**ITEM NO. RA2**

**PUBLIC UTILITY COMMISSION OF OREGON**
**STAFF REPORT**
**PUBLIC MEETING DATE: November 29, 2022**

**REGULAR** __X__ **CONSENT** ____ **EFFECTIVE DATE** ________N/A________

**DATE:** November 21, 2022

**TO:** Public Utility Commission

**FROM:** Scott Gibbens

**THROUGH:** Bryan Conway and Caroline Moore **SIGNED**

**SUBJECT:** OREGON PUBLIC UTILITY COMMISSION STAFF:
(Docket No. UM 2011)
Staff request for Commission adoption of Capacity Contribution Best Practices and closure of the general capacity investigation UM 2011.

## STAFF RECOMMENDATION:

Staff recommends the Public Utility Commission of Oregon (Commission) 1) adopt Staff's Capacity Contribution Best Practices found in Attachment 1 and direct PacifiCorp, Portland General Electric (PGE), and Idaho Power Company to consider this guidance when performing capacity contribution calculations; and 2) close the general capacity investigation UM 2011, with further decisions surrounding capacity valuation to be determined in use-case specific dockets.

## DISCUSSION:

### Issues

Whether the Commission should adopt Staff's Capacity Contribution Best Practices and close UM 2011 or if further discussion, investigation, or analysis into capacity valuation is warranted in this docket.

### Applicable Law

Under ORS 756.515(1), whenever the Commission believes that an investigation of any matter relating to any public utility or telecommunications utility or other person should be made, the Commission may, on its own motion, investigate any such matter.

## Analysis

*Background*

On April 23, 2019, the Commission opened a general capacity investigation docketed as UM 2011. The goal of the investigation is to "begin to resolve universal capacity issues in a manner that is resource and program agnostic…[to] harmonize the understanding of the value of capacity to individual utility systems through this investigation across all applications where capacity is relevant."

Staff proposed to examine three central questions relevant to valuing capacity, in phases:

- Phase 1: What is capacity?
- Phase 2: How is capacity acquired?
- Phase 3: How should capacity be valued?

Phases 1 and 2 laid the groundwork by which Staff and stakeholders could determine the appropriate paths to improvement in the way in which capacity is modeled and valued. In Phase 3, Energy and Environmental Economics (E3) produced a report on the Principles of Capacity Valuation. The report outlines a consistent set of principles in valuing capacity across all resources and use cases to ensure that one technology, customer, or ownership type is not favored over another. The report focuses on principles to determine 1) how much capacity can a resource provide (MW); and 2) what is the value of capacity ($/MW). It also touches on additional valuation and compensation methods that should be informed by the requirements and objectives of the use case.

Following the release of the E3 report, Staff engaged parties in the development of a capacity valuation "Best Practices" document. The Best Practices were based on key takeaways from the E3 report as well as stakeholder input and priorities. Staff proposed that, following Commission approval, the utilities will be expected to treat the Best Practices as modeling requirements and file a written explanation when deviating from the requirements.

On November 16, 2021, Staff held a workshop to discuss its recently released Best Practices proposal. At the workshop, parties agreed that having the utilities share some sample capacity contribution modeling results would help to resolve some key areas of disagreement where parties had recommended different approaches.

On January 25, 2022, Idaho Power, PGE, and PacifiCorp (Utilities) filed Capacity Contribution Modeling Results to ground truth the impact of the most contested modeling assumptions and methodologies. On February 15, Staff held a workshop to discuss the modeling results with parties.

Following the workshop, Staff contracted with E3 to provide further analysis of the utilities' modeling results against E3's principles report.

On September 23, 2022, Staff filed a proposal to conclude UM 2011 with an updated Best Practices document based on the takeaways from the utilities' filings.

On October 24, 2022, stakeholders filed comments in response to Staff's proposal including feedback on Staff's Best Practices document. PGE, PacifiCorp, Idaho Power, Renewable Northwest (RNW), Renewable Energy Coalition (REC), Oregon Solar + Storage Industries Association (OSSIA), and Community Renewable Energy Association (CREA) filed comments.

The rest of this Staff report provides the general reasoning behind Staff's proposal, and Staff's final proposed Capacity Contribution Best Practices (Best Practices). When discussing issues where parties provided comments or concerns, Staff will include those comments and a Staff response, where applicable.

*High-Level Takeaways from the Capacity Investigation*

Parties have worked collaboratively for nearly four years to explore the principles of capacity and capacity valuation under Docket No. UM 2011. While the policy and technology landscape has evolved since the investigation began, these changes only reinforce the importance of capacity valuation practices in supporting the affordable, reliable, and just transition to a clean electric system.

Throughout the investigation Staff focused on exploring a set of high-priority questions including:

- To what extent can capacity valuation methods be standardized across resource types and use cases?
- To what extent can capacity values be calculated in a generic, resource agnostic manner?
- Which practices ensure fair and consistent capacity valuation between resources across resource acquisition and ownership models?
- Which practices promote transparency into changing system needs and the resource characteristics that will be most helpful in meeting those needs?
- Which practices send better signals to the market across use cases and resource types?

Exploration of these questions has resulted in a set of meaningful findings which can be applied to capacity valuation practices across resource types and use cases. These key findings are discussed below and reflected in Staff's final Best Practices proposal in Attachment 1.

Staff believes that its Best Practices proposal provides a fair and consistent framework to identify the capacity that any resource provides. Further, UM 2011 allows for considerations of the granularity and transparent market signals to help the system operate in a reliable manner. The following summarizes the high-level takeaways Staff has gleaned through this investigation and that key feedback received.

**Distinguishing Capacity Contribution from Capacity Valuation**

Over the course of Phase 3, Staff identified a subtle but important distinction between capacity contribution and capacity valuation. Capacity contribution is the megawatt quantity of capacity that a resource provides to the system, capacity valuation is the dollar value of that contribution. Staff finds that capacity contribution methods can be meaningfully applied fairly and consistently in a more universal manner, while many of the capacity valuation and associated compensation practices explored in UM 2011 should be considered on a use case specific basis. This is because the valuation practices require more specialized consideration of the policy and economic goals specific to the particular application, beyond the mathematical concepts that underlie many of the capacity contribution practices. Staff provides an example for illustrative purposes.

> For example demand response (DR) can provide capacity at potentially any time of capacity need, but it can't provide capacity at *every* time of capacity need. If DR doesn't show up when called upon, it provides no capacity value and thus the pricing structure must incent the customer to reduce demand when called upon. Energy efficiency on the other hand operates in nearly the opposite manner, a pricing structure that only values capacity at a minimum number of times during the year might not reflect all of the times EE is providing capacity and an incentive to "show up" is unwarranted.[1]

In that vein, Staff's Best Practices focus on standard practices for calculating capacity contribution, but also outline key capacity valuation issues discussed during the investigation that are best left up to the use-case determination in the appropriate

[1] UM 2011 General Capacity Investigation Staff Announcement, September 23, 2022, p. 2.

venue.[2] More detail about these capacity valuation practices is provided later in this Staff report.

Stakeholder feedback: REC argues that the docket should not be closed until capacity value can be further examined or Staff Best Practices address value in a more direct manner. In particular, REC recommends that Staff re-add a previously removed proposed best practice:

> When assigning a dollar value to the capacity contribution of supply or demand-side resources (including hybrid resources), the price will be determined using the resource type's ELCC (or alternate approach) multiplied by the relevant cost of capacity.

Staff response: Although Staff does support certain valuation practices for certain use cases, (e.g., use of ELCC multiplied by relevant cost of capacity as means to assign dollar value to capacity contributions), Staff does not believe this is something that can be standardized across use cases. In applications removed from compensation, determining a dollar value from an ELCC or LOLP capacity contribution is relatively straightforward. However, it could be construed to be an application on proper compensation of capacity, which as Staff has noted, should consider specific circumstances. Staff believes that providing guidance on capacity contribution, but remaining silent on price, provides sufficient input towards value determination such that the recommendation remains flexible enough to consider circumstance without promoting estimates that could vary widely in result without using an unreasonable or convoluted methodology.

**Standardizing Capacity Contribution Models**

Through this investigation Staff has found that at a high level, the utilities have adopted capacity contribution methodologies that largely align with industry Best Practices. All three electric utilities use a version of Loss of Load Probability (LOLP) analysis to calculate capacity contribution. These models use a range of inputs related to load, weather, and generation along with Monte Carlo simulations or other stochastic statistical methods to determine the probability of outages over a given timeframe. A useful derivative metric available for apples-to-apples comparison of capacity between resource types is ELCC. ELCC is the equivalent amount of "perfect" capacity provided by a specific resource towards meeting system reliability requirements. By indexing all capacity to the amount of "perfect" capacity a resource provides, comparisons between resource types can be made. Staff believes that ELCC is currently the best option for holistic identification of capacity contribution for a specific resource or resource type.

[2] Staff discusses the specific use-case items and some additional stakeholder feedback later in the Staff report.

While alternative methods, such as the loss of load probability (LOLP) approximation method, do provide additional benefits in transparency and applicability in certain use-cases, ELCC incorporates interactive impacts between the resource of interest and the system where LOLP does not. As such, Staff recommends that ELCC be used as the de facto standard for capacity contribution unless the resource type, compensation framework, or other use-case specific circumstances warrant an alternative method. Put another way, ELCC is the best measurement of capacity contribution when viewed in a vacuum. However, LOLP approximation may be preferred when considering need for transparency or granularity in particular applications.

