BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

Docket No. UM 2011

In the Matter of **PUBLIC UTILITY COMMISSION OF OREGON,** **General Capacity Investigation.**	**Staff's Reply Comments**

Introduction

To assist in its investigation, Staff hired consultant E3 to make recommendations for a capacity valuation methodology. E3's Report, Principles of Capacity Valuation, was filed on December 15, 2020. On March 8, 2021 Stakeholders provided feedback on that E3 Report and on Staff's Opening Comments. These Comments are all-party Reply Comments and respond to the stakeholders' feedback.

On December 17, 2020, E3 presented its capacity valuation framework focusing on two key questions: (1) how much capacity can a resource provide, and (2) what is the value of capacity. On January 14, 2021, Staff provided Opening Comments in response to the E3 Report. Following a workshop on February 24, 2021, participants in the investigation provided Comments on March 8, 2021. An additional workshop was held on March 17, 2021.

In these Reply Comments, Staff responds to Stakeholders discussion of the following issues within the two broader categories in E3's report:

- How much capacity can a resource provide:
    - E3's overall recommendations for use of the Loss of Load Probability (LOLP) model to calculate the Effective Load Carrying Capability (ELCC or capacity contribution) of resources, in particular Staff's response to stakeholder positions on:
        - Calculating yearly ELCC values
        - Requirements for the use of historic generation data for renewable resources
        - Requirements to correlate load/weather data with resource generation data
        - Modeling assumptions for dispatchable resources
    - Requirements for modeling the ELCC of hybrid resources
    - Requirements for the use of resource libraries in the ELCC calculations
    - Requirements for the use of a last-in or first-in ELCC approach
    - Other modeling requirements
- What is the value of capacity:
    - Requirements for the proxy resource that is used to determine avoided resource costs
    - Requirements for characterizing the need or benefit of a resource's capacity contribution, including the use of a sufficiency and deficiency period
    - Capacity value during the resource sufficiency period
    - Other capacity valuation issues raised by participants in this investigation

Key Question 1: How much capacity can a resource provide?

LOLP and ELCC Modeling

In Docket No. UM 1719, the Commission adopted requirements for calculating the capacity contribution of a resource in utility integrated resource plans. In Docket No. UM 1719, the Commission investigated whether to "adopt a standardized calculation methodology [for capacity contributions]" and "whether the utilities should all be required to use the same calculation method." Ultimately, the Commission adopted a stipulation executed by the three investor-owned electric utilities (IOUs) operating in Oregon, Staff, and other stakeholders, in which parties agreed that for purposes of their integrated resource planning, the three IOUs should estimate the capacity contributions from wind and solar generators using either an ELCC or a CF (capacity factor) approximation methodology.[1]

In Order No. 16-326, Commission described the two methodologies as follows:

> ELCC is a reliability-based method that estimates the additional load that can be served by adding an incremental generator while maintaining the same level of system reliability. System reliability is measured with metrics such as the loss of load probability (LOLP) and the loss of load expectation (LOLE). The LOLP is the probability of a loss of load event in which the system load is greater than available hourly generating capacity. The LOLE is the sum of LOLPs during a planning period, usually one year, for example, 0.1 days per year. ELCC is generally determined by modeling the system with and without the renewable generation in question, and comparing how much capacity the generator adds while still maintaining the same level of LOLE.
>
> The CF approximation method approximates ELCC by calculating the capacity factor for a generator or class of generators for each hour of the year (mean generator output/maximum generator output). The weight for each hour is the LOLP for that hour divided by the sum of LOLPs for all hours. While there is an initial LOLP calculation for each hour, there are no iterative LOLP calculations.[2]

The E3 Report includes recommendations that update the ELCC methodology approved by the Commission in Docket No. UM 1719. As noted in previous comments, Staff supports this overall ELCC framework described by E3. Table 1 describes how the recommendations in the E3 Report compare with UM 1719 guidance and methodologies employed by Oregon's investor-owned electric utilities.

[1] Order No. 16-326, p. 1.
[2] Id, p. 2.

Table 1: Key E3 Report Model Recommendations Discussed in Staff's Comments

	Yearly ELCC calculations	Years of generation data	Correlation of weather/load data with resource generation	Modeling assumptions for dispatchable resources
UM 1719	For ELCC "system reliability is measured with metrics such as the loss of load probability (LOLP) and the loss of load expectation (LOLE)."	"[The electric utilities] will estimate the capacity contributions from wind and solar generators using either an Effective Load Carrying Capability (ELCC) or a Capacity Factor (CF) approximation."	Load and generation data should be for the same time period to capture correlations.	Capacity contributions of storage resources were not part of the UM 1719 stipulation.
E3 Report	Utility should compute yearly ELCCs to reflect retirements and additions over time.	Utility should use at least eight years of renewable generation profiles.	Utility should correlate weather/load data and renewable resource generation data.	Duration of energy storage and demand response should be modeled.
PGE	**Current Status: Not aligned with E3 recommendation** "Staff requests that PGE compute effective load-carrying capability (ELCC) values by year… PGE will work with Staff and participants to consider what additional ELCC exploration may be informative for the next IRP."[3]	**Current Status: Aligned with E3 recommendation** PGE used 7 years of wind solar data in its last IRP[4] [and Staff presumes that PGE will use additional years of renewable generation data in its next IRP].	**Current Status: In progress to align with E3 recommendation** "Correlations due to weather between load and wind or solar generation are captured through a methodology that calculates the wind and solar distributions for load "bins.""[5]	**Current Status: Aligned with E3 recommendation** PGE's new Sequoia model improves modeling of storage because it "optimizes the generation from dispatchable resources across all hours of the week."[6]
PAC	**Current Status: Not aligned with E3 recommendation.** "2019 IRP did estimate year-by-year portfolio capacity contribution values for wind and solar… [but] these values are not applicable to individual assets and do not reflect marginal ("last-in") contributions."[7]	**Current Status: Not aligned with E3 recommendation** For its next IRP, PAC is still working on its capacity contribution methodology. So far, the Company is using four years of actual renewable resource output data.[8]	**Current Status: In progress to align with E3 recommendation** Using bins PAC aligns the intra-month variations of generation and load.[9]	**Current Status: Aligned with E3 recommendation** Duration of energy not served events are modeled.[10]
IPCo	**Current Status: Not aligned with E3 recommendation.** Although IPCo computes ELCC values based on four historical weather years, the Company does not compute yearly ELCCs to reflect retirements and additions over time.[11]	**Current Status: Not aligned with E3 recommendation** IPCo uses four years of generation data for existing wind resources[12]	**Current Status: In progress to align with E3 recommendation** IPCo 2021 IRP captures weather and load correlation for four years[13]	**Current Status: In progress to align with E3 recommendation** IPCo's modeling of energy storage to be determined[14]

