September 23, 2022

UM 2011 General Capacity Investigation
Staff Announcement

This announcement describes the Oregon Public Utility Commission Staff's (Staff) proposed strategy to bring this phase of the UM 2011 investigation to a productive conclusion by the end of 2022. Additional scheduling information regarding UM 2011, UM 2143, and UM 2000 is included. Staff's updated Capacity Valuation Best Practices document is also attached.

Background

On April 23, 2019, the OPUC 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?

In Phase 3, 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 or customer 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. Because the best practices document includes details beyond the generic modeling principles from the E3 report, Staff proposed that the best practices do not need to apply to Integrated Resource Plan, Request for Proposals under Division 89, or Resource Adequacy programs.

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 15th, 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. Staff and E3 met with each of the three utilities individually.

The remainder of this announcement outlines Staff's process to finalize the best practices document and begin implementing the findings of this investigation through use case specific activities.

Takeaways from UM 2011 Process

A primary goal of the Commission's capacity investigation was to look at the issue of valuing capacity holistically and consistently across dockets and technology types. Staff finds that consistent capacity valuation across applications is possible, but that determination of the value of the capacity and, where applicable, the price of providing capacity must reflect the circumstances surrounding the use-case and the need to send signals in the public interest. Meaning that it is possible to fairly compensate resources for the capacity they provide while using differences in the valuation assumptions and incentive structure. A standard pricing methodology cannot be utilized in all circumstances, either. 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 DR to respond when called upon. Energy efficiency (EE) 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 value and an incentive to "show up" may not be appropriate.[1]

At the core of capacity valuation is the calculation of capacity contribution, which reflects the amount of capacity any particular resource is expected to provide to any particular system. In contrast to valuation, Staff believes that methods for capacity contribution calculations can be standardized across use-cases, such that regardless of venue, technology, timeframe, or goal, the theoretical amount of capacity any resource provides can be compared to other resources on an apples-to-apples basis for a given system. Whether the resource is properly incentivized to provide the capacity is not pertinent to how much capacity a resource *could* provide.

Ultimately, Staff finds that Oregon utilities are largely performing capacity contribution modeling using reasonable assumptions and industry standard methodologies, however Staff believes that some updates and standardization are warranted. Below Staff provides some of the changes and clarifications Staff has made to its best practices to reflect these overall findings.

HB 2021 and the transition towards an energy mix free from carbon presents many challenges for the utilities, stakeholders and the Commission. Capacity sources are shifting from near perfect dispatchable thermal sources, to a mix of options which provide capacity in less direct ways. Non-dispatchable sources (stand-alone wind and solar), and non-self-generating sources (batteries and pumped hydro) make capacity planning more complex and fraught with potentially poor outcomes if not done with proper attention. As we seek to close the investigation into capacity, Staff's hope is that this document will provide a consistent and accurate capacity contribution methodology and provide a framework and better understanding of compensation and other tools available to ensure fair and accurate capacity valuation as we move forward.

Changes to Staff's Best Practices

Staff has modified its previous best practices proposal to include the following:

- Updates to the generic capacity contribution methodology best practices to address deficiencies identified in utility-specific filings;

[1] Staff notes that resource agnostic compensation can be achieved through the use of resource agnostic capacity contribution modeling so long as the incentive structure maximizes the benefit to the public. Resource agnostic compensation could use a capacity price multiplied by the resource types' ELCC or an indexed version of LOLP values, such that expected or actual generation is compensated based on the capacity cost multiplied by the weighted LOLP profile. This approach should result in the same average annual cost of capacity, but with different prices depending on relative LOLP hours during the year.

- Differentiation of generic modeling best practices from elements that should be informed by the requirements and objectives of individual use cases;
- Because of the differentiation noted above, expanded applicability of the generic modeling best practices to apply to all use cases, including planning, procurement, and resource adequacy to the extent practical;
- A process to conclude Phase 3 of UM 2011 and close the generic capacity investigation:
  - Commission adopts a set of best practices for modeling the capacity contribution of any single resource. Adopting the best practices will signify that the Commission agrees these practices should serve as a common baseline for Staff, parties, and the Commission when examining future capacity calculations across use cases.
  - A set of use case specific modeling decisions that should be considered in use case specific activities.
  - A roadmap of priority activities to begin implementing the generic best practices and tackling use case specific decisions.

