy. If a non-decoupled utility is having problems with fixed cost recovery that issue should be resolved through a rate case proceeding. Furthermore, this issue will be explored in Investigation 2.

#### **23. Tax credits (State and Federal)**

Renewable Northwest agrees with staff's recommendation to exclude this element from the RVOS investigation, as such incentives are paid out of the general tax base. While such an element would be of interest to legislators and policy makers, it would only benefit this investigation if it was compared to the tax credits afforded to rest of the energy sector.

#### **24. DSM Alternative**

Renewable Northwest disagrees strongly with staff's recommendation to include this element in the RVOS investigation. Renewable Northwest acknowledges the role of DSM, but its consideration (and any comparison) should take place after the solar resource value investigation, not during. Staff's perspective is that this should be included because, "as utility revenues fall, less funding will go to the public purpose charge resulting in less investment in energy efficiency".<sup>8</sup> Such an argument can also be extended to energy efficiency itself, and the public purpose charge itself, leading to the conclusion that such endeavors are self-defeating. Energy efficiency and load reduction through on-site generation are not self-defeating endeavors; this element should not be included as part of the RVOS investigation.

#### **25. Environment: Compliance Impacts**

Renewable Northwest agrees strongly with staff's recommendation to include current environmental compliance costs this element from the RVOS investigation, including carbon costs (associated with the imminent regulation of emissions from existing fossil fuel plants through section 111(d) of the Clean Air Act), costs

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<sup>8</sup> Staff Memo, Investigation to Determine the Resource Value of Solar, UM 1716, 15 July 2015, p 10.

associated with existing regulation of NO<sub>x</sub>/SO<sub>x</sub>/Particulates, and other current regulation (such as Mercury Air Toxics). The quantifiable value of avoided environmental costs and harms certainly will be of interest to many stakeholders including utilities, rate-payers, citizens and legislators.

Renewable Northwest also agrees strongly with staff's recommendation to include this the environmental compliance costs from future carbon regulations in the RVOS investigation. Exploring the RVOS under a range of future carbon prices would be an informative exercise. Even so, Renewable Northwest agrees with staff's recommendation to exclude future regulation of NO<sub>x</sub>/SO<sub>x</sub>/Particulates and other potential as yet unknown future environmental compliance requirements from the RVOS investigation as such elements would be highly speculative and uninformative.

Renewable Northwest notes that in discussing solar benefit estimates, the Commission's "Investigation into the Effectiveness of Solar Programs in Oregon" ("Solar Report") relied heavily on the 2013 Rocky Mountain Institute ("RMI") survey of sixteen solar resource value studies other states.<sup>9</sup> Eleven out of those sixteen investigations examined environmental attributes.<sup>10</sup> If the Commission determines that it is inappropriate for environmental values to be incorporated, Renewable Northwest recommends that the Commission provide a detailed explanation as to why.

## **26. Environment: Externalities**

Renewable Northwest disagrees with staff's recommendation to exclude this element from the RVOS investigation Renewable Northwest acknowledges that ocean acidification, ocean warming, water usage, and water pollution are all important societal considerations, and to the extent that they can be quantified, they should be investigated and their ultimate inclusion or inclusion should be decided by the consultant. The potential quantifiable value of avoided environmental and harms certainly will be of interest to many stakeholders including rate-payers, citizens and legislators.

## **CONCEPTS TO INCLUDE IN OREGON'S RESOURCE VALUE OF SOLAR INVESTIGATION**

During the scoping workshops, stakeholders identified certain elements that would affect all other elements. Rather than consider such factors in isolation, it was instead recommended that they be considered as potential overarching concepts. As

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<sup>9</sup> Oregon Public Utility Commission, "UM 1716—Scope Development for Investigation Oregon's Resource Value of Solar", pp19–20, April 2015.

<sup>10</sup> Rocky Mountain Institute, "A Review of Solar PV Benefit and Cost Studies", p2. [www.rmi.org/cms/Download.aspx?id=10793&file=eLab\\_DERBenefitCostDeck\\_2nd\\_Edition&title=A+Review+of+Solar+PV+Benefit+and+Cost+Studies](http://www.rmi.org/cms/Download.aspx?id=10793&file=eLab_DERBenefitCostDeck_2nd_Edition&title=A+Review+of+Solar+PV+Benefit+and+Cost+Studies)

explained in Section I, Renewable Northwest disagrees strongly with Staff's recommendation that the RVOS should not be considered from perspectives beyond those of a utility and ratepayer.

Renewable Northwest agrees with Staff's recommendation to consider the type of solar technology (fixed, single-axis tracking, dual axis tracking), and the solar PV scale (residential, commercial, utility) when undertaking consideration of the above elements in a calculation of the RVOS for Oregon. Renewable Northwest also agrees with Staff that the location of a solar PV system should be taken into account, while acknowledging that the costs and/or benefits associated with location would likely already be captured by such elements as avoided energy, avoided capacity, line losses, avoided transmission and distribution, security, integration impacts, and ancillary services and grid support.

Finally, Renewable Northwest disagrees with Staff's recommendation that the levelized costs of solar should be considered as part of a RVOS investigation. While such an exercise is extremely useful, such an inquiry would build upon a RVOS calculation rather than be part of it.