Stakeholders generally support the use of LOLP models to calculate the ELCC of a resource, but raised several questions regarding specifics of the model. Notably, many comments touched on the value of a more granular (yearly) ELCC to measure contributions to reliability when the system is rapidly changing due to increased renewable resource penetration and coal retirements. Below Staff summarizes stakeholder positions related to the modeling recommendations in the E3 Report.

Stakeholder positions

NWEC

NWEC asks "how much historical data is needed to assure accurate profiling of resource capacity?"[15] NWEC discusses that resources can underperform during extreme weather and other stress events.[16]

Renewable Northwest

Renewable Northwest suggests that "multiple years of weather data -- typically five to seven years' worth -- should be used to determine the ELCC values of renewable resources to capture the effects of inter-annual variability." This is important because weather "'outliers' become more frequent due to climate change."[17]

Renewable Northwest emphasizes the importance of capturing changes in system characteristics by stating that "there is a common misconception that the ELCC of resources such as wind and solar decrease when additional resources are added to the grid… Adding evening-producing wind power could push reliability issues back into the daytime, increasing the ELCC of solar resources."[18]

To capture the impacts of weather, Renewable Northwest suggests that, "ELCC can be performed on data from one historical year at a time; thus only one accredited capacity value is derived per modeled weather year. The results of each weather year can then be trended into an average."[19] Renewable Northwest points out that this is the method used by the Southwest Power Pool. Staff notes that Renewable Northwest's suggestion also matches the proposal for IPC's next IRP in Table 1 above.

[3] In the Matter of PGE 2019 Integrated Resource Plan LC 73, PGE's April 12, 2021 response to Staff Report, pp. 2, 6, 7.
[4] PGE's response to Staff IR 5.
[5] Id.
[6] In the Matter of PGE 2019 Integrated Resource Plan LC 73, IRP Update, p. 32.
[7] PAC's response to Staff IR 8.
[8] PAC's response to Staff IR 10.
[9] Ibid.
[10] In the Matter of PacifiCorp 2019 Integrated Resource Plan LC 70, IRP Appendix N, p. 400.
[11] IPCo 2021 IRP, IRP Advisory Council April 8, 2021 slide deck, "Effective Load-Carrying Capability: Solar, Wind, Storage," p. 35, available at https://www.idahopower.com/energy-environment/energy/planning-and-electrical-projects/our-twenty-year-plan/
[12] Ibid.
[13] Ibid.
[14] Id, p. 33.
[15] Comments of NWEC (March 8, 2021), p 3.
[16] Id, p. 4.
[17] Comments of Renewable Northwest (March 8, 2021), p. 4.
[18] Id, p. 5.
[19] Id, p. 4.

Renewable Northwest adds an example related to E3's discussion that the ELCC of storage depends on how it is used. If storage in a hybrid resource can be grid charged it might have a higher ELCC than if it can only be charged from the connected renewable resource. Renewable Northwest states that the ELCC of storage resources should be modeled "considering these resources' actual dispatch." [20]

OSSIA
OSSIA discusses that ELCC values can increase over time: "if battery storage is able to significantly alter the generation profile of new solar resources combined with storage, one may expect to see higher and more consistent ELCC values over time."[21]

REC
REC emphasizes that future capacity needs should be considered to fairly value renewable resources.[22] REC argues that neither the E3 Report or Staff Comments address the impact of the following on capacity needs: 1) the need to decarbonize the system; 2) Governor Brown's Executive Order 20-04 calling for the Commission and other agencies to facilitate decarbonization; and 3) significant planned retirements of existing fossil fuel resources.[23]

Obsidian Renewables
Obsidian renewables states that "the [LOLP] analysis should be conducted considering the planned retirement of assets." Obsidian Renewables also discusses that in addition to full retirement, fossil fuel resources are likely to be run less in the future.[24]

Swan Lake North Hydro
Swan Lake discusses the duration of energy storage and recommends that, "it is critical to use ELCC models that optimize in a time sequential manner and over a longer time horizon (at least one week… When the time window is not long enough in an optimization (*i.e.*, the time window is limited to, for example, 24 hours), storage is forced to arbitrarily discharge and charge daily for modeling purposes."[25]

Joint Utilities
The Joint Utilities state that, "Staff's proposal that a resource's capacity contribution be calculated separately for each year, rather than based on a test year, is inconsistent with each utility's IRP methodology."[26] Relatedly, PGE in its LC 73 IRP Update discusses that the removal of a coal plant or adding a storage resource may not lead to an increase in ELCC values.[27]

Staff analysis
Staff appreciates stakeholder's thoughtful comments about requirements and improvements in modeling LOLP and ELCC. Staff has highlighted a few key areas related to LOLP and ELCC modeling that deserve additional discussion based on stakeholder comments and additional Staff analysis of current utility practices.

