BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON

UM 1716

In the Matter of OREGON PUBLIC UTILITY COMMISSION Comments on Scope Development for Investigation into Oregon's Resource Value of Solar	Joint Comments of Renewable Northwest, Environment Oregon, The Green Energy Institute at Lewis and Clark Law School, NW Energy Coalition, Northwest Sustainable Energy for Economic Development, Obsidian Renewables LLC, Oregon Solar Energy Industries Association, Oregon Chapter—Sierra Club, Oregonians for Renewable Energy Progress

. INTRODUCTION

The opportunity to comment on the Scope Development for the Investigation into Oregon's Resource Value of Solar ("Scope Development") is welcome. The undersigned parties ("the Parties") to UM 1716 have agreed on the following observations, comments and recommendations. These comments are structured for ease of comparison with the Scope Development. At this stage of the docket, the comments have been restricted to the scope of the investigation and do not address any issues related to particular policy outcomes.

The Parties recommend that the solar resource be evaluated from four perspectives: the utility; the participating solar customer; the non-participating customer; and society as a whole. The Parties recommend that a technical advisory committee be set up to support the Commission during the investigation. The Parties also

recommend that the Commission incorporate environmental values in this investigation from the outset.

The Parties would like to acknowledge and applaud Staff's work in drafting a well-structured scope for the investigation. The parties look forward to continuing the docket with the Oregon Public Utility Commission ("the Commission") in such a well-structured way.

II. UM 1716—DELIVERABLES LIST FOR SCOPING PHASE

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.[1] 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.

[1] 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-ce56adf8dadc/0/cpuc_standard_practice_manual.pdf

III. SCHEDULE

As indicated in the Scope Development, all parties to UM 1716 agreed to the procedural schedule for Phase One ("Scoping Phase") of this investigation. Phase One is to be followed by:

- Phase 2—development of detailed methodologies and values; and
- Phase 3—exploration to determine the extent, if any, of the cost-recovery issue in Oregon.

Phases 2–3 are proposed to be held concurrently. However, the extent of the utility cost-recovery issue (Phase 3), if any, cannot be quantifiably determined until the results of Phase 2 have been reported (this does not rule out a *qualitative* discussion of fixed cost recovery issues and components). Furthermore, Phases 2–3 could also interact significantly with UM 1719 (Investigation of Renewable Generator's Contribution to Capacity). The Parties recommend that the Commission provide clarity on how Phase 2 (detailed methodologies and values), Phase 3 (exploration of fixed cost recovery), and UM 1719 will run concurrently given the extent to which they interact.

IV. OPTIONS TO INCORPORATE EXTERNAL EXPERTISE

The Parties respectfully recommend that a technical advisory committee be set up to support the Commission during the investigation. A panel of independent experts with prior experience of conducting solar resource value studies would contribute to an efficient, transparent and robust investigation.

Clarification on the relationship between such a group of experts and the technical advisory committee proposed for UM 1719 would be welcome. For example, whether an expert could be in both groups, or even whether both groups could be the same given the opportunity for symbiosis between UM 1716 and UM 1719.

V. ELEMENTS TO USE WHEN DETERMINING THE RESOURCE VALUE OF SOLAR

Overall, the components of the solar resource value listed in the Scope Development form a sound foundation for the Commission's investigation. As referred to in Section II, in order for a solar resource value investigation to be comprehensive and transparent, the perspectives from which the values are being considered must be recognized and acknowledged. The Parties will make specific comments on the following solar resource value costs and benefits.

Economic Development

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.[2] While the Commission may not be situated to provide value for such a benefit—especially when considering the solar

[2] 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

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.

Solar PV Scale

When considering the solar resource value, it is essential that the scale and type of solar PV is acknowledged: rooftop solar, commercial, community solar, or utility scale solar. For example, distributed solar located on the property where the power is consumed would avoid transmission losses, which may not be the case for utility scale solar located far from load.