Clarifications to the generic best practices for modeling capacity contribution

Staff updated its best practices to reflect learnings from the recent discussion and analysis in UM 2011. These changes serve to correct and clarify the standard assumptions and methodology for calculating capacity contribution across use cases. Staff's best practices can be found in Attachment A.

- ELCC "Tuning"

  In order to ensure ELCC calculations measure contributions towards reliability in a consistent manner, Staff finds that Utilities should benchmark their systems to a target reliability metric (Staff proposed 1 day in 10 years LOLE in UM 2143) prior to computing incremental ELCC. This ensures there is no conflation between capacity contribution (MW) and capacity value ($/MW). Capacity contribution is simply the incremental load or incremental perfect capacity that the resource in question can serve or replace relative to a perfect resource. In other words, a perfect resource should always yield a capacity contribution result of 100% which may not be the outcome of an ELCC calculation on a system that is significantly short or long on capacity. Additionally, a system that is too short or too long will not result in realistic dispatch of resources. Dispatchable resources will need to run more often, increasing the likelihood of forced outages; battery storage resources must be charged, putting a further strain on dispatchable resources; storage hydro must be used to avoid outages earlier in the year, unrealistically leaving less water later in the year. A system that is tuned to the target reliability will realistically dispatch all resources based on actual future expected system operations.

- Preferred Portfolio resource assumptions

  Utilizing the preferred portfolio produces the most realistic assumption for capturing the incremental contribution of a specified resource. With unrealistic assumptions regarding the portfolio mix, ELCC calculations will not properly reflect interactions (synergistic and antagonistic) between different resources in the portfolio. For example, excluding expected future solar from the portfolio would diminish the future ELCC of battery storage (missing positive synergy with solar) while simultaneously increasing future ELCC of solar (missing antagonistic saturation effect). The use of the preferred portfolio offers a realistic assumption about the future system borne from a vetted and rigorous process.

Differentiation of generic and use-case specific elements

Parties identified a range of important capacity valuation practices and priorities over the course of the investigation. In closing out this effort, Staff concludes that there are technical best practices for calculating capacity contribution of resources that should be standardized. There are resource agnostic practices that form the basis for accomplishing the stated goals of this investigation. There are also a range of policy-focused decisions that should be made on a case-by-case basis to send the right signals and align with use case specific requirements and policy goals.

Staff's final proposed best practices for capacity contribution modeling are detailed in Attachment A and include recommendations in the following categories:

- Application of best practices
- Model determination (i.e., when to utilize ELCC or LOLP approximation)
- Model methodology
    - Tuning
    - Baseline resource assumptions
    - Temporal granularity (i.e., capturing capacity contribution change over time)
    - Interactive effects
        - Climate
        - Load
        - Storage with other resources
    - Avoided Resource Definition

Staff determined that the following practices discussed throughout Phase 3 should be considered on a use case by use case basis.

- Target reliability metric
    - Staff observes that utilities do not use the same target reliability metric in tuning their ELCC calculations. Staff believes that the exact metric (e.g., 1 in 10 LOLE equivalent) does not have substantial impacts on properly modeled ELCC results. As Staff previously discussed, the system should be tuned to the target reliability metric, but this is an assumption which equates to what is considered "reliable". The capacity need determination relates more to the capacity value than to the actual contribution of capacity that any particular resource can provide. The tuning process ensures that ELCC is calculated relative and incrementally to the reliability metric, but where the reliability metric is set isn't as impactful on ELCC as ensuring the ELCC calculation is measured against a set metric in a consistent manner. Thus Staff believes that it is more appropriate to consider a standard reliability metric in UM 2143, the resource adequacy investigation, because it more directly relates to concerns about reliability. In that docket, Staff is currently recommending the use of a standard of 1 day in 10 year LOLE equivalent reliability metric.
- Proxy resource characteristics and quantity (i.e., expectations for proxy marginal resource selection and differentiation)
    - The investigation explored best practices for the identification of renewable proxy resources and their characteristics, focused on PURPA avoided cost rates. While PURPA-focused practices may not be applicable to all use cases, Staff continues to support PURPA proxy resource selections that are realistic and sufficiently differentiated enough to justify the administrative requirements. Staff looks forward to further discussions on this issue in UM 2000.

- Sufficiency/deficiency determination
    - Parties engaged in meaningful discussion about whether and how to continue to use sufficiency/deficiency demarcation in assigning a dollar value ($/MW) to capacity contribution, with a focus on PURPA capacity pricing. Ultimately, Staff finds that pricing and compensation approaches should be informed by the objectives of the use case rather than standardized in this investigation. However, Staff continues to support a capacity pricing framework for PURPA that balances simplicity, accuracy, and the realities of utility procurement drivers under HB 2021 and market conditions.
- Capacity compensation framework and methodological dependencies (e.g., use of 8760 LOLP for 8760 pricing)
    - In this investigation, Staff learned that sending more granular pricing signals is possible under an ELCC or 8760 LOLP approach. Staff believes that this is a pricing and compensation issue, which should be addressed where proper balancing of incentives, transparency, and process can be achieved based on specific objectives and circumstances of the use case.
- Transparency and update process
    - Given the breadth of applications for capacity contribution, Staff ultimately determined that process and transparency issues are difficult to address generically. Staff supports further discussion on this issue in other venues like PURPA dockets, IRP's, RFP's, etc.

Phase 3 outcomes

The investigation has resulted in meaningful exploration of capacity valuation methods and priorities. Given the efforts required to accomplish reliable, affordable electric system decarbonization on a condensed timeline, Staff believes that it is time to conclude broad exploration and move on to use case specific activities. Staff's key takeaways from this investigation include a blend of policy and technical considerations that were identified during a time of great uncertainty and change. Therefore, Staff believes that having the Commission weigh in on a set of best practices will provide clarity and consistency, while recognizing that objectives, granularity, and transparency can vary across use cases.

Staff proposes that the investigation conclude with a Public Meeting or Special Public Meeting, designed to accomplish the following:

- Present Staff's final takeaways from the investigation to the Commission, focusing on the generic capacity valuation best practices and associated E3 report, as well as key learnings related to pricing and other use case specific determinations;
- Present Staff's proposed priority use case activities;
- Provide the Commission a final opportunity to hear parties' perspectives, ask questions of parties, including the experts at E3, and share their expectations for generic modeling and use case specific activities.

If the Commission decides to adopt the best practices, they will serve as a common baseline for Staff, parties, and the Commission when examining future capacity calculations across use-cases.

In terms of use case specific activities, Staff proposes a few near-term implementation priorities for applying the consistency and rigor provided by the UM 2011 principles:

Use-Case Categories	Use-Case Implementation Priorities
Administrative pricing	• Launch UM 2000 by November 2022 with capacity compensation as a near-term issue • 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. • Consider UM 2011 principles as future energy efficiency, demand response, or other DER programs are proposed or considered for modification. • 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. • Review IRP ELCC methodologies against UM 2011 principles beginning with next IRPs filed (expected in March 2023).
Procurement	• Review RFP modeling against UM 2011 in future RFP proposals.

Proposed Schedule

The detailed schedule below outlines Staff's plan to conclude UM 2011 and proposed steps to continue the discussion of capacity valuation in other forums:

UM 2011 Final Steps	
Circulate Staff's capacity value investigation findings (generic best practices, use-case specific considerations, use case activities)	September 23, 2022
Written comments on Staff's investigation findings	October 24, 2022
Target Staff Public Meeting memo	November 10, 2022
Regular or Special Public Meeting on Staff's capacity value best practices and next steps. Staff anticipates that this concludes the docket.	TBA November/ December 2022
Staff target re-launch date for UM 2143	*September 23, 2022*
Staff's target re-launch date for UM 2000	*November 1, 2022*

Please contact with questions:

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Attachment A
Staff Capacity Value Best Practices
Updated September 23, 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 type and not a portfolio of resources is being considered (incremental vs portfolio capacity analysis). This currently includes regulatory purposes such as administrative pricing, cost effectiveness and customer program design, resource adequacy analysis, planning, and procurement.

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 capacity contribution of a variable resource must be derived taking 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.

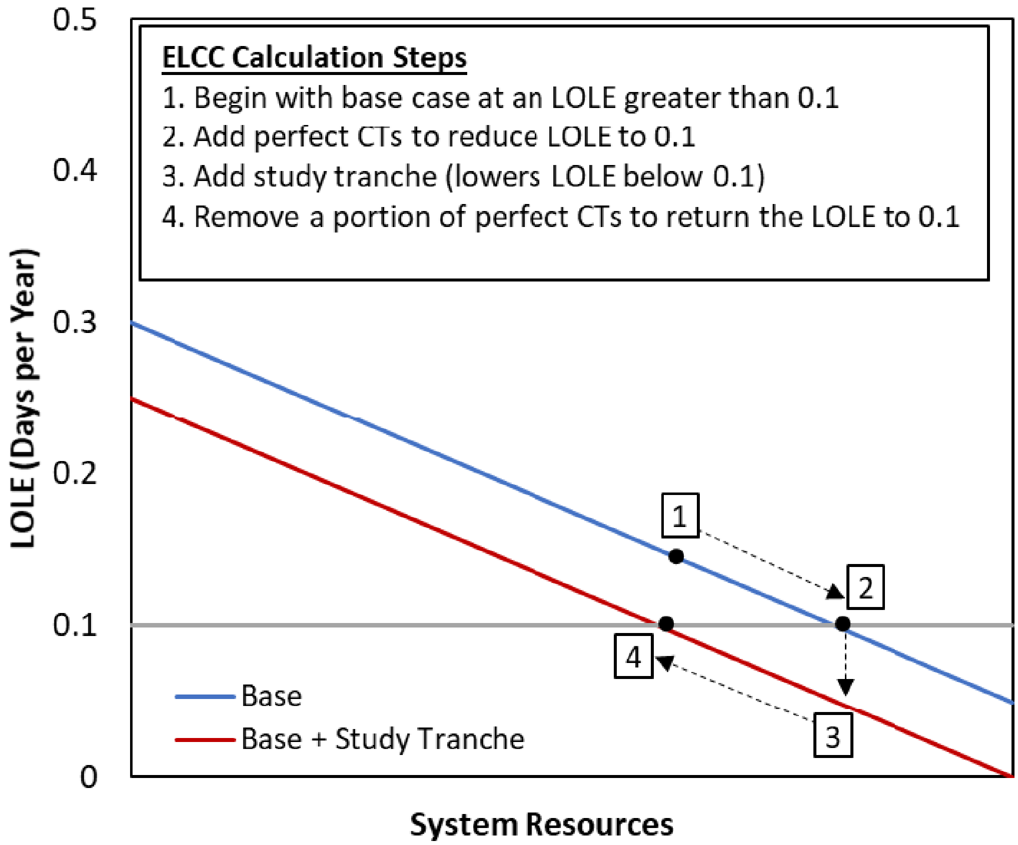
Model Methodology

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."[2,3] The figure below illustrates the ELCC process.

[2] E3's December 15, 2020 Principles of Capacity Valuation Report at 2.

[3] Staff assumes that this computation method causes resources to have ELCC > 0% in resource sufficiency periods.



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.[4] The synthetic data observation values should be matched with utility load levels with respect to year, month, and hour.
        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.

4 For example, utilities can generate synthetic profiles using NREL data or other publicly available data.

d. Resource additions should be made to the utility's supply-side resources to reflect the utilities most recently acknowledged preferred portfolio 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.[5]

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 ELCC.")[6, 7, 8] 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 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

[5] 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 resource over time.
[6] 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%.
[7] Stakeholders have argued that non-dispatchable resources are modeled to serve less baseload demand then they might actually serve when a single snapshot year of analysis is used.
[8] A "resource" type can be distinguished by different types of the same resource or different locations and includes hybrid resources. See (3)(b).

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[9]

9. The avoided resource should be informed by 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. 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 avoided resource should use ELCC modeling to weight the potential resources on a $/MW of capacity provided scale to identify the appropriate avoided resources unless legal or other considerations warrant the use of an alternative method.

[9] 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.