[20] Id, p. 8.
[21] OSSIA Opening Comments, p. 5.
[22] Renewable Energy Coalition's Comments (March 8, 2021), p. 6.
[23] Ibid.
[24] Obsidian Renewables. LLC Comments (March 8, 2021), p. 1.
[25] Comments of Swan Lake North Hydro LLC (March 9, 2021), p. 4.
[26] Joint Utilities' Initial Comments (March 8, 2021), p. 6.
[27] In the Matter of PGE 2019 Integrated Resource Plan LC 73, PGE's April 12, 2021 Response to Staff Report, p. 7.

Yearly ELCC calculations

The E3 Report recommends that the utilities compute yearly ELCCs to show how ELCC values change over time because of additions and retirements in the utilities' generation portfolios. As noted above, many stakeholders find a more granular approach like this compelling. In contrast, PGE and PAC identify a single snapshot year and use that ELCC in every year in a given application, e.g., IRP analysis and PURPA avoided cost calculations.

PGE uses a snapshot year of 2025 in its 2019 IRP, despite capacity resource losses in the years immediately following 2025. As described in Table 1 above, PGE is open to working with stakeholders, "to consider what additional ELCC exploration may be informative for the next IRP."

As described in Table 1 above, PAC states that it calculates a yearly capacity contribution for all wind and all solar in its portfolio when calculating its load-resource balance; however, PAC does not calculate a yearly ELCC for marginal renewable resources.

Staff is interested in understanding more about the utilities' method for determining and using snapshot years in different applications. Ultimately, Staff believes that the E3 Report's recommendation to use yearly ELCCs will provide a more accurate assessment of the capacity contribution of marginal resources over time. Staff looks forward to discussing the details of the use of yearly ELCCs in different applications with stakeholders. Staff also believes that it would help stakeholders evaluate yearly ELCC modeling requirements if the utilities were to circulate an example of a yearly ELCC values for a timeframe that extends beyond their current ELCC snapshot dates.

Years of Generation Data

The E3 Report recommends using at least eight years of historic renewable generation data in the ELCC. The E3 Report also recommends that, when historical data is not available, it must be simulated using the best available estimates of its actual productive capability, such as the National Renewable Energy Laboratory (NREL) System Advisor Model. As noted above, Renewable Northwest recommends using five to seven years and NWEC suggests that more discussion about the amount of historical data that is necessary would be helpful. IPCo has also expressed that it does not have sufficient data to comply with this proposed requirement.[28, 29, 30]

Staff believes that data used to represent the generation profiles of both existing and proxy resources is important. Staff is supportive of further discussion of the extent of historical data that is necessary. Staff recommends further exploration of the number of years and appropriate uses of simulated renewable generation data at a future UM 2011 workshop.

[28] When UM 1719 was settled, the utility's position was that it did not have sufficient data on number of years of renewable resource generation.

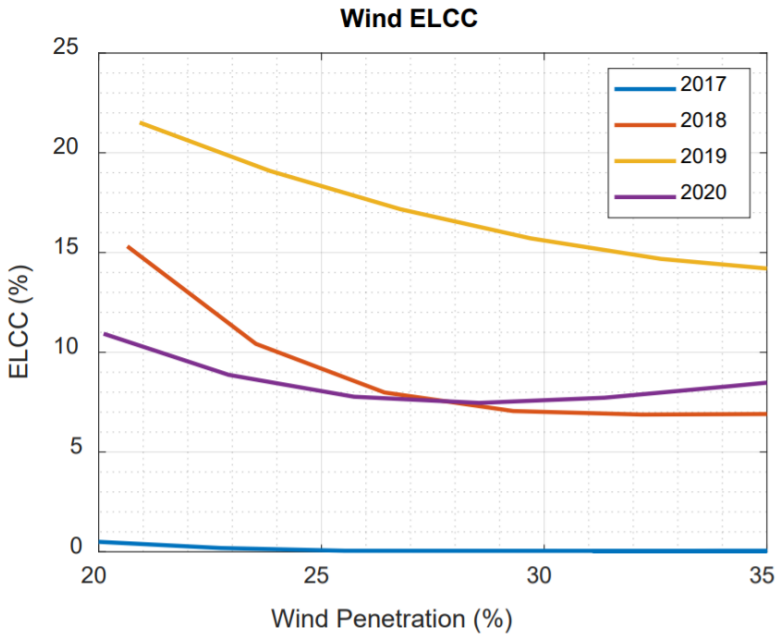
[29] *See* Idaho Power Company Integrated Resource Plan LC 74, IPCo's February 5, 2021 Final Comments, p. 47. In its 2019 IRP, IPCo described that it had "inadequate longitudinal data to perform the ELCC calculation" and that it finds extrapolated solar data inappropriate for capacity contribution modeling.

[30] In response to Staff IR 4, IPCo specifies that it only has hourly solar generation data since 2016.

Correlation of weather/load data with resource generation

E3 notes in its Report that a well calibrated ELCC model reflects the correlation between resource output and conditions that drive system need. For example, the ELCC can reflect higher solar generation but lower gas turbine output on high load/hot days. Staff appreciates the utilities' ongoing efforts to improve how they reflect correlations, including PAC's work of correlating renewable generation with load bins.[31] Staff finds great value in IPCo's demonstration that using different weather years can have a sizable impact on ELCC values. Staff reproduces IPCo's wind ELCC results in Figure *1*, which shows how ELCC can vary greatly by year[32]:

Figure 1: Idaho Power's Wind ELCC Results



Stakeholders have not yet commented on the need to establish baseline requirements for reflecting correlations in ELCC calculations, but Staff finds that it is an important topic for further exploration. Baseline requirements for the correlation should be studied and modeled as data permits. If data are insufficient, utilities should make and execute plans to collect and analyze the correlation, if any. Staff recommends that at a future UM 2011 workshop, stakeholders discuss whether there can be value in aligning the weather correlation approaches of the three electric utilities.