Solar PV Lifetime

Furthermore, it is vital that the values are calculated to accrue over the full reasonable life of the solar array. While integrated resource plans look only 20 years ahead, solar PV resources typically have a useful life of 30 years. A 2012 study from the National Renewable Energy Laboratory ("NREL") suggested that solar PV systems would have an operating capacity of over 80% of capacity after 40 years.[3] Nevada, in their solar resource investigation, used a lifetime of 25 years when they evaluated the impact of net metering.[4]

[3] NREL, "Photovoltaic Degradation Rates—An Analytical Review", June 2012. Median degradation rate of 0.5% per year equates to approximately 82% capacity after 40 years.awww.nrel.gov/docs/fy12osti/51664.pdf

[4] E3 for State of Nevada PUC, "Nevada Net Energy Metering Impacts", July 2014

Environmental Values

The Scope Development noted that, "environmental values will be incorporated if and when appropriate".[5] The Parties recommend that environmental values be considered and incorporated from the outset, as the quantifiable value of avoided environmental costs and harms certainly will be of interest to many stakeholders including utilities, rate-payers, citizens and legislators.

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.[6] Eleven out of those sixteen investigations examined environmental attributes.[7] If the Commission determines that it is inappropriate for environmental values to be incorporated, the Parties recommend that the Commission provide a detailed explanation as to why.

There are many different types of environmental costs and benefits. They can include the value of avoided carbon dioxide and other greenhouse gases (including fugitive methane emissions from the extraction and transportation of natural gas),

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http://puc.nv.gov/uploadedFiles/pucnvgov/Content/About/Media_Outreach/Announcements/Announcements/E3%20PUCN%20NEM%20Report%202014.pdf?pdf=Net-Metering-Study.

[5] Oregon Public Utility Commission, "UM 1716—Scope Development for Investigation Oregon's Resource Value of Solar", p6, April 2015.

[6] Ibid pp19–20.

[7] 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

avoided criteria air pollutants (NOx, SO_2 and particulate matter from combustion, including the scenario when electric vehicles fueled by clean power displace traditional transportation), reduced water usage, and reduced land footprint for generation.[8] Such environmental costs and benefits are composed of both avoided environmental compliance costs—which would be of interest to the utility and ratepayers—and actual avoided environmental harms, which are of interest to society as a whole. Furthermore, avoidance of carbon emissions would also provide a hedge against a rising carbon price in the future, not to mention the partial mitigation of the environmental harms that are a result of such emissions.

Fuel Price Hedge

Parties welcome the inclusion of a Fuel Price Hedge in the benefits to be considered. 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 fuel price hedge is driven by assumptions about natural gas price volatility, and the difficulty of accurately predicting price changes. The Parties recommend that the solar resource value methodology find some way to capture the benefits of avoiding volatility and long term increases in fuel price.

This uncertainty is demonstrated in the range, and changing range, of gas prices as forecast by the Northwest Power and Conservation Council (" Council"). For

[8] Rocky Mountain Institute, "A Review of Solar PV Benefit and Cost Studies", p17. www.rmi.org/cms/Download.aspx?id=10793&file=eLab_DERBenefitCostDeck_2nd_Edition&title=A+Review+of+Solar+PV+Benefit+and+Cost+Studies

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.

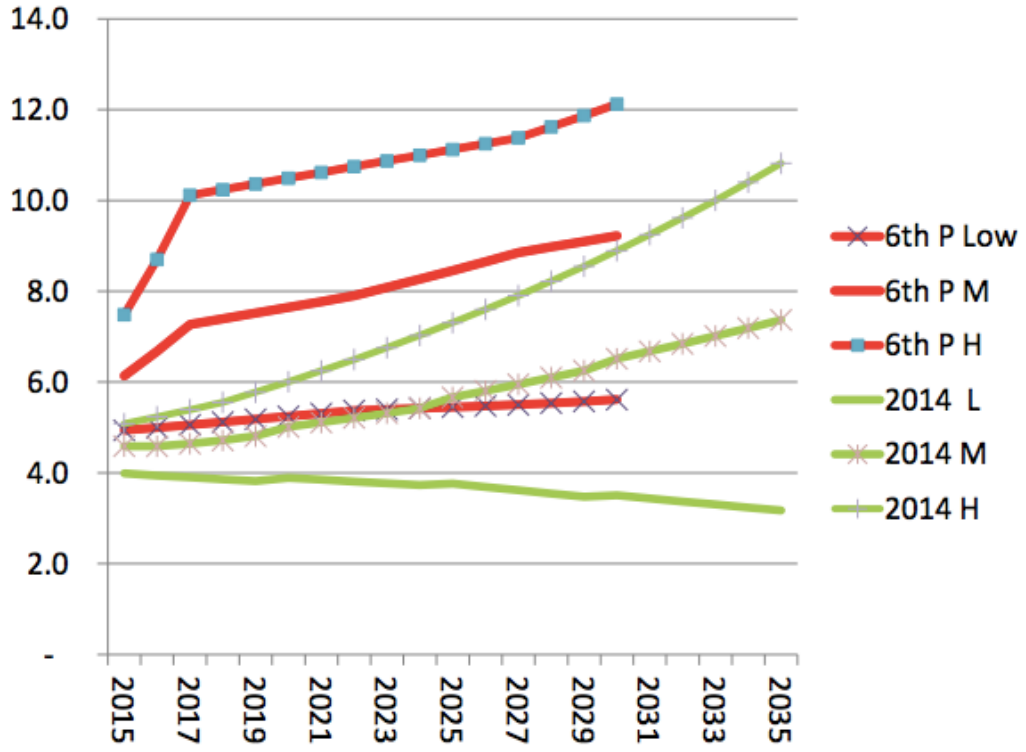

Figure 1—Northwest Power and Conservation Council Sixth Power Plan Henry Hub Natural Gas Price Forecast compared to Draft Forecast for the Seventh Plan [$2012/mmBTU].[9]

Avoided Renewable Energy Costs

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

[9] NWPCC, "Revised Fuel Price Forecast for the Seventh Power Plan", July 2014. www.nwcouncil.org/media/7113626/Council-FuelPriceForecast-2014.pdf

renewable energy that would have to be procured as mandated by the Renewable Portfolio Standard. When describing this benefit, the Scope Development states that, "Customer-owned DG satisfies customer demand to be served with a penetration of renewable generation in excess of the utility's RES requirements, and thus can avoid the costs which the utility would incur to meet such customer preferences through green pricing programs or other initiatives."[10] The Parties have observed that green pricing programs (such as those being explored in UM 1690) or "other initiatives," such as community solar or premium solar REC programs, are not mutually exclusive. These other initiatives can provide customers with unique access to solar value streams that would otherwise be unavailable without the ability or desire to site solar PV on their property. The Parties recommend that Avoided Renewable Costs be restricted to the benefits associated with decreased load (and therefore decreased renewable portfolio standard obligations).

VI. EXPLORE RELIABILITY IMPACTS FROM SOLAR FOR OREGON

Phase 4 of this investigation proposes to "[d]etermine the threshold for Oregon, defining at what point we may see reliability impacts from solar on the stability of the grid".[11] The Parties recommend that Phase 4 also consider how solar could contribute *to* the reliability and stability of the grid. Modern power electronics and smart inverters have the potential to enable solar PV systems to respond to changes in voltage and frequency in a manner that contributes to grid reliability.

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[10] Oregon Public Utility Commission, "UM 1716—Scope Development for Investigation Oregon's Resource Value of Solar", p6, April 2014

[11] Oregon Public Utility Commission, "UM 1716—Scope Development for Investigation Oregon's Resource Value of Solar", p7, April 2014.

The potential colocation of electricity storage with 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. The Parties recommend the impacts of the storage on the solar resource value be considered in the initial phase of this investigation. If Phase 4 took these potential resiliency benefits into account, rather than just focusing on challenges, UM 1716 could lead to recommendations that could support policies to eventually enable these benefits.

The question of solar penetration and reliability has also been explored at the state and federal level. The Small Generator Interconnection Procedures ("SGIP") were adopted by the Federal Energy Regulatory Commission ("FERC") in 2005, and apply to distributed energy resources up to 20 MW in capacity that fall under federal jurisdiction. The interconnection procedures that were developed were intended to be a model rule for consideration by state public utility commissions.

Most state interconnection procedures allow for expedited interconnection without additional technical studies if the proposed interconnection passes a series of technical screens. In 1999, before FERC set the SGIP, the California Public Utility Commissions established a 15% capacity threshold to identify situations where the

amount of distributed generation capacity on a line section exceeds 15% of the line section's annual peak load. This 15% threshold was subsequently adopted by FERC for the SGIP. Penetrations above this threshold trigger the need for supplemental reliability studies.

Given the rapid growth and widespread deployment of solar PV system embedded in distribution grids across the country, the National Renewable Energy Laboratory ("NREL") undertook a review of the SGIP in order to ensure they were as streamlined as possible so as to avoid unnecessary studies, costs and delays.[12] NREL observed that there are many circuits across the United States and Europe with PV penetration levels well above 15% where system performance, safety, and reliability have not been materially affected, suggesting the existing 15% screen is indeed conservative.

In 2013 FERC updated the supplemental review process for interconnections that would exceed the 15% penetration level. If the aggregate generation capacity on a power line section is less than 100% of the minimum load, the small generation facility can interconnect if it passes two additional screens for voltage/power-quality and safety/reliability.[13] The Commission determined that the 100%

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[12] Updating Interconnection Screens for PV system Integration, U.S. Department of Energy, National Renewable Energy Agency, 2012.
energy.sandia.gov/wp/wp-content/gallery/uploads/Updating_Interconnection_PV_Systems_Integration.pdf

[13] FERC, "Small Generator Interconnection Procedures and Agreements", November 2012, p81.
www.ferc.gov/whats-new/comm-meet/2013/112113/E-1.pdf

minimum load screen appropriately balanced the considerations of flexibility and reliability.

For comparison, the Commission's Solar Report noted that in 2013, 77 MW of solar PV had been installed, compared to peak load for the state of 8,200 MW.[14] While this solar PV is not uniformly distributed across Oregon, and some feeders will have more solar PV on them than others, even so, on average this equates to a statewide penetration of less than 1%.

VII. CONCLUSION

The Parties recommend that in order for UM 1716 to be comprehensive and robust, 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 solar resource value. Furthermore, the Parties recommend that it is appropriate from the outset of this investigation to consider environmental values, especially given the importance and validity of different perspectives on the solar resource value. In addition, the Parties recommend that a technical advisory committee be set up to support the Commission during the investigation.

The Parties also recommend that the Commission provide clarity on how Phase 2 (detailed methodologies and values), Phase 3 (exploration of fixed cost recovery),

[14] Oregon Public Utility Commission, "Investigation into the Effectiveness of Solar Programs in Oregon", p3, July 1, 2014.

and UM 1719 (Investigation of Renewable Generator's Contribution to Capacity) will run concurrently given the extent to which they interact.

The Parties appreciate the opportunity to comment on the Scope Development and look forward to engaging with the Commission and other stakeholders through this important investigation.

RESPECTFULLY SUBMITTED this 30th day of April, 2015.

RENEWABLE NORTHWEST
ENVIRONMENT OREGON
THE GREEN ENERGY INSTITUTE AT LEWIS AND CLARK LAW SCHOOL
NORTHWEST SUSTAINABLE ENERGY FOR ECONOMIC DEVELOPMENT
NW ENERGY COALITION
OBSIDIAN RENEWABLES, LLC
OREGON SOLAR ENERGY INDUSTRIES ASSOCIATION
OREGON CHAPTER, SIERRA CLUB
OREGONIANS FOR RENEWABLE ENERGY PROGRESS

/s/ Michael O'Brien

Michael O'Brien
Energy Policy Analyst
Renewable Northwest Project
421 SW 6th Avenue, Ste. 1125
Portland, OR 97204
(503) 223-4544
michael@renewablenw.org