Stakeholder feedback: PacifiCorp broadly supports the flexibility to adjust the methodology based on particular circumstances. PacifiCorp notes they expect to use the 8760 LOLP alternative to comply with the Best Practices document. OSSIA provides arguments in favor of the use of LOLP approximations instead of the use of ELCC due to added transparency and flexibility.

Staff response: Staff agrees that in many circumstances, LOLP approximation is a suitable and sometimes better alternative to ELCC. Staff would note that while an 8760 LOLP approximation does provide additional transparency and a more granular view at the utility's hours of need, it is only an approximation of the true capacity contribution as it largely fails to account for interactive effects between the resource and the portfolio in a holistic manner. A rudimentary analogy to illustrate the difference between LOLP approximation and ELCC modeling is to consider a sports team attempting to determine whether to acquire a prospective player. LOLP approximation is akin to looking at the current team's performance over every game, identifying where the team's weaknesses were and examining how the prospective player's talents and attributes would fit those needs. ELCC modeling is akin to simulating the team's performance with that prospective player on the roster compared to what the team's performance was without the player on the roster, providing the actual number of wins that a single player's addition would add to the team over the course of a year. While well informed estimations about the player's ability to improve the team can be gleaned from the first analysis, only the second analysis really shows how the other players on the team would react and change their behavior given the roster addition.

Staff recommends the use of marginal ELCC because of the accuracy advantages it provides over LOLP approximations, and thus, when capacity contributions between the two methods diverge, ELCC should generally be thought of as the more accurate estimate. Staff encourages utilities to periodically examine the resulting estimates against ELCC values whenever the LOLP method is utilized and to continue to evaluate the use of ELCC in future applications as computing power and data systems evolve, particularly in instances where compensation is not an issue such as IRPs and RFPs.

Staff also notes that ELCC calculations are derived from LOLP models, and thus ELCC model runs can usually provide some form of LOLP data as well to aid in transparency and granularity.

**Capturing System Value Consistently Across Use Cases**
The investigation considered that ELCC can be calculated in several different ways:

- Portfolio ELCC is the combined capacity contribution of the entire portfolio.
- First-in ELCC measures the capacity contribution of a resource assuming no other system resources exist to aid in serving load. In a simple sense, this looks at the expected resource generation against the expected load and determines that capacity is provided anytime there is overlap between the two.
- Marginal or last-in ELCC is the incremental capacity value of a resource measured relative to an existing portfolio. It effectively answers the question, "How much capacity does this resource add to the portfolio?"
- Average ELCC compares the total installed capacity on the system and the ELCC capacity. It is equivalent to the sum of all marginal ELCC's, plus interactive effects. This occurs because each additional resource interacts with the portfolio in synergistic and antagonistic ways, resulting in a portfolio ELCC that is either greater or smaller than the sum of its parts.

Staff finds that the use of marginal ELCC to calculate all resources capacity contribution provides a clear and reasonable manner with which to compare capacity contributions without having to make contentious determinations about how to allocate interactive impacts amongst different resource types. This ensures that all resources are judged based on what capacity they add to the system. This includes the determination of the capacity contribution of resources in the utility's IRP preferred portfolio and RFP, such that all resource additions, whether utility-owned, utility scale, small scale, or other are compared and evaluated in a consistent manner.

<u>Stakeholder feedback:</u> OSSIA presents arguments related to the use of last-in or marginal ELCC for capacity contribution. They argue that in certain circumstances, portfolio or average ELCC is a better metric to evaluate contributions to the system, particularly for DER. They further note that multiple resource additions occurring in a particular year should have similar ELCC values as to not penalize resources for the order in which they are added.

<u>Staff response:</u> Staff agrees that there could be circumstances where a different approach better fits the needs of the use-case and notes that its proposed Best Practices allows parties to consider the appropriateness of that circumstance. However, Staff believes there is value in a consistent approach across applications to ensure commensurate evaluation of resources. Staff further notes that the use of marginal

ELCC to evaluate resources on the capacity that they are expected to provide to the system over the course of the resource's life should mitigate against the importance of resource procurement timing. However, should a specific circumstance arise where similar resources have different ELCC calculations, Staff is open to further discussion in the appropriate venue.

**Reflecting Changes in System Need Over Time**
Another key finding of the investigation is that capacity contribution should reflect changes in system value of the resource over time, rather than reflect a "snapshot" year. Therefore, Staff's Best Practices document proposes that ELCC values should be calculated for at least four years of the resource in question's useful life. The first shall be the first year where a major resource need is identified, the second being the last year of the study period, with the other two being selected by the utility after input from stakeholders. The values then should be interpolated across the study period to provide an estimate of the capacity contribution over time

Stakeholder feedback: PGE disagrees with Staff recommendation on temporal granularity, noting the uncertainty surrounding the resource portfolio in future years. Idaho Power also disagrees but generally raises concerns surrounding the burden of additional estimation processes.

Staff response: Staff would note that although PGE may have concerns over the certainty of the portfolio in the future, by not attempting to estimate future capacity contributions but investing in resources which last much longer than the Company's snapshot date, PGE is effectively forecasting that the capacity contribution will remain stagnant over the entire resource's life. They are not avoiding the issue but instead making an unfounded assumption. Although Staff agrees that the future has inherent uncertainty, attempting to predict it the best we can is paramount to effective planning. This would be akin to making a load forecast for two years into the future in an IRP, and utilizing that forecast over the entire 20-year planning horizon. Staff further reiterates the importance of ELCC "Tuning." Evaluating future portfolios which are tuned to the reliability metric ensures marginal ELCC is calculated as opposed to a mixture of marginal, average, and first-in ELCC. Staff further notes, in response to Idaho Power, that deviations from Best Practices will likely exist but that again, Staff attempted to minimize the recommendations to capture what it believed were the most important aspects and assumptions for accurate capacity contribution modeling. Utilizing one or two capacity contribution modeling years may be reasonable when examining a resource with a five or ten-year life span, but would likely lack the information regarding the capacity contribution of the resource over time if the resource's useful life was 20 or 30 years.

*Staff's Best Practices Summary*
The Best Practices document in Attachment 1 reflects the culmination of years of philosophical and technical discussion with a broad group of experts and other stakeholders. It captures the key findings described above along with additional findings and analytical specificity to support implementation across use cases. Staff sees the Best Practices as a capacity modeling framework that balances the need for consistency and rigor with the flexibility to tailor market signals, administrative simplicity, and accessibility to the needs of the use case.

Staff provides a high-level list of the Best Practices not captured in the key takeaways above and its response to stakeholder comments and feedback.

**Applicability**
Staff envisions the use of the Best Practices to provide guidance for parties when assessing capacity contributions of different resources. Staff's goal in this proceeding was to identify a methodology that would result in consistent and fair evaluation of all resource type's capacity contribution regardless of ownership, size, or type.

Staff attempted to pare down its recommendations and focus on addressing the most important considerations while acknowledging the need for flexibility and limiting administrative burden. The result is a Best Practices document that may not address all issues but that can be more widely applied and ensures commensurate treatment across a wider range of applications like key planning processes like IRPs and RFPs.

Comparisons between the utility's actual methodology and Staff's Best Practices will aid in vetting models and parties will be able to make recommendations to the Commission about the appropriateness of capacity contribution methods in use case specific dockets. Staff believes that utilities should provide reasoning as to why any divergence from Staff's Best Practices were performed when filing capacity contributions with the Commission.

<u>Stakeholder feedback:</u> PGE requests confirmation on the applicability of the Best Practices to IRPs, RFPs, and DSP work streams. Idaho Power has concerns over the use of the Best Practices modeling in IRPs, and further raises concerns regarding the application to the upcoming IRP.

<u>Staff response:</u> Staff limited the scope of the Best Practices so that they would be applicable to all capacity contribution calculations where a specific resource, resource type, or set of resources is being considered. One key to assuring a fair result for all resources regardless of procurement process or ownership, is ensuring that all resource capacity contributions are based on marginal capacity contribution. All resource

additions should be judged on the value they add to the portfolio, including the resources in the preferred portfolio. When capacity contributions are calculated in future years, the estimations should include all other resources that were optimally selected based on their marginal contribution of capacity to the system. However, Staff notes that it expects the Best Practices to serve as guidance that are followed where possible, but exceptions can be made where the Company is able to provide reasonable evidence to support differences. Staff is amenable to the concerns raised by Idaho Power regarding the upcoming IRP, and thus has changed the recommendation to implement Best Practices into the following IRP. To the extent practicable, Staff would recommend some discussion in the 2023 IRP highlighting some of the differences from the utilities current methodology to Staff's Best Practices to aid in the review of the IRP modeling results and prepare for potential modeling changes in the future.

**ELCC Model Methodology**
ELCC models should be tuned to the agreed upon reliability metric prior to model runs to ensure consistent and accurate results. This involves calculating system reliability, then adding or subtracting perfect capacity to achieve the target reliability metric, adding the desired resource to the portfolio, and then removing perfect capacity until the target reliability is restored.