Modeling assumptions for dispatchable resources

The E3 Report suggests that it is critical to incorporate the duration of energy-limited resources, such as energy storage and demand response, and any limitations on how often they can be used/called, when calculating ELCC. As noted above, OSSIA argues that properly modeling storage can improve the value of solar ELCCs and Swan Lake suggests that modeling longer durations for storage resources can improve optimization.

Staff believes PAC and PGE are already doing a good job of modeling the duration of energy storage, however in light of Swan Lake's recommendation to model over at least one week, Staff recommends

[31] PAC 2021 IRP, January 29, 2021 IRP Public Input Meeting slide deck, pp. 13-17.
[32] IPCo 2021 IRP, April 8, 2021 Advisory Council slide deck, p. 35.

further discussion. Note that in PGE's 2019 IRP docket, Swan Lake's joint comments with Goldendale Energy Storage state that "this consultant team has reviewed hundreds of IRP models throughout the country. These same consultants believe PGE's Sequoia model is amongst the most accurate models in the country for purposes of fairly, accurately, and honestly evaluating the ability of various types of resources to contribute to PGE's future capacity needs in a realistic and meaningful manner."[33] Staff intends to gather further information about how IPCo models the duration of energy storage. Staff recommends continuing to discuss alignment in the treatment of storage and demand response across utilities' ELCC models at a future workshop.

Hybrid resources

Below Staff summarizes the stakeholder position from filed Comments.

Stakeholder positions

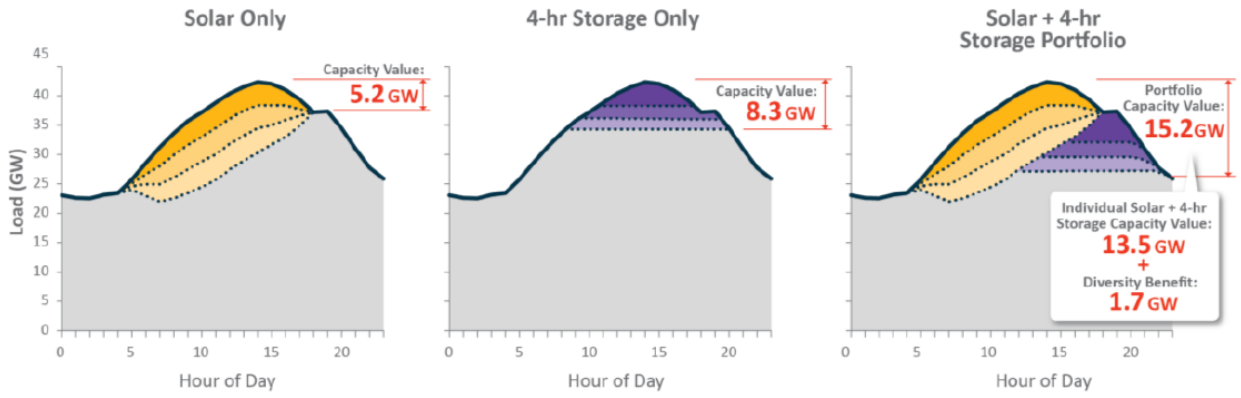
NWEC

NWEC describes that the combined contribution of renewable resources to system reliability can exceed the sum of their last-in ELCC value because of interactions. NWEC describes that, "work on "ASCC array tables" at the Northwest Power and Conservation Council is beginning to address this next level of assessment."[34]

Staff analysis

The E3 Report describes the synergistic pairing of storage with other resources, such that the combined ELCC exceeds the sum of the last-in ELCC values. How to treat hybrid, renewable plus storage, resources was a big topic of discussion at the March 17, 2021 Workshop. A difficult question for capacity contributions is how to divvy up the diversity benefit between the two resources in the hybrid grouping. Figure 2 reproduces the example in E3's Report of a synergistic paring.

Figure 2: Synergistic Pairing: Benefits of Solar + Storage



Some might argue that the storage resources should be assigned all of the diversity benefit value. Staff recommends further dialog about the attribution of capacity contribution to each resource in a hybrid resource pairing at a future UM 2011 Workshop.

[33] Ibid, Swan Lake North Hydro and Goldendale Energy Storage's March 4, 2021 Comments on PGE's IRP Update, p. 2.

[34] Comments of NWEC (March 8, 2021), p. 4.

Resource libraries

Staff supports the use of library groupings. As described in Staff's Opening Comments resource libraries "ensure that compensation for specific individual resources does not stray too far from the compensation that would be suggested if a full-ELCC model were run (the full ELCC model is not run for all resources because it is a time-consuming process)."[35] Below Staff summarizes the stakeholder positions from filed Comments.

Stakeholder positions

OSSIA

OSSIA describes the benefits of the libraries approach to model geographic differences in solar.[36]

Renewable Northwest

Renewable Northwest emphasizes the importance of libraries for geographical differences for resources.[37]

Staff analysis

To inform the discussion or resource libraries, Staff recommends that the utilities provide stakeholders with examples to help determine the appropriateness of the E3 Report's recommendation on page 19 that, "sufficient modeling should be performed such that the Last-In ELCC assigned from the library to each individual renewable resource is within 5% of its true Last-In ELCC."

Last-in ELCC

In Opening Comments, Staff concluded that last-in ELCC should be used for capacity contributions in procurement decisions. Below Staff summarizes the stakeholder positions from filed Comments.

Stakeholder positions

OSSIA

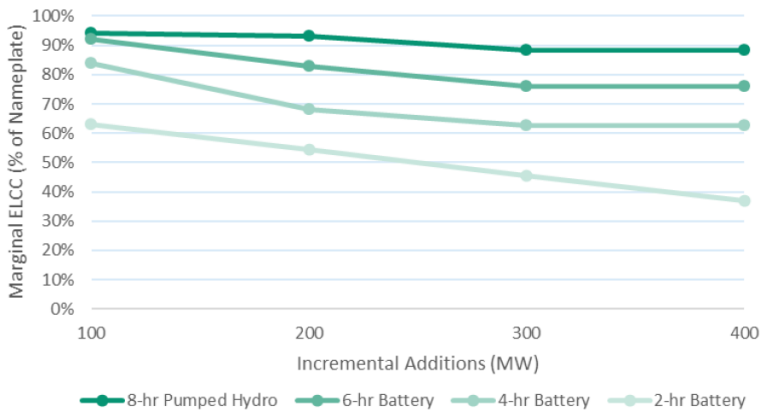
OSSIA describes the imprecision of last-in ELCC as resources are added to the system, by describing that last-in ELCC, "may be speculative given the amount of capacity assumed to be added first." OSSIA prefers the portfolio ELCC that is "more in line with the average capacity value of the entire portfolio."[38]

Staff Analysis

OSSIA raises an interesting issue, in that the utilities' IRPs present the capacity contribution of including additional resources holding all else constant. An example of this is PGE's capacity contribution for storage reproduced in Figure *3*.[39]

[35] Staff's Opening Comments, p. 11.
[36] OSSIA Comments (March 8, 2021), p. 5.
[37] Comments of Renewable Northwest (March 8, 2021), p. 4.
[38] OSSIA Comments (March 8, 2021), p. 4.
[39] In the Matter of PGE 2019 Integrated Resource Plan LC 73, PGE's January 29, 2021 IRP Update, p. 49.

Figure 3: Marginal ELCC for storage resources



For example, consider the declining ELCC of a 2-hour battery. The interactive effects with other future resource additions could quicken or delay the decline, so the order of resource additions matters. However, Staff believes the IRP approach of holding all else constant is correct and that this issue is better addressed by updating ELCC values somewhat frequently.

Last-in ELCC is a measure of the value that an incremental resource brings to the existing system, which has been well established as the appropriate ELCC measure for procurement decisions. Staff recommends against using a portfolio ELCC in procurement applications as it will lead to the utilities procuring non-optimal resources. However, Staff is interested in discussing whether portfolio ELCC measures are appropriate in other use cases, such as compensation frameworks and resource adequacy.

Other Model Specifics

Stakeholder positions

NWEC

NWEC asks, "How should forced outage rates be determined?" NWEC provides an example that if the gas peaker plant receives interruptible fuel supply, it might be interrupted when it is most needed.[40]

NWEC suggests the Western Electricity Coordinating Council (WECC)'s hourly reserve margin on a probabilistic basis might better inform resource acquisitions than a planning reserve margin.[41]

Swan Lake North Hydro

Swan Lake discusses additional useful reliability metrics by describing that, "it is possible that two resources with similar ELCCs can have different risk bands (*i.e.,* the standard deviation of ELCC or capacity that a particular resource provides."[42]

[40] Comments of NWEC (March 8, 2021), pp. 3-4.
[41] Id, p. 5.
[42] Comments of Swan Lake North Hydro, LLC (March 9, 2021), p. 2.

Obsidian Renewables
Obsidian Renewables recommends that, "capacity needs should be determined without anticipating new resources unless those resources are contracted at the time of the analysis."[43]

Staff Analysis
Staff supports further investigation of the modeling specifics raised by NWEC and Swan Lake. This investigation may be completed in a subsequent phase on UM 2011 or another docket as the analysis will likely be ongoing in nature.

Related to including only contracted resources when computing ELCC values, Staff highlights the differences between Obsidian Renewables recommendation to only consider contracted resources versus utilities' current practices. In response to Staff IR 11, PAC describes that its future portfolio "includes planned resources that have not yet been committed to." This is for the purpose of modeling a reliable portfolio. Staff requests further clarification from PAC at a future UM 2011 Workshop as to whether this inclusion impacts ELCC values.

In response to Staff IR 11, PAC further describes that "market purchases are counted as firm resources… Using only existing resources in this future period would likely result in an extremely large number of [energy not served] ENS events." Potentially conversely to PAC, in response to Staff IR 6, PGE describes that for its 2019 IRP Update, "the winter and summer on-peak market capacity [purchase] assumptions were both 0 MW." Understanding whether market purchases lower ELCC values should be discussed at a future UM 2011 Workshop.

As described above, including planned resource retirements in the ELCC calculations is equally important. In response to Staff IR 8, PAC states, "for example, as the Company's existing solar contracts expire, the capacity contribution of solar would tend to increase."

Staff understands stakeholders' concerns about the reliability impacts of including non-contracted resources in the ELCC calculation and proposes further discussion about standard guidelines for the inclusion of non-contracted resources and resource retirements in ELCC calculations. Staff also looks forward to exploration of whether different practices are appropriate in different applications.

Summary of Staff's Analysis - How much capacity can a resource provide?
Staff requests the following explanation or analysis from the utilities:

- Staff believes that it would help stakeholders evaluate yearly ELCC modeling requirements if the utilities were to circulate an example of a yearly ELCC values for a timeframe that extends beyond their current ELCC snapshot dates.
- To inform the discussion or resource libraries, Staff recommends that the utilities provide stakeholders with examples to help determine the appropriateness of the E3 Report's recommendation on page 19 that, "sufficient modeling should be performed such that the Last-In ELCC assigned from the library to each individual renewable resource is within 5% of its true Last-In ELCC."
- Staff requests further clarification from the utilities as to how planned resource retirements and additions/market purchases impact ELCC values.

[43] Obsidian Renewables, LLC Comments (March 8, 2021), p. 1.

Staff suggests discussion of the further explanation from the utilities at a future workshop. Staff also suggests the following future workshop topics:

- Exploration of the number of years of generation data inputs to compute ELCC values and appropriate uses of simulated renewable generation data.
- Whether there can be value in aligning the weather correlation approaches of the three electric utilities.
- Discuss alignment in the treatment of storage and demand response across utilities' ELCC models.
- Further dialog about the attribution of capacity contribution to each resource in a hybrid resource pairing.

Key Question 2: What is the value of capacity?

Which proxy resource acquisition should the Commission use to value capacity?

In Staff's opening comments, Staff proposed that the value of capacity should be based on the lowest net cost avoided capacity-providing resource. This is consistent with the E3 Report. Page 10 of the December 2020 E3 Report includes the following:

> Net resource cost is equal to the gross cost of the capacity resource less the value of the system benefits it provides and can be compensated for, such as energy and ancillary services, as depicted in the equation below.
>
> *Figure 9. Net Resource Cost Calculation*
>
> | | |
> |---|---|
> | Gross cost of capacity | *$/kW-yr* |
> | – System benefits
energy
ancillary services
etc. | *$/kW-yr* |
> | = Net cost of capacity | *$/kW-yr* |
>
> Traditionally, combustion turbines have been the lowest net cost of capacity resource in the electricity system. Other resources should not be used to establish the net resource cost unless they are lower cost or if there are policy limitations on lower-cost resources, such as restrictions on construction of fossil fuel plants.

Below Staff summarizes the stakeholder positions from filed Comments.

Stakeholder positions

Joint Utilities

The Joint Utilities support Staff and E3's use of a net cost metric and agree with Staff a SCCT remains an appropriate proxy for the avoided resource.[44] However, the utilities also note that other combinations of resources may yield an overall lower cost result.[45] The Joint Utilities argue that the value of capacity should also consider RFPs and that the value of capacity should not exceed PURPA avoided cost.[46]

OSSIA

OSSIA discusses what the proxy capacity resource should reflect and states that, "the capacity proxy resource should reflect resources the utility would add to its portfolio."[47]

REC

REC states that the Washington Commission adopted its staff recommendation that the value of capacity during sufficiency periods, "should not be based on market purchases"… but, "should be based on an actual resource."[48]

NewSun Energy

NewSun Energy discusses the value of capacity and what resources that value should reflect. NewSun concludes that the value of capacity should reflect the costs of resources capable to be built by the date of the next capacity needs.[49]

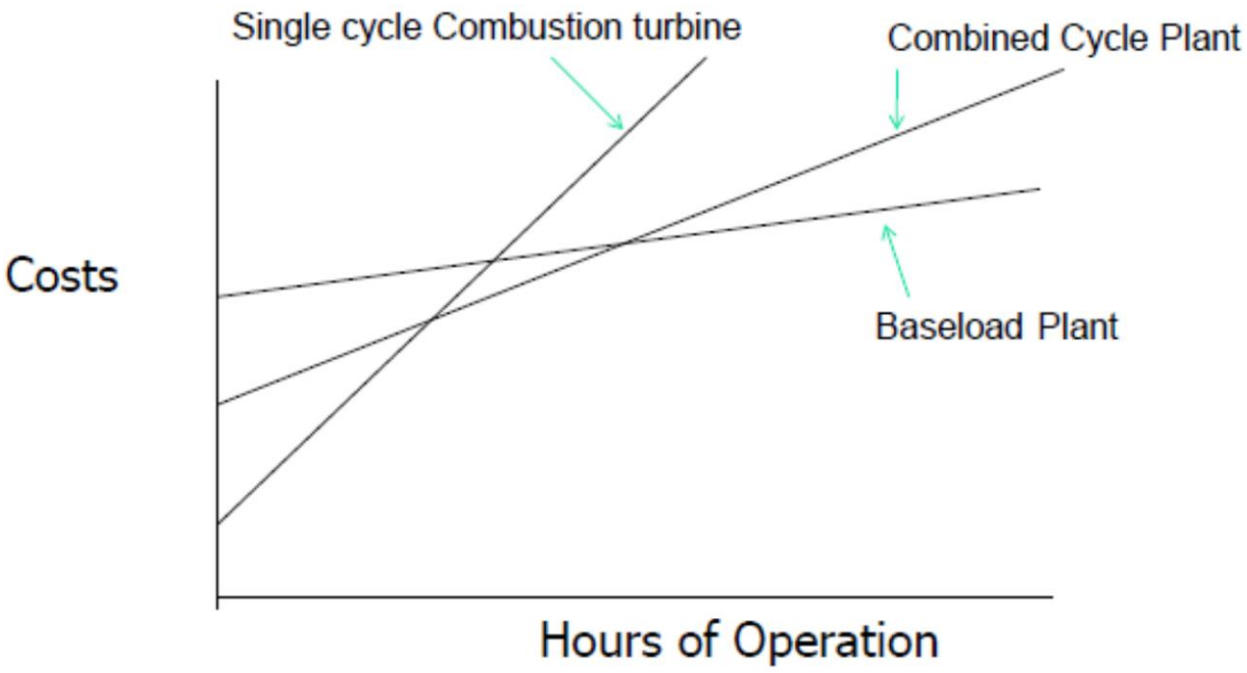
Staff Analysis

Utility resource procurement decisions consider a range of utility needs, such as energy and ancillary services, not simply capacity needs. Therefore the least cost resource across the range of utility needs may not be the same resource that provides the specific service of capacity at the lowest cost. It is E3's and Staff's view that the lowest cost resource for providing the singular service of capacity is currently a SCCT.[50]

For example, in developing capacity costs during the 1980s an argument might have been made that the cost of capacity equaled the cost of building a baseload plant because a baseload plant was chosen as the least cost resource instead of a SCCT. A graphical depiction of the cost tradeoff is shown in Figure 4.

