March 8, 2021

To: Oregon Public Utility Commission

Re: Docket No. UM 2011, General Capacity Investigation

**Comments of NW Energy Coalition**

The NW Energy Coalition (NWEC) appreciates this opportunity to provide comments on two filings in UM 2011, the December 2020 paper by E3, *Principles of Capacity Valuation,* and Staff's comments of January 14, 2021. Our discussion here focuses primarily on capacity assessment, but we want to recognize the substantial amount of discussion already underway on capacity acquisition and valuation.

NWEC appreciates the thorough and wide-ranging content of the E3 presentation. It is a good starting point for further development of this docket, but also has some underlying assumptions we feel should be reviewed further.

**1. Continued Development of UM 2011**

The initial recommendation by Staff to open this docket concluded:

> Launching a three-phased general capacity investigation would ensure a common framework of understanding by parties and stakeholders of appropriate assumptions to value capacity. Staff envisions this investigation resulting in establishment of a methodology that looks to the characteristics of capacity a resource provides. This methodology could then be used across multiple dockets and technologies for valuing capacity brought to the electric system.
>
> Order No. 19-155 (emphasis added).

To achieve a successful outcome in this docket, NWEC believes the exchange of views should now focus on two key areas: the reach of a common capacity framework across relevant Commission processes, and identification of key issues.

First, as noted by several stakeholders during the February 24 workshop, there is not currently a clear understanding of the range of PUC regulatory processes that should be informed by the outcomes of this docket. Those mentioned at various points have included integrated resource planning (IRP), resource acquisition (RFP) processes, PURPA, rate cases and resource adequacy; other processes may also be relevant.

We recommend a discussion in the next workshop to survey Staff and stakeholders on the range of Commission proceedings and contexts that should explicitly be addressed in this docket.

Second, we recognize that a great many issues have already been brought forward in this docket, and appreciate the wide ranging discussion and viewpoints presented, and the thorough work of the E3 presentation and Staff's response comments.

At this point, we believe that identifying key findings could be helpful in shaping the further development of the docket and to clarify the outcomes that may be desired, including general findings and potential further action for specific purposes, perhaps including rulemaking.

Such findings could include:

- The potential and limits of available methodologies and metrics to assess capacity within the full electric system context.
- Data requirements and gaps and computational constraints for capacity assessment.
- The applicability of traditional metrics such as Planning Reserve Margin (PRM) and Cost of New Entry (CONE) in a more dynamic and diverse electric system.

**2. Current State of Play**

NWEC observes that events of the last few months in California and Texas have raised fundamental questions about how capacity is counted. Grid reliability deteriorated as demand accelerated and supply suffered from common mode failures in ways not foreseen by standard planning and operational assessments. Capacity assumed to be available when needed was not, well beyond ordinary maintenance and forced outage rates, resulting in rotating outages.

These events are not completely unique. There have been many close calls, including in the Pacific Northwest. While it is not possible to predict exactly how and when such future events will occur, the question raised here is whether capacity assessment, acquisition and valuation should now include the capability of different resources to provide resilience and ride through extreme events.

These recent events also call into question some of the underlying assumptions about capacity under ordinary system variation. For example, the California ISO Department of Market Monitoring found that under high ambient temperatures, output of the CAISO gas fleet

declined about 3%.[1] Parts of the wind fleet also showed downturns in conditions where the thermal gradient between ocean and inland areas decreased. Moreover, standard demand response capacity valuation was insufficient to distinguish between DR that performed very well and DR that did not. Similar examples can be found during other stress events for every kind of electric system resource.

**3. ELCC**

E3's advocacy for the ELCC method is welcome and reflects that it is an evolving methodology, not a static algorithm. ELCC helps move from a singular focus on annual and seasonal system coincident peak hours to consideration of events, not just hours, and to include stress conditions where supply and demand are tight even well below seasonal peak. It also enables a more consistent and comparable approach to capacity across many different resource types, and helps move the focus away from legacy resource metrics such as nameplate capacity to system value. This is particularly important for representing the value of customer side resources such as energy efficiency and flexible demand, as demonstrated in the E3 presentation.

All that said, ELCC is only one part of capacity assessment. Because it uses a "perfect capacity" construct, additional adjustments must be made to determine capacity value. There are evident issues with:

- Data availability and quality. How much historical data is needed to assure accurate profiling of resource capacity? How should forced outage rates be determined?
- Comparators. The recommended E3 approach relies on planning reserve margin (PRM) and cost of new entry (CONE). As discussed below, these may not be sufficient to provide proxy values for capacity.
- Composite resources. While ELCC has been effective at levelling the comparison of a variety of individual supply, storage and demand side resources, it is proving difficult to represent the capacity value of hybrids (for example, solar and battery storage), various types of "virtual power plants," and microgrids. These composite resources are rapidly emerging to fill the gaps in replacing spinning-mass resources with aggregations that can provide energy, capacity, flexibility and ancillary services. As these more diverse configurations mature, it will be important to fully represent their combined capacity value, not merely the standalone contribution of each separate element. A key point is that composite resources, if properly configured and

[1] DMM Report on System and Market Conditions, Issues and Performance: August and September 2020, *http://www.caiso.com/Documents/ReportonMarketConditionsIssuesandPerformanceAugustandSeptember2020-Nov242020.pdf*

operated, could evolve toward being closer analogues of "perfect capacity" in the sense of best-fit to grid needs in operational time.