Stakeholder feedback: PGE generally expresses support for the use of ELCC in capacity contribution calculations. They note that they perform ELCC calculations using a different process than that laid out by Staff, which involves fewer iterations and shorter runtimes.

Staff response: Staff requests that PGE continue to examine its ELCC modeling to ensure that an accurate estimation of marginal ELCC is calculated on a system that is as close to practicable to target reliability, particularly in future years where untuned load and resource changes could cause the system to diverge from target reliability to a greater degree.

**Baseline Resource Assumptions**
When running capacity contribution models the input data should include no less than 8 years of actual or synthetic output data for variable resources, adjust for climate trends, be granular enough to capture meaningful impacts, and utilize the preferred portfolio and any other known additions or retirements.

Stakeholder feedback: Idaho Power raises concerns over the overly and unduly burdensome nature of the data requirements. OSSIA request clarification of the applicability of the data requirements for resource specific vs proxy resource applications.

Staff response: Staff does not view the data requirements as overly or unduly burdensome. Staff's view is supported by guidance from E3 who views this as an industry standard practice. Certain resources are generally evaluated using proxies as stand-ins to minimize the administrative burden of evaluating all resources, while other generally larger resources may have their specific ELCC's calculated. In all circumstances, Staff recommends the use of as close to eight years of data as possible to ensure the model is appropriately informed and the resulting capacity contribution value is robust. Finally, Staff notes the National Renewable Energy Laboratory (NREL) publishes industry standard sources that provide high-quality independent and transparent source of data if the utilities are struggling to identify the appropriate and necessary data.

Stakeholder feedback: OSSIA further raises concerns over the use of the preferred portfolio in future capacity valuation estimates, arguing it results in disparate treatment between utility-owned and non-utility owned resources. CREA argues that the use of the preferred portfolio may not be consistent with PURPA.

Staff response: Staff appreciates OSSIA and CREA raising this concern and looks forward to discussing the application of Staff's Best Practices for PURPA in UM 2000, where the concerns can be vetted in a more in-depth manner. Staff believes that the outlined methodology provides a fair and accurate way to measure capacity contribution regardless of resource ownership or size. The use of the preferred portfolio provides an accurate representation through a vetted process of the portfolio in future years, allowing the model to calculate the marginal capacity provided by any particular resource over the life span of the resource.

**Use-case Specific Items**

These items are more appropriate addressed in use-case specific dockets where particular circumstances can be considered.

a) Target reliability metric
b) Marginal resource characteristics and quantity
c) Sufficiency/deficiency determination
d) Capacity compensation framework
e) Transparency and update process

Stakeholder feedback: OSSIA and Idaho Power both request clarification on Staff's position on the reliability metric.

Staff response: Staff believes that both OSSIA and Idaho Power raise pertinent items for consideration when examining the appropriate target reliability metric and is thankful that the Commission has opened the investigation into resource adequacy to examine this and surrounding considerations more in-depth. Ultimately, Staff believes that the reliability metric is a policy determination reflective of the Commission's determination of what level of reliability is appropriate and that the goals and considerations of UM 2143[3] are more capable of developing a sufficient record around that issue. Staff has made recommendations in UM 2143 regarding the reliability metric and encourages stakeholders to participate in discussions in that venue. Reference to a one event in ten-year LOLE in the Best Practices was for illustrative purposes and not intended to imply a recommendation.

**Avoided resource definition**
Staff recommends that the avoided resource be the resource or resources that provide the lowest cost of viable capacity. In the proposed Best Practices, viability includes the feasibility and cost of alternative utility resource options under policy and market realities, including such issues as climate policy, transmission availability and interconnection queues. Staff generally supports the inclusion of all appropriate costs when determining lowest costs and does not foresee a circumstance where a thermal resource could provide "viable capacity" given the current legislative direction.

<u>Stakeholder feedback:</u> PGE and OSSIA seek clarification regarding Staff's recommendation on avoided resource selection. Idaho Power believes that the language surrounding the avoided resource definition should be removed.

<u>Staff response:</u> This Best Practice is important to include because it provides meaningful direction to modernize the avoided resource without locking all use cases into a single static resource. This flexibility is important as the range and characteristics of capacity resources that can be acquired continues to grow as the system transitions away from traditional thermal resource options. Further, this Best Practice provides direction as to how capacity contribution modeling should be incorporated into avoided resource definition. Potential resources should be judged based on their $/MW of capacity provided (Resource cost/(ELCC x Nameplate)), such that the avoided capacity price reflects the lowest cost capacity value *to that system*. Even though a pumped hydro resource may provide longer duration capacity than a four-hour battery, they are both judged based on their capacity contribution to the utility's specific system

**Additional PURPA Implementation Feedback**
PGE requests clarification on the impact of UM 2011's conclusion on UM 2000. Staff responds that it does not intend to prohibit the discussion of issues or stakeholder recommendations in UM 2000. To the extent the Best Practices outline a process or methodology, Staff will continue to recommend the application and use of the best practice until a reasonable argument can be made for an exception in a specific

[3] Docket No. UM 2143 is the Commission's investigation into resource adequacy.

circumstance. Where particular recommendations are made that would obviate, or warrant an exception to, the application of the Best Practices, Staff will evaluate the issue and make a recommendation in line with the public good.

REC raises a concern regarding the approach to capacity payments of existing or renewing non-utility-owned resources. Generally, REC makes a recommendation that seeks to guarantee fair and similar treatment for utility-owned and non-utility-owned resources. In response, Staff thanks REC for raising this issue, particularly when considering the modeling of renewing QFs in the context of current and future portfolios. Staff notes that the treatment of renewing QF contracts may be better determined and discussed more in-depth in UM 2000. Notwithstanding that concern, Staff's recommendation is for all resources to be evaluated using marginal capacity contribution, regardless of ownership or build status. Resources should be evaluated and procured based on the value they provide to ratepayers inclusive of any meaningful circumstance. If the utility were in a circumstance where the future of a ratepayer-owned resource was to be determined, Staff would recommend that the capacity contribution of that resource be evaluated on a prospective basis as opposed to a retroactive basis so that the benefit analysis would match the cost time horizon.

OSSIA requests Staff input on sufficiency/deficiency demarcation. Staff continues to believe that use-case dockets such as UM 2000 are a better venue for determination of sufficiency/deficiency matters, but agrees with OSSIA that accurately estimating capacity contribution over a longer time horizon may aid in determining the appropriate compensation for resources. Staff looks forward to further discussions regarding sufficiency/deficiency in UM 2000.

*Next Steps*
Following the conclusion of UM 2011, Staff proposes to explore implementation and dive into valuation and compensation questions in the following near-term implementation priorities.

| Use-Case Categories | Use-Case Implementation Priorities |
|---|---|
| **Administrative pricing** | • Review capacity compensation as a near-term issue in UM 2000, which was re-Launched on November 1, 2022.<br>• Begin reviewing Voluntary Renewable Energy Tariff (VRET) crediting proposals against UM 2011 principles with the next VRET resource filing. |

| | |
|---|---|
| **DER program design** | • Begin reviewing UM 1983 Energy Efficiency Avoided Cost updates against UM 2011 principles in 2023.<br>• Consider UM 2011 principles as future energy efficiency, demand response, or other DER programs are proposed or considered for modification.<br>• Consider UM 2011 principles as other DER avoided cost/cost effectiveness dockets arise. |
| **Planning** | • Consider establishing a standard reliability metric for tuning capacity valuation models in UM 2143. Consider the alignment of capacity contribution methods of regional RA programs with UM 2011 principles.<br>• Review IRP ELCC methodologies against UM 2011 principles beginning with next IRPs not currently in process (expected in March 2025). |
| **Procurement** | • Review RFP modeling against UM 2011 in future RFP proposals. |

Conclusion

Staff thanks all the utilities, stakeholders, and national experts who have participated in UM 2011. The investigation has been very informative and provided valuable understandings about one of the most critical aspects of utility planning and operations. It further has been very timely as we begin to transition the system from thermal resources that provide on-demand capacity to a carbon-free system with resources that all must work in harmony to meet load. Capacity planning is no longer as simple as taking nameplate capacity and accounting for the potential forced outages. It now requires a more extensive examination of how each resource fits into the system as a whole. The learnings from the investigation give us the tools to find the appropriate balance between reliability and affordability. Staff believes that the updated Best Practices provide stakeholders and the Commission with a clear, concise, flexible, and meaningful way to ensure fair and even-handed capacity contribution estimations for a wide range of applications. It provides the first step in what is now an even more complex process of capacity planning by ensuring we can look at the capacity that any resource provides to a specific system in a robust manner. Further, the investigation has provided insights into how we can take information about capacity contribution along with surrounding circumstances related to the resource characteristics, procurement, process needs, or incentive structure, to establish capacity compensation that is fair and produces outcomes in the public interest.

**PROPOSED COMMISSION MOTION:**

Adopt Staff's Capacity Contribution Best Practices as found in Attachment 1 and direct PacifiCorp (PAC), Portland General Electric (PGE), and Idaho Power Company (IPC) to consider this guidance when performing capacity contribution calculations. Close the general capacity investigation, UM 2011, with further decisions surrounding capacity valuation to be determined in use-case specific venues.

RA2 – UM 2011

**Attachment A**
**Staff Capacity Contribution Best Practices**
Updated November 21, 2022

**Application of Best Practices**

1. These policies and procedure are applicable when calculating the capacity contribution of a supply or demand side resource, generally whenever a specific resource or resource type and not a portfolio of resources is being considered (incremental vs portfolio capacity analysis). This currently includes some aspects of regulatory purposes such as administrative pricing, cost effectiveness and customer program design, resource adequacy analysis, planning (IRP & DSP), and procurement (RFP).

**Model Determination**

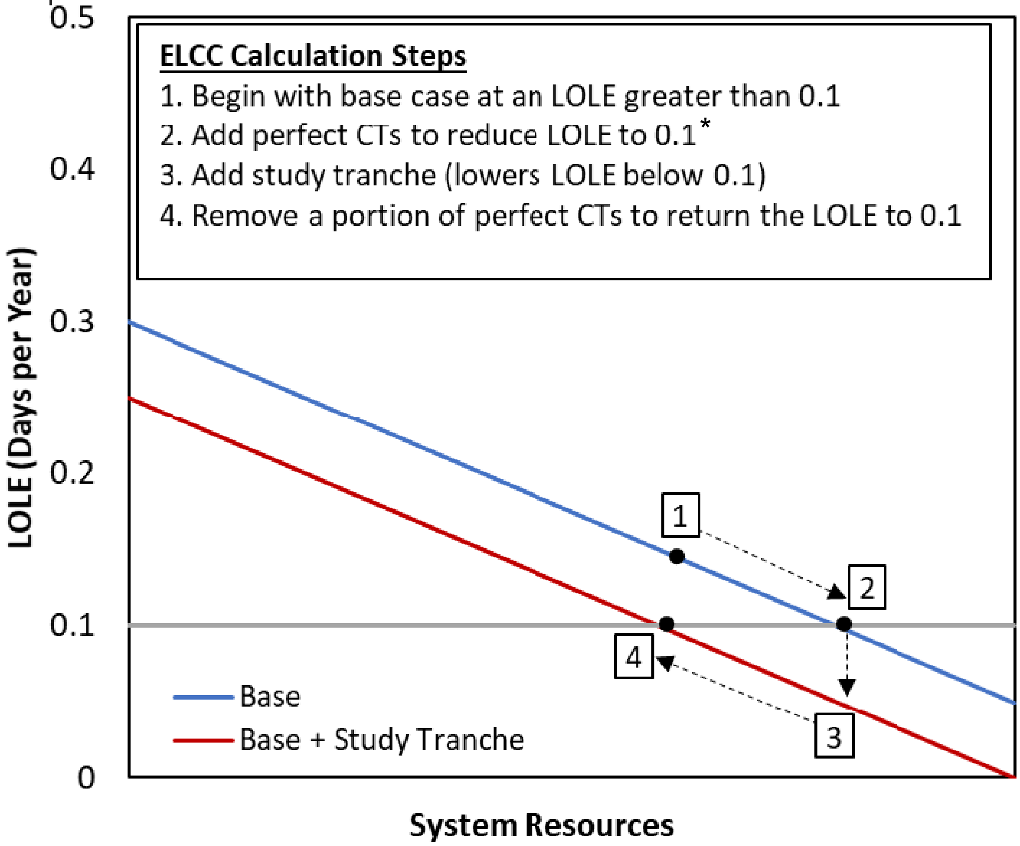
2. The most accurate and preferred methodology to calculate the capacity contribution of all types of supply- and demand-side resources (including 'hybrid resources') is Effective Load Carrying Capability (ELCC).

   In the event that calculating ELCCs for many resources for many years is not practical from a utility workload perspective, a utility may use an alternate method to estimate resource capacity contribution. One such "qualifying" alternate method is developing normalized 8760 LOLP values for each year of the study period. In an overlay capacity-contribution approach using the 8760 LOLP value matrix, the derivation of the capacity contribution of a variable resource must take into account both the distribution of its output across available actual or synthetic weather and the resource adequacy power reliability standard such as overlaying each of the eight years of variable generation and selecting a capacity value that can reasonably be relied upon for planning purposes.

**Model Methodology Tuning**

3. ELCC is calculated by the following steps: 1) calculating system reliability, 2) adding or subtracting perfect capacity or perfect load to achieve the target reliability metric, 3) adding the desired resource to the resource portfolio, and then 4) removing

perfect capacity until the target reliability is restored.”[1][2] The figure below illustrates the ELCC process.




* For illustrative purposes only, actual reliability metric may be different.

**Baseline Resource Assumptions**

4. Capacity contribution modelling should include reasonable estimates of the distribution of output for variable generation resources using actual weather data where available.
    a. Modeling the output of resources should:
        i. Use no less than eight years of the most recent output data for the resource. Where eight years of actual data is not available, the utility should use synthetic data that reasonably represents future actual data with respect to mean and variance. Synthetic data sources should be reasonably transparent and understood by stakeholders.[3] The synthetic data observation values should be matched with utility load levels with respect to year, month, and hour.

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[1] E3’s December 15, 2020 Principles of Capacity Valuation Report at 2.
[2] Staff assumes that this computation method causes resources to have ELCC > 0% in resource sufficiency periods.
[3] For example, utilities can generate synthetic profiles using NREL data or other publicly available data.

ii. Include adjustments to historic weather and generation data, as appropriate, to
reflect potential impacts of climate change. For these adjustments, the utility must also separately identify the climate change related impact on the distribution of the resource output.

b. Variable resources should have at a minimum:
   i. Monthly generation forecasts and variability;
   ii. Hourly generation forecasts and variability; and
   iii. Analysis of the relationship of resource output variability during peak load hours.

c. The ELCC computations should reflect best estimates of resource additions and retirements at of the time of the study.

d. The utility's supply-side resources should include the utilities most recently acknowledged preferred portfolio additions in future years updated to reflect any actual RFP procurement which operates under the required statutory constraints in a safe and reliable manner while limiting excess costs and unwarranted investment. Further additions outside of the preferred portfolio should include:
   i. Non-PURPA resources that are contractually committed, including voluntary customer supported supply-side resources;
   ii. PURPA projects that are contractually committed to come on-line and reasonably expected to produce power; and,
   iii. Customer owned or supported resources, outside the direct control of the utility with respect to timing of installation, that are reasonably expected to result in either reduced loads or an increase in total supply dedicated to meet loads.[4]

e. The utilities should continue to use their full IRP models to compute the present value revenue requirement of different proposed resource procurement decisions when able.

**Temporal Granularity**

5. Annual values for resource capacity contributions should be derived using results from last-in ELCCs for each resource class. (Throughout this straw proposal "ELCC" refers to "last-in/incremental/marginal ELCC.")[5, 6] At a minimum, the IRP index of proxy resources must include at least four ELCC modelling year resource capacity contribution values. Unless otherwise warranted, the first ELCC modelling year shall

[4] As a condition of LC 73 IRP Update Order No. 21-129 PGE is to compute ELCC values by year for its next IRP. Staff anticipates that the quantity of hours with potential loss of load increases as there are fewer supply-side resources over time.
[5] For example, see E3's December 15, 2020 Principles of Capacity Valuation Report at 18: year one ELCC of 25% and year two ELCC of 44.4%.
[6] A "resource" type can be distinguished by different types of the same resource or different locations and includes hybrid resources.

be the first year where a major resource need is identified, and the last ELCC modelling year shall be the last year of the study period. The other two modelling years shall be selected by the utility, after considering input from Staff and stakeholders. Years of the study period not directly modelled shall have the ELCC annual capacity contribution values derived through interpolation using a reasonable method given the findings of the ELCC modelling analysis.

**Interactive Effects**

6. Utilities should periodically perform analysis that determines if there is a correlation of weather/utility load data and renewable resource generation data. If such a correlation exists, then it should be included in the capacity contribution ELCC modelling.
7. Duration of energy storage and demand response should be modeled to capture the effects of multi- day weather events.

**Items addressed in use-case circumstances**

8. Generally, Staff's best practices relate to the appropriate calculation of a resource's capacity contribution (MW), but do not address capacity value ($/MW) or compensation. Staff continues to find merit in the principles presented in previous iterations of its best practices on the items listed below but looks forward to further discussion. Specific assumptions related to use-case applications may include:
    a. Target reliability metric
    b. Marginal resource characteristics and quantity (i.e., expectations for proxy marginal resource selection and differentiation)
    c. Sufficiency/deficiency determination (i.e., whether and how to utilize in pricing)
    d. Capacity compensation framework and methodological dependencies (e.g., use of 8760 LOLP for 8760 pricing)
    e. Transparency and update process

**Avoided Resource definition**[7]

9. The avoided resource should be informed by the feasibility and cost of alternative utility resource options under policy and market realities, including such considerations as climate policy, transmission availability and interconnection queues. The avoided capacity resource should be the most cost-effective form of capacity that can be used to serve Oregon load under those principles. Determination of the most cost-effective avoided resource should use ELCC

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[7] Due to shifting market and technological impacts, Staff does not recommend the use of a standard avoided resource but instead a methodology for identifying the proper avoided resource in future applications.

modeling to weigh the potential resources on a $/MW of capacity provided scale (Resource Cost/ (ELCC * Nameplate)) to identify the appropriate avoided resources unless legal or other considerations warrant the use of an alternative method.