[44] Joint Utilities' Initial Comments, pp. 1-2, 7.
[45] Id, p. 3.
[46] Id, pp. 8, 5.
[47] OSSIA Comments, p. 3.
[48] Renewable Energy Coalition's Comments (March 8, 2021), p. 14.
[49] NewSun Energy Comments (March 8, 2021), p. 3.
[50] E3 Report December 15, 2020, p. 10.

Figure 4: Example Cost Analysis of Traditional Resource Types



The costs of a baseload plant were lower overall when a baseload plant met the capacity and energy needs of a utility over many hours of operation. But the SCCT is lower cost when considering its use in a limited number of high need hours, better reflecting capacity service.

The Joint Utilities make the case that RFPs result in competitive prices and perhaps should be used as a proxy for the value of capacity. Staff understands the argument that RFPs may establish costs that better reflect reality. However, those results could be one-time events not replicable or ongoing in the future. It could have resulted from a distressed sale, or tax credits no longer available, or a site specific opportunity or economics. Therefore RFPs are not a reliable means of estimating the cost of meeting all future needs for capacity.

With respect to OSSIA and NewSun's comments about the feasibility of building the proxy resource, Staff notes that SCCTs are not currently being built and questions whether they would be in the future. This remains highly uncertain given a range of policy and economic considerations. Staff emphasizes its understanding that SCCTs are currently capable of being built at the lowest cost from a capacity perspective, but is interested in continued discussion about the suitability of hybrid or other storage resources as a potential least cost capacity resource in certain applications.

Staff also agrees with REC that the value of capacity should not be based on market purchases. That position could be revisited when there is a structured/organized market in the PNW. Staff supports a three-year ramp up to a full capacity value. While it may have been unclear in the original Staff comments, Staff is not supporting using O&M costs for the proxy for the value of capacity during the sufficiency period and is recommending that the delineation of sufficiency/deficiency periods be removed. The value would be based solely on the three year ramp up to the full capacity value.

Does the utility need new capacity, and how should that point of need be demarcated?

In Opening Comments, Staff proposed a standard resource sufficiency assumption such that a utility is resource sufficient in four years (three year ramp) from today on a rolling basis. Below Staff summarizes the stakeholder positions from filed Comments and related to the workshop held on March 17, 2020.

Stakeholder positions

Joint utilities

The Joint Utilities do not support what they describe as an arbitrarily determined date for the beginning of the deficiency period. The Joint Utilities state that, "PGE's acquisition timeline is not representative of that of the other utilities….Idaho Power should have a ten year timeline." The Joint Utilities also state that the Staff calculation is in error, "Staff's timeline contains incorrect and incomplete information."[51] In response to Staff IR 7, PGE adds that "PGE does not agree that the period of time reviewed by Staff is necessarily representative of the timing of PGE's future procurements."

OSSIA

While OSSIA states that perhaps the sufficiency/deficiency delineation should be removed, OSSIA states on the second page that, "Staff should update that assumption over time."

REC

REC comments that the demarcation between the sufficiency period and the deficiency period should be removed because, "…it is utility-controlled and therefore subject to utility gaming".[52] REC proposes that, "at minimum, the Commission should eliminate the sufficiency-deficiency demarcation for existing resources."[53] REC also discusses when the three-year ramp-in should begin and recommends it begin at contract execution.[54] REC discusses the impact of Staff's three-year ramp-in proposal as compared to current practice. REC notes that Staff proposes a general three-year ramp for every resource acquisition and that under Staff's proposal, "*if it begins at commercial operations*, the QF would not receive full deficiency pricing until 2027, two years later than the current status quo."[55]

NewSun Energy

NewSun discusses the three-year ramp-in and questions when the three-year period begins. NewSun states, "when does "year one" start in this methodology: (1) At the acknowledgement of the most recent IRP, (2) upon execution of the PPA, (3) upon commencement of the actual power sales in the PPA?"[56] NewSun discusses whether the three-year ramp in Staff's proposal allows for full cost recovery in certain circumstances, stating that it, "will fail to provide QFs with a payment of full avoided costs in the event that a utility recognizes a resource need sooner than three years."[57]

Obsidian Renewables

Obsidian comments include the consideration of equity regarding treatment of capacity between the utility and market participants, and does not think E3's framework realized this goal. Obsidian states,

[51] Joint Utilities' Initial Comments (March 8, 2021), p. 10.
[52] Renewable Energy Coalition Comments (March 8, 2021), p. 8.
[53] Id, p. 13.
[54] Id, p. 11.
[55] Id, p. 12.
[56] New Sun Energy LLC Comments (March 8, 2021), p. 6.
[57] Id, p. 4.

that "the objective of letting market participants compete for capacity contracts on a level playing field with the monopoly's shareholders is extremely important."[58]

Staff analysis

With respect to the value of capacity during the three-year ramp in period, the comments filed by stakeholders describe the Staff proposal as either arbitrary (Joint Utilities) or insufficient (Obsidian, REC). OSSIA suggests that the three-year proposal be reviewed and updated over time.

The three-year ramp-in proposal is not arbitrary. The proposal was developed after looking at the history of timing of a utility acquiring additional resources and typical needs identified in least cost plans. The Joint Utilities submitted comments that the Staff analysis was in error, because although recently PGE has acquired large resources about every three years, this has not been the pattern looking historically back to 1978. The Joint Utilities have argued that Staff's three-year ramp is not an accurate reflection of the sufficiency period because PAC's average number of years before acquisition in an IRP is 6 years, and IPCo's is 10 years. Staff believes that the three-year ramp is also appropriate for PAC because of that Company's reliance on front-office transactions. In response to the Joint Utility's Comments, Staff is persuaded that a three-year ramp is not representative of IPCo's likely future resource procurements. Staff would be amendable to a ten-year ramp for IPCo as long as this value is reviewed regularly.

Staff recognizes that its three-year ramp proposal can result in a different capacity payment stream than would be obtained under the Commission's current avoided cost methodology. Staff appreciates NewSun's comments regarding whether full capacity payments can be received under a three-year ramp-in method in certain circumstances. However, the fact that a generator may not recover its full costs does not, on its own, mean that a methodology to value the capacity contribution of a resource is flawed. The focus of this methodology is identifying avoided capacity costs regardless of a given generator's economics. The Commission's responsibility in regard to compensating a generator for the utility's avoided cost is to ensure the rates for customers are no higher than necessary while encouraging competition among energy suppliers.

With respect to OSSIA's assertion that the ramp should be periodically reviewed, Staff agrees. Staff recommends the policy be reviewed no less than every five years.

Capacity value during the resource sufficiency period

In Opening Comments Staff recommended that the "value of capacity in sufficiency period is equal to the fixed operations and maintenance cost of the lowest net cost resource. [and to] ramp up capacity value over three years of sufficiency period to full deficiency period capacity value in year four."[59] Based on feedback during the March 17, 2021 UM 2011 Workshop, Staff recognizes that this caused confusion about whether the fixed operations and maintenance cost of the lowest net cost resource is relevant for valuation in the second year – Staff's position is updated below. Below Staff summarizes the stakeholder positions from filed Comments.

Stakeholder positions

Joint Utilities

[58] Obsidian Renewables, LLC Comments (March 8, 2021), p. 2.
[59] Staff's Opening Comments, p. 3.

The Joint Utilities note they do not support using O&M as the value during the sufficiency period. The Joint Utilities state, "the utility would not avoid the fixed O&M costs …customers would pay for capacity twice…"[60]

OSSIA
OSSIA agrees with Staff that wholesale market prices do not represent the cost of capacity. They note that "it is unlikely that wholesale energy market prices will reveal increased capacity values as resource deficiency dates approach for a particular utility."[61]

REC
While REC does not support a sufficiency/deficiency demarcation, REC states that it is unclear whether the Staff proposal is preferable as, "it is difficult to say whether Staff's proposed change will improve the process."[62]

Staff analysis
In response to Stakeholders' Comments, Staff is amenable to not using the fixed O&M costs during the sufficiency period. Rather than using the fixed O&M costs in the first year, Staff would be comfortable with using zero. In the second and third years, the sufficiency period capacity value would still be one-third and two-thirds the value of capacity during the deficiency period.

Other Capacity Value issues raised by stakeholders

Stakeholder positions
NewSun Energy
NewSun advocates for the undertaking of a new study: "the value of capacity should reflect the costs of system reliability failures and the price customers are willing to pay to avoid failures."[63]

Renewable Northwest
Renewable Northwest responds to whether the value of ancillary services or resiliency should be calculated in this docket.

Staff analysis
Staff does not agree with NewSun that the value of capacity should reflect the economic cost of outages and willingness to pay. These reflect the demand for capacity and not the cost of supplying capacity. Staff does agree with NewSun that the costs of interruption are important and should be reflected in developing energy policy. However, Staff thinks the issue of costs of interruption should be used to develop the capacity targets—meaning in the application of the methodologies discussed in this investigation in investigations specific to the resource adequacy use cases. For example, if there were a 100 percent reserve margin, there would be no interruptions and the NewSun consideration would be moot. For this investigation, Staff assumes a one-day-in-ten years planning standard. The value of capacity reflects the least cost resource that is available solely to meet this need.

[60] Joint Utilities' Initial Comments (March 8, 2021), p. 11.
[61] OSSIA Comments, pp. 1-2.
[62] Renewable Energy Coalition Comments (March 8, 2021), p. 13,
[63] New Sun Energy LLC Comments (March 9, 2021), p. 2.

Staff appreciates RNW raising the issue and openness as to whether these related valuations should occur in this docket. Staff does not support the determinations as to specific values be made in this docket, but rather take place in other dockets for those use cases.

Next Steps

The goal of this docket is to determine which capacity valuation components can be standardized and what the requirements for standard practices should be. In addition, Staff hopes to determine which capacity valuation issues should be determined by its specific use case and establish any minimum requirements for doing that. Staff and stakeholders have identified several areas that require additional discussion. Stakeholders have also indicated that it would be helpful to more clearly articulate the issues list for this investigation as well as which use case specific discussions will happen where.

Staff has a workshop scheduled for April 30, 2021 where Staff plans to continue discussion of stakeholders' positions, discuss the detailed issues list and other scoping information requested, and identify future workshop topics that would help determine which capacity valuation components can be standardized and what the requirements for standard practices should be.

This concludes Staff's Reply Comments.

Dated at Salem, Oregon, this 26th of April, 2021

/s/ Max St. Brown

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Max St. Brown

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