- Space and time. A major challenge going forward is accurate assessment of capacity in a changing system. The declining marginal capacity value of variable renewable resources and "energy limited" resources such as storage and demand response is generally accepted, but what is the appropriate capacity value for a gas peaker with interruptible fuel supply that may decrease as demand rises on both the electric and gas systems?

- Individual vs. Ensemble Assessment. ELCC makes significant advances in considering single resources in a system context, and E3's insights considering "first in" and "last out" effects are helping improve the method considerably. However, as currently practiced, ELCC does not consider the interactive effects of ensemble or portfolio additions to the system. Yet actual procurements increasingly and correctly take an all-source perspective. As a result, ELCC does not forestall a suboptimal winner-take-all outcome. Notably, many utilities use their IRP frameworks built around capacity expansion models to determine capacity as well as other value in optimizing new resource portfolios. Work on "ASCC array tables" at the Northwest Power and Conservation Council is beginning to address this next level of assessment.[2]

**4. Reserves and Risk**

Existing approaches to capacity assessment and valuation have hidden assumptions that can distort outcomes. One clear example is the use of Planning Reserve Margin (PRM). PRM is basically founded on a construct of consistent fuel supply for generation and a historical envelope for demand variation.

We recognize that there are actually many different methods for determining a PRM. But on the whole, it basically amounts to a combination of the reliability standard for contingency reserves (about 6%) plus an adder roughly representing forecast error for demand and supply, usually around 9%, for a total PRM of about 15% (with many specific variations).

As has long been recognized in the Northwest, this is less applicable to hydro-oriented regional grids because of interannual precipitation and runoff variability. The Bonneville Power Administration has never employed a PRM, and in Oregon, PacifiCorp and Portland General Electric are moving away from it as a primary construct for resource adequacy as their resource mix increasingly relies on resource diversity instead of the steadiness of fuel supply.

[2] *https://www.nwcouncil.org/sites/default/files/2020_08_p4.pdf*

Therefore, as our regional system evolves toward a more diverse resource base for supply, demand and storage, PRM is becoming obsolete as a basically static and supply-only construct. It may suffice for basic assessment, but when it comes to resource choice, acquisition and compensation, it could lead to capital misallocation.

The question now is, what should replace PRM? One example of a different approach is the new Western Electricity Coordinating Council (WECC) Western Assessment of Resource Adequacy (WARA), which uses a convolutional model to calculate an hourly reserve margin on a probabilistic basis.[3]

**5. Capacity Reference Resource**

For more than four decades, since the passage of PURPA in 1978, a foundational element of capacity valuation has been avoided cost – almost always defined in relation to a new combined cycle or peaker gas plant. This seemingly simple construct has led to endless disputes over the economic and engineering aspects of defining and profiling the reference resource. The term "cost of new entry" (CONE) is relatively recent here, but has long been used in the east to refer to capacity valuation in RTO/ISO "organized" markets. The equally long and bitter disputes over the definition and application of CONE suggest the shaky underpinnings of the concept.

Together, the concepts of PRM and CONE focus attention on resources that are gas plants, or behave like them. Anything different is considered suboptimal by definition. Thus, a seeming consensus has emerged that storage and demand response should provide 4-hour response times. Yet recent research by Astrape[4] shows, as one might expect, that other resource duration periods such as 1, 2, 6 or 8 hours (and longer) can also provide considerable system value.

Using a reference resource also has generic drawbacks. In the case of gas plants, they have dispatch characteristics that add costs to the system, including startup and turndown time and emissions, ramp rate limitations, and minimum run rates. An "energy limited" battery or hybrid has none of those, and can respond to a dispatch signal much more quickly and accurately in any event. All this is to say that gas plants do not perform as "perfect capacity," but then neither do possible alternative CONE reference resources, including batteries.

---

[3] Western Assessment of Resource Adequacy: Northwest Power Pool, WECC, March 2, 2021, *https://www.wecc.org/Administrative/NWPP%20March%202%20Webinar%20FINAL.pdf*

[4] Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company's ELCC Study Submission, Advice Letter 4243-E, July 1, 2020, and Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company's Second Effective Load Carrying Capability Study Submission, Advice Letter U 338-E, December 29, 2020, both submitted to the California Public Utilities Commission.

A better reference for capacity value is the system itself. While there is not a clear method for determining system capacity value at the present time, to the extent that the CONE/reference plant construct continues in use, it should be expected to phase out as a more accurate and effective measure is developed.

This concludes our comments. NWEC looks forward to further dialogue as the process continues in this docket.

/s/

Fred Heutte
Senior Policy Associate
NW Energy Coalition
fred@nwenergy.org