BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON

UM 2011

In the Matter of **PUBLIC UTILITY COMMISSION OF OREGON,** **General Capacity Investigation.**	**COMMENTS OF** **NW ENERGY COALITION**

The NW Energy Coalition (NWEC) appreciates the opportunity to provide comments on the initial set of questions proposed by Staff in Phase III of this investigation, concerning capacity valuation.

A. ***Which Resource Attributes are Appropriate to "Capacity"?***

1. Which of these capacity definitions are applicable for which types / categories of capacity, if at all?
a. Nameplate capacity
b. Maximum dependable capacity
c. Baseload capacity
d. Ability to meet energy needs
e. Effective Load-Carrying Capability (ELCC)
f. Peaking capacity

As explained in our comments at the June 14 workshop, NWEC suggests that the term "capability" is more encompassing than "capacity," which is often assumed only to be nameplate or maximum output of a resource.[1] NWEC proposes that the general definition of resource capability should include these elements:

(1) maximum design or "nameplate" supply output or demand reduction

(2) an adjustment, as appropriate, for ambient conditions such as altitude

(3) an availability metric based on forced outage rate (both equipment and fuel) adjusted for system peak or stress conditions, not average conditions

[1] Capabilities of Electric Power Resources, PNUCC System Planning Committee, March 2011, http://pnucc.org/sites/default/files/CapabilitiesofResourