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.	Comments

STAFF RECOMMENDATION:

Staff recommends the Oregon Public Utility Commission (OPUC) issue an order specifying that the following elements are subject to further investigation as elements that may be included in in the resource value of solar (RVOS). Staff recommends that the OPUC hire a consultant to develop a methodology to quantify these elements and determine Oregon's RVOS:

RVOS Elements Recommended for Inclusion	

• Avoided Energy Impacts
• Avoided Capacity Additions
• Line Losses
• Avoided Transmission and Distribution
• Compliance Value: RPS
• Security: Reliability, Resiliency, and Disaster Recovery
• Utility: Integration Impacts
• Utility: Administration Impacts
• Utility: Interconnection Impacts
• Financial: Market Price Response
	• Ancillary Services and Grid Support
	• Financial: Fuel Price Hedge
	• Operational Impacts
	• Avoided Natural Gas Pipeline Impacts
	• DSM Alternative Impacts
	• Environment: Compliance Impacts
	  ○ Carbon - Current
	  ○ NOx/SOx/Particulates - Current
	  ○ Other—Current (e.g. MATS - Mercury Air Toxics)
	  ○ Carbon-Future in the RVOS Investigation

History and Process:

In 2009, the Legislature adopted House Bill (HB) 3039 requiring the OPUC to establish a Volumetric Incentive Rate Pilot Program for solar photovoltaic (SPV) energy systems (VIR Pilot

Program). To implement HB 3039 (now ORS 757.365), the Commission required each of the subject electric utilities, Portland General Electric Company (PGE), PacifiCorp, dba Pacific Power (PAC), and Idaho Power Company (Idaho Power), to file their estimate of the 15-year levelized "resource value" of the electricity delivered from the SPV systems on November 1 of 2010, 2012, and 2014. *See* OAR 860-084-0370(1).

Because of stakeholder concerns over the values reported early in the VIR Pilot Program, the Commission opened an investigation in 2012, to look into the appropriate method of calculating the resource value (Docket No. UM 1559). At the conclusion of the UM 1559 investigation, the Commission determined in Order No. 12-396 that:

1. It was not necessary at that time to choose a specific approach to calculate the solar resource value.
2. Prior to the expiration of the first 15-years of program participants' contracts; ORS 757.365(9) required only that the Commission make a finding on whether or not the resource value was greater than the volumetric incentive rate (VIR).
3. The resource value was not greater than the incentive rates. That finding was not disputed.
4. The resource value will be used to determine payments to VIR Pilot Program participants at the end of the 15-year pilot program.

The Commission also directed the three utilities to report a range of resource values in their November 1, 2012, reports using three different methodologies. (Order No. 12-396 at 3).

In 2013, the Oregon Legislature passed HB 2893 extending the VIR Pilot Program and directing the Commission to study the effectiveness of the state's various solar energy incentive programs and to report on those findings to the Legislature. Specifically, the OPUC was directed to:

a) Investigate the resource value of solar energy,
b) Investigate the costs and benefits of the existing solar incentive programs,
c) Forecast future costs for solar energy systems,
d) Identify barriers to the development of solar energy systems, and
e) Recommend new programs or program modifications that encourage solar development in a way that is cost effective and protects ratepayers.

In 2013, the Commission opened an" Investigation into the Effectiveness of Solar Programs in Oregon "to receive comments regarding the report required by HB 2893 (The Solar Report). The Solar Report was ultimately adopted by the Commission and included:

1. No recommendation for changes to the programs.
2. A commitment to undertake the following actions:
    a) Open a formal proceeding to determine the resource value of solar, the extent of cost-shifting, if any, from net metering, and to evaluate the reliability and operational impacts of increasing levels of solar generation.
    b) Begin workshops to examine the use of smart inverters, track national efforts to change interconnection standards, and when the timing is right, consider new interconnection requirements.

The Solar Report also referred to the resource value of solar as "the value of the benefits solar generation brings to the utility system and electricity ratepayers in general. It does not include potential social benefits such as improved environmental quality." The Solar Report outlined that the resource value of solar included such factors as:

- avoided energy costs,
- avoided capacity additions,
- reduced transmission line losses,
- avoided transmission,
- distribution investments, and
- other factors

Additionally, the Solar Report stated that a number of studies in recent years have tried to estimate the value of solar. The estimates ranged widely from 4 cents per kilowatt-hour to 25 cents per kilowatt-hour. It was determined in the Solar Report that there is no agreed upon approach to estimating the value of solar. The studies used different assumptions, different calculation methods, and quantified different combinations of value elements. See Solar Report at iii and iv.

UM 1716- Scope and Determination of the Process for the Docket:

In February of 2015, Docket No. UM 1716 was opened by the Commission to determine the resource value of solar and the extent of cost-shifting, if any, from net metering. Also as part of this docket, the Commission will evaluate the reliability and operational impacts of increasing levels of solar generation.

The 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 for chosen elements. Staff conducted two scoping workshops (on May 15, 2015, and on June 19, 2015) to develop a scope for the following three independent, concurrent investigations:

1. Develop a **resource value of solar** for Oregon (Investigation 1);
2. Explore and determine to what extent the **fixed cost recovery** is an issue for Oregon (Investigation 2); and
3. Determine at what penetration level **reliability impacts from solar** affect Oregon (Investigation 3).

The parties commented on how to conduct the three investigations concurrently and this led to adjustments so that any relevant results from Investigation 2 and 3 would be integrated in the RVOS calculation and process toward the end of the docket.

The resultant timelines for all three investigations can be found in Attachment A. Investigation 2 and 3 will initiate scoping in August 2015, and will be led by OPUC Staff.

Please note that the remainder of this memo will focus on the Resource Value of Solar investigation.

Investigation 1 – Resource Value of Solar

At the May 15, 2015 workshop, Staff presented a process flow chart for discussion by the parties. Input was received and incorporated and during the second workshop on June 19, Attachment B was agreed upon by the parties. Attachment B shows the process of the RVOS investigation only and outlines the expected time when the parties will engage with the consultant, offer input, and participate in the docket.

The general agreed upon process outlined in Attachment B includes:

- With the scoping process complete, all parties will file (by July 20, 2015) their comments to the Commission outlining what elements they would like to see included or excluded for exploration to determine the resource value of solar.[1]
- A consultant's work will result in a report informing Staff.[2]
- Staff will draft a memo informed by the consultant's report and present final recommendations to the Commission in May 2016.
- The other investigations to determine fixed cost recovery and reliability impacts will occur concurrently with relevant results incorporated into the resource value of solar later in the process.
- The end result will be an Oregon specific set of methodologies and values for the Resource Value of Solar.

There was a general understanding amongst all parties that:

1. The ultimate RVOS will vary by utility, but the valuation methodologies should be the same.
2. This docket considers all solar, not just residential systems.
3. A neutral consultant would be hired and managed by Staff to develop a methodology for the elements chosen by the Commission with input presented by all parties.
4. The resultant values would serve as an Oregon-specific catalog of elements that would be used, as appropriate, for different rate making processes and policy exploration. Each element would not necessarily be used for every rate making purpose.
5. The parties would have several opportunities to provide feedback on a draft RFP, on a draft Consultant report, again before the utilities develop utility specific numbers, and on the final report.
6. The parties understood that Staff will be informed by the consultant's final report, but Staff's final recommendations will be submitted to the Commission in May 2016, separate from the consultant's report.

To determine the scope of the RVOS, the workshops began with the presentation of a proposed process for the docket and a list of 24 elements as a starting point to center the discussions on what has been explored in other states. The list included elements that were considered in Value of Solar and Cost Benefits investigations conducted in the states of Hawaii, Minnesota, Maine, Nevada, Arizona, Louisiana, Mississippi, South Carolina, and Vermont.

After constructive and collaborative engagement by all 14 parties, the second scoping workshop resulted in a compiled list of 26 elements that emerged from the parties for inclusion or exclusion as part of the resource value of solar for Oregon. See Attachment C. The term "element" was chosen to represent a general topic area to explore and implies that the topic could have either a cost or a benefit. The term "impacts" is used because the element could result in either a cost or a benefit.

[1] Staff elects to submit its comments on July 15, 2015, to allow parties opportunity to review and respond to Staff's positions in their own comments.
[2] The PUC will release a Request for Proposal (RFP) and hire a neutral and independent consultant to conduct an investigation of the resource value of solar based on a list of elements approved by the Commission.

Some elements were ultimately reclassified as “concepts” to be incorporated into the consultant’s methodologies, because they were overarching and applied to many elements. The term “concept” was chosen to represent an idea that affects more than one element and that could have either a cost or a benefit. The parties offered their input on the concepts presented in Attachment D.

All parties will file comments to the Commission on July 20, 2015. These comments are expected to clarify each party’s position on which elements should be explored for Oregon’s RVOS and why. There is a general understanding amongst the parties and Staff that the exploration of an element does not mean that it will ultimately be included in the RVOS. Instead, some of the elements may be included for exploration by the consultant to investigate whether or not the elements should be included in the RVOS.

Staff contemplates that after review of Staff’s July 15, 2015 comments and the parties’ July 20, 2015 comments, the Commission will issue an order determining which elements are to be included for exploration by the consultant chosen through a competitive RFP process. The RFP will be finalized and released after the Commission decision on which elements to include. Attachment A shows the expected timeline for the issuance of the RFP. Staff hopes to release the RFP by September 1, 2015.

Staff’s Recommendations on the Elements to Explore for Oregon’s RVOS

Below, Staff will define and present recommendations to the Commission for each of the 26 elements presented in Attachment C.

1 Avoided Energy Impacts

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: Avoided Energy Impacts should be considered and were historically included in previous RVOS calculations in UM 1559. Staff envisions specifying the marginal generator and then calculating the cost of the generation from this unit. If solar is delivered to the energy system, the utility will reduce the amount of energy generated at the most expensive operating a plant. The energy related costs of that “avoided” plant comprise of the avoided energy component, and typically includes fuel, operations and maintenance and line loss costs.

2 Avoided Capacity Additions

- Staff Recommends Inclusion in the RVOS Investigation: Avoided capacity should be considered and was historically included in previous RVOS calculations in UM 1559. Staff envisions specifying the marginal generator and then calculating the cost of the generation from this unit.
- Staff Perspective: The cost and amount of generation capacity that can be deferred or avoided due to customer-sited solar should be included in RVOS. Grid interconnection can result in reduced capital costs of electricity generation capacity by displacing the need for new capacity for a utility. The utility may be spared, or able to defer, the financial burden of the costs associated with new power plants (needed for energy, serving peak power needs, or spinning reserves), instead making payments for electricity consumed from the interconnection.

3 Line Losses

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: These are avoided costs of delivering power to a customer because of solar generation either on or closer to the customer's site. This includes transmission and distribution costs. The calculation may provide value to the utility system and customers. However, the calculation of the RVOS should not double count line losses under Avoided Energy Impacts and Line Losses.

4 Avoided Transmission and Distribution (T&D)

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: If the utility has any transmission plans, then distributed generation solar is likely helping to defer expenses and should be included. The OPUC's 2014 (p.2) "Investigation into the Effectiveness of Solar Programs in Oregon" identifies avoided infrastructure investments as a benefit to the utility and ratepayers in general.

5 Compliance Value: Reduced RPS Procurement Due to Reduced Utility Sales

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: A renewable portfolio standard (RPS) requires the utility to obtain a portion of their energy used to serve retail load from renewable sources. The portion that the utility needs to meet the RPS standards is determined by applying a percentage to the utility load. That is why reducing load via solar reduces the compliance costs. Under Oregon's Solar Capacity Standard, a subset of the required renewable energy must come from solar systems. When utility sales are reduced, there is an avoided cost of the utility having to build its own resources or buy RECs to comply with the RPS. Because developing renewable energy facilities can be a costly and complicated endeavor, many utilities choose to purchase RECs from homeowners and businesses.

6 Security: Reliability, Resiliency, and Disaster Recovery

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: The stability associated with distributed generation (e.g., versus relying on long-distance generation) may bring benefits from: 1) reductions in outages by reducing T&D network congestion; 2) minimization of outages resulting from a more diverse and dispersed electricity supply. As solar penetration increases, distributed generation could add significant value to the system in terms of resiliency and stability.

7 Utility: Integration Impacts

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: The cost of the operational modifications needed to accept variable/intermittent solar generation onto the utility system is a solar resource cost element to the utility system and customers.

8 Utility: Administration Impacts

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: As with any resource, utility administration costs associated with managing solar resources should be considered if they exceed the comparable metering and billing costs for regular utility customers (not those on limited use or custom tariffs). Utilities are usually allowed to recover reasonable

administrative costs, such as the direct costs associated with the administration of utility functions associated with distributed solar system, rebates and incentives and other administrative tasks.

9 Utility: Interconnection Impacts

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: Distributed resource (DR) interconnection can contribute to conditions that might go beyond what originally was planned for, designed, and built into the electric grid. With that said; the cost of interconnecting a solar facility to the utility system is typically paid by the interconnecting customer who triggers the need for facilities changes/upgrades. These impacts should be reflected as a reduction or a gain in the value of solar to the utility and other ratepayers. All costs not paid by the distributed generation customer should be captured when determining the value of solar.

10 Financial: Market Price Response

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: This should be included because customer-sited solar reduces the demand for electricity, which may reduce prices in the wholesale electricity market. This typically brings down costs for ratepayers. If wholesale electricity prices are 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

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: Solar system inverters can provide grid support through voltage support and frequency regulation. The use of advanced inverters is being sought by utility executives across the nation and ancillary services from these will almost certainly be available in the near future. Modelling the costs and benefits of ancillary services can also inform policy decisions like those related to interconnection technology requirements and may provide a hedging benefit.

12 Financial: Fuel Price Hedge

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: Adding solar generation to the electricity system reduces reliance on conventional fuels and provides a hedging benefit. Solar generation also provides a hedge against future regulation of greenhouse gas emissions which will ultimately affect conventional fuel prices.

13 Operational Impacts

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: When the addition of an interconnection causes changes in the way that power plants are operated and/or built, a savings in operating costs will likely accompany any savings in fuel costs and/or capital costs. These costs savings may include savings in variable operating costs - costs that vary with the amount of electricity produced, and fixed operating costs, which vary (at least somewhat) with the amount of generating capacity, but not with the amount of

generation in any given year. Variable cost savings may include savings on chemicals for pollution control equipment, possibly spinning reserves costs, and savings on waste disposal costs. Fixed operating costs, including costs for some maintenance activities, plant labor costs, and other costs, are avoided primarily when the use of an interconnection reduces the need for capacity additions. Other impacts may include enhanced forecasting and scheduling resulting from availability of solar.

14 Avoided Natural Gas Pipeline Impacts

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: These are avoided costs of transporting natural gas because of decreased demand for natural gas due to solar generation. Avoided natural gas pipeline costs are specific to individual future resource acquisitions. The importance of this element may be heightened by future energy policies such as the Clean Power Plan that may result in natural gas being used more heavily in electricity generation.

15 Rate Impacts: Net Metering Credits (Revenue that was not collected)

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: The net value of net metering provides benefits to participants, but it is not a system impact and should therefore be excluded. Several aspects of net metering will be explored in parallel through Investigation 2, exploring the Fixed Cost Recovery rate, and incorporated at a later time.

16 Societal: Economic Development

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: The value of economic benefits or stimulation of jobs, businesses, and local economies resulting from the installation of solar projects is outside the normal scope of the OPUC's activities and is outside the scope of this investigation. Likewise, electric utility infrastructures provide economic development benefits that are not considered in OPUC's rate making process.

17 Health and Other Societal Impacts

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: These are reductions in societal costs from health risks, including reduced morbidity and mortality, related to air pollution from fossil-fuel production, transportation, and generation. These are outside of scope of OPUC. However, Staff believes that valuing future carbon regulation (element 25) is a step toward capturing health and other societal impacts of solar systems.

18 Capital Risk

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: The assessment of capital risk is too tenuous and not sufficiently linked to solar resource activity to be included at this time. Staff notes that at workshop 2, the concept of the avoided cost of the utility having to build its own large resources to meet demand was introduced. It was explained that large single investments, such as a new gas turbine or peaker plant can cost hundreds of millions of dollars per unit and have interest rate risk (real or nominal) because it is difficult to time the market effectively, whereas timing a more granular investment like a large number of solar systems can be shaped to some degree based on market conditions to decrease capital access and cost risk. However,

Staff is not convinced that this risk is sufficiently linked to a solar resource and believes that it would be extremely difficult to quantify.

19 Utility: Production Impacts (IRP Process) - Levelized cost of production over the lifetime of the project based on an assumed annual capacity factor ($/MWh)

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: Staff believes that production impacts are accounted for in the existing IRP process. An integrated resource plan covers a full range of resource options, including renewable energy. Solar PV cost assumptions are reflected in the utility's solar cost assumptions used in their long-term plan. Utilities want more certainty in predicting future solar PV prices, especially over a multi-decade planning horizon, by addressing the solar generator's capacity value, the correlation between utility peaks, solar generation and region specific daily and seasonal peak demand. The RVOS investigation may include the levelization of the lifetime costs of production as well as other inputs that are included in Attachment D regarding overarching concepts.

20 Behind-the-Meter Production During Billing Month

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: Behind-the-Meter generation allows solar electric systems to generate energy for on-site consumption and therefore reduces the need for utility generated energy. Therefore, Staff believes this element is captured by elements 1 and 2, avoided energy and avoided capacity. In addition, the value provided by a solar generator to the utility system will be fully explored later in the UM 1719, Investigation of Renewable Generator's Contribution to Capacity, and will be integrated into the results of this investigation.

21 Resource Need

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: A key element in Integrated Resource Planning is finding a resource need through planning, and defining how to get this resource through a preferred portfolio of supply-side and demand-side resources and outlining how a utility will acquire that resource. Staff believes the resource need is accounted for in the existing IRP process and therefore should be excluded from RVOS investigation at this time.

22 Rate Impacts: Lost Utility Revenue

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: Lost revenues are sale revenues that would have come from customer consumption of electricity, which is replaced by solar. This element is linked to avoided energy impacts (element 1) but its impact will be better explored in the fixed cost recovery investigation.

23 Tax credits (State and Federal)

- Staff Recommends Exclusion from the RVOS Investigation.
  Staff Perspective: State and Federal tax credits go directly to the project owners and are from sources outside of the electric system, so they have minimal system impact.

24 DSM Alternative Impacts

- Staff Recommends Inclusion in the RVOS Investigation.
- Staff Perspective: 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.

25 Environment: Compliance Impacts

Carbon—Current (e.g. 111d is very soon)
Carbon—Future
NOx/SOx/Particulates—Current
NOx/SOx/Particulates—Future
Other—Current (e.g. MATS - Mercury Air Toxics)
Other—Future

- Staff Recommends Inclusion of the following in the RVOS Investigation.
  - Carbon—Current
  - NOx/SOx/Particulates—Current
  - Other—Current
- Staff Perspective: All of the utility's cost of compliance with existing and anticipated environmental laws avoided by solar should be included, or at least explored, for inclusion in RVOS.

- Staff Recommends Inclusion of the Carbon-Future in the RVOS Investigation.
- Staff Perspective: Staff would like the consultant to prepare a range of carbon values based on potential future compliance scenarios.

- Staff Recommends Exclusion of the following from the RVOS Investigation:
  - NOx/SOx/Particulates—Future
  - Other—Future
- Staff Perspective: Future NOx and SOx regulations are speculative and inclusion of a range of carbon values is a working substitute for other future fossil-fuel regulations. For that reason, Staff recommends exploring future carbon values at this time.

26 Environment: Externalities:

- Carbon—Societal Impacts of Carbon
- Carbon—Ocean Warming and Acidification
- NOx/SOx/Particulates—Societal Impacts
- Avoided water usage—for Thermal Power Production
- Avoided water usage—for Natural Gas Hydraulic Fracturing
- Avoided pollution—Associated with Hydraulic Fracturing

- Staff Recommends Exclusion from the RVOS Investigation.
- Staff Perspective: These environmental externalities are outside of the scope of the OPUC.

Staff recommends the above elements be included or excluded as part of the investigation into the resource value of solar for Oregon.

Staff's Recommendations on the Concepts to Include in Oregon's RVOS

Attachment D includes overarching concepts to consider in the methodology to calculate the RVOS for Oregon. Those include the type of solar technology, solar PV scale, levelization of costs and benefits and levelization period, the perspective to consider for the costs and benefits (utility, participating customer, non-participating customer, and the society), and the duration and frequency of reassessment of the values and methodology for the RVOS.

Because these concepts will affect the RVOS, Staff supports their consideration in the methodology to determine the RVOS for Oregon with the exception of the different customer and society perspectives outlined in Attachment D. The Commission defined the resource value of solar as "the value of the benefits solar generation brings to the utility system and electricity ratepayers in general. It does not include potential social benefits such as improved environmental quality." See Solar Report at iii and iv. Consistent with this definition, Staff believes that although the different perspectives may be interesting to consider, it is the utility system and all ratepayers' perspective that should be considered in the determination of the RVOS. Further, as indicated in these comments, while Staff does not deny that there are societal benefits associated with solar systems, Staff believes that those benefits are not within the scope of utility ratemaking; most of those benefits are still speculative at best and thus should not be included in the calculation of the RVOS at this time.

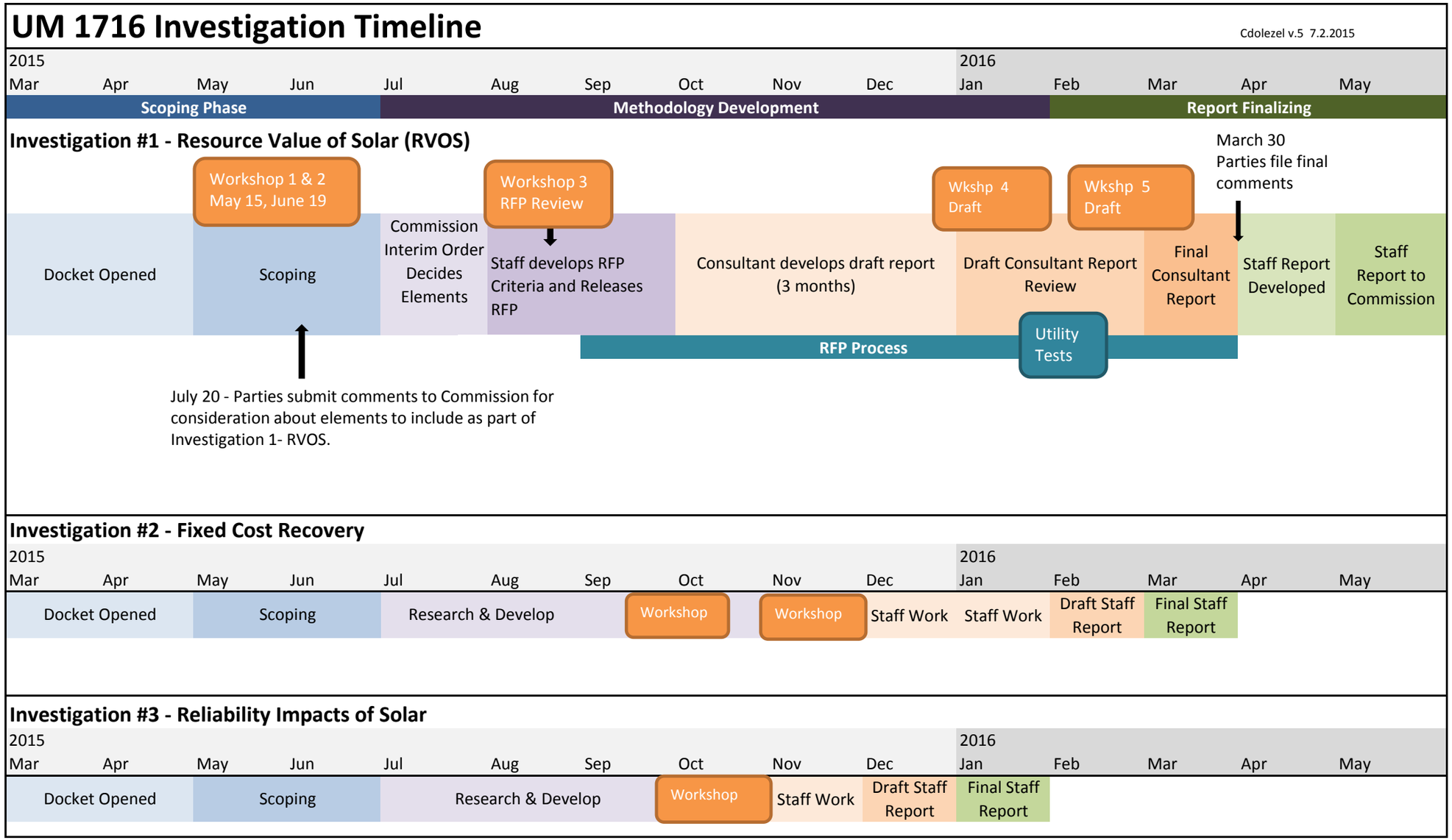
Finally, Staff added the location of solar PV system because it considers that where the solar PV system is located in a utility service territory will greatly impact the RVOS. Thus Staff supports the consideration of the location of the solar system not as a different element, but as a factor to consider for the RVOS for Oregon.

This concludes Staff's comments on the Investigation to Determine the Resource Value of Solar.

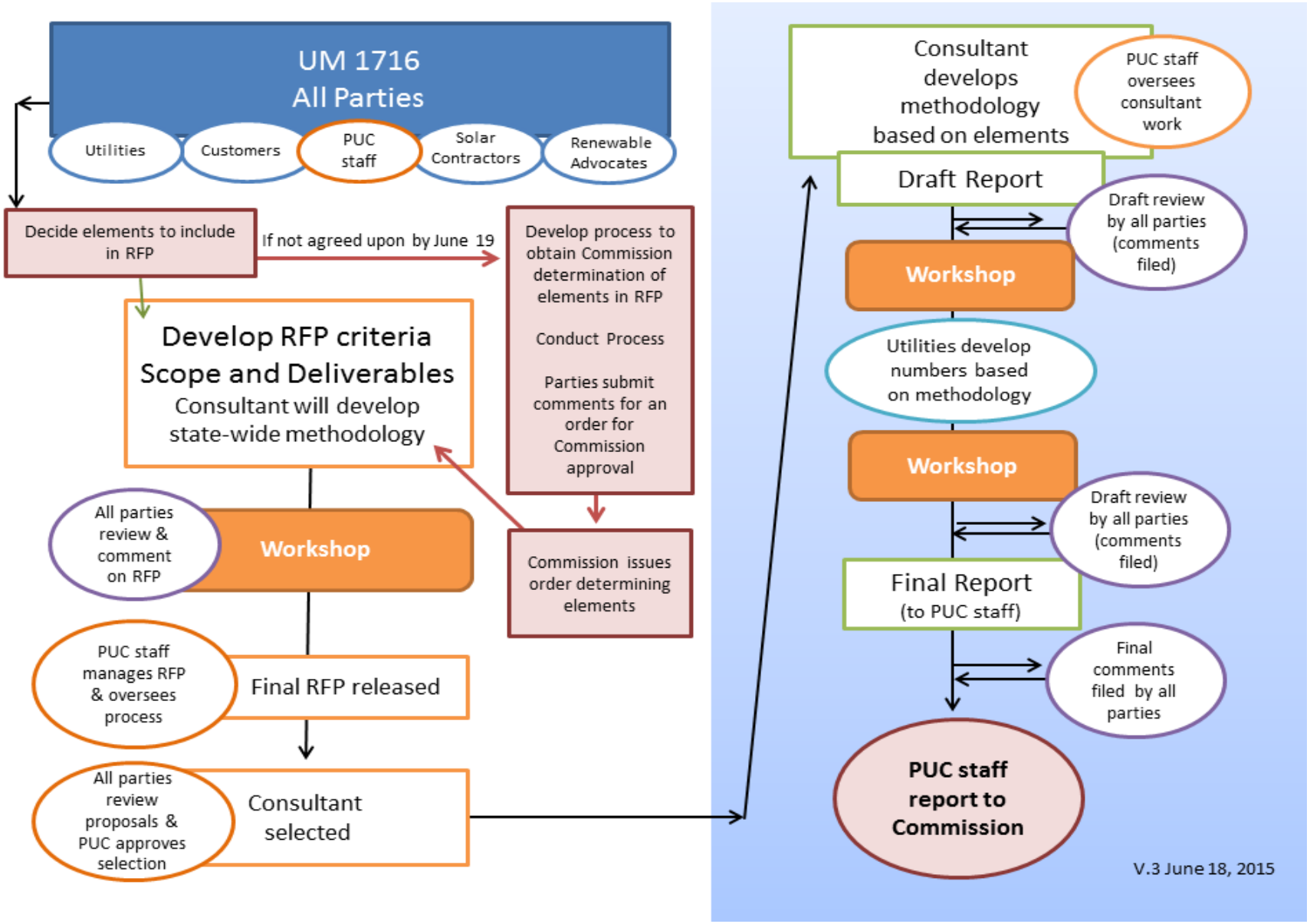
Dated at Salem, Oregon, this 15th of July, 2015.

for _____
Cindy Dolezel
Senior Utility Analyst
Energy Resources and Planning Division

Attachment A - Timelines for UM 1716 Investigations



Attachment B – UM1716 Agreed Upon Process For UM 1716 RVOS



Attachment C - List of Elements and Parties Responses

	Elements		Utilities*			Non-Profits/Advocacy **									Totals	
#	Should these elements be included for exploration for a methodology to lead to a resource value of solar?	PUC	PGE	PAC	Idaho	CUB	IREC	GEI	TASC	OREP	Enviro OR	RNP	OSEIA	NWEC	Total (Yes out of total responders)	% of Responders Said Yes
1	**Avoided Energy Impacts**														13	100%
2	**Avoided Capacity Additions**														13	100%
3	**Line Losses**														13	100%
4	**Avoided Transmission and Distribution**														13	100%
5	**Compliance Value:** RPS														13	100%
6	**Security: Reliability, Resiliency, and Disaster Recovery**														13	100%
7	**Utility: Integration Impacts**														13	100%
8	**Utility: Administration Impacts**														13	100%
9	**Utility: Interconnection Impacts**														12	92%
10	**Financial: Market Price Response**					~									12	92%
11	**Ancillary Services and Grid Support**														12	92%
12	**Financial: Fuel Price Hedge**														12	92%
13	**Operational Impacts**					~	~				~	~	~		7	88%
14	**Avoided Natural Gas Pipeline Impacts**														9	69%
15	**Rate Impacts: Net Metering Credits**														9	69%
16	**Societal: Economic Development**														8	62%
17	**Health and Other Societal Impacts**												~		7	58%
18	**Capital Risk**					~	~				~	~	~		4	50%
19	**Utility: Production Impacts (IRP Process)**												~		6	50%
20	**Behind-the-Meter Production During Billing Month**			~		~									5	45%
21	**Resource Need**					~				~			~		4	40%
22	**Rate Impacts: Lost Utility Revenue**														3	23%
23	**Tax Credits** (State and Federal)										TBD	TBD	TBD		2	20%
24	**DSM Alternative Impacts**			~	~	~	~			~			~		1	14%
25	**Environment: Compliance Impacts**															
	Carbon—Current												~		11	92%
	Carbon—Future						~						~		9	82%
	NOx/SOx/Particulates—Current												~		11	92%
	NOx/SOx/Particulates—Future						~						~		8	73%
	Other—Current (e.g. Mercury Air Toxics)												~		11	92%
	Other—Future					TBD	~						~		7	70%

#	Should these elements be included for exploration for a methodology to lead to a resource value of solar?	PUC	PGE	PAC	Idaho	CUB	IREC	GEI	TASC	OREP	Enviro OR	RNP	OSEIA	NWEC	Total (Yes out of total responders)	% of Responders Said Yes
26	**Environment: Externalities**															
	Carbon—Societal Impacts of Carbon												~		8	67%
	Carbon—Ocean Warming and Acidification												~		7	58%
	NOx/SOx/Particulates—Societal Impacts												~		7	58%
	Avoided water usage—for Thermal Power Production												~		7	58%
	Avoided water usage—for Natural Gas Hydraulic Fracturing												~		7	58%
	Avoided pollution—Associated with Hydraulic Fracturing												~		7	58%

* Portland General Electric (PGE), Pacific Power (PAC), Idaho Power (Idaho)

** Citizens' Utility Board (CUB), Interstate Renewable Energy Council, Inc. (IREC), Green Energy Institute, Lewis & Clark Law School (GEI), The Alliance for Solar Choice (TASC), Oregonians for Renewable Energy Progress (OREP), Renewable Northwest (RNW), Oregon Solar Energy Industries Association (OSEIA), and Environment Oregon (Enviro OR), Northwest Energy Coalition (NWEC), Oregon Department of Energy (ODOE)

Legend:

= YES

= YES with a caveat

= No

~ = No Answer, TBD

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Attachment D - Concepts To Consider For The Resource Value of Solar Methodology Development

Overarching Concepts for Methodology for UM 1716

#	Should these concepts be included/researched in the methodology of the resource value of solar?	PGE	PAC	Idaho	CUB	IREC	GEI	TASC	OREP	Enivro OR	RNP	OSEIA	NWEC	Yes	% of Responders Who Said Yes
1	**Type of Technology**											~	~	12	**100%**
2	**Solar PV Scale**											~		12	**100%**
3	**Levelization Period**											~		10	**100%**
4	**Perspectives:**											~		12	**100%**
	a. Utility											~		12	**100%**
	b. Customer											~		12	**100%**
	c. Non Participating Customer											~		11	**92%**
	d. Society											~		9	**75%**
5	**Duration and Frequency of Reassessment of Values and Methodology**											~	~	9	**90%**
6	**Location of Solar PV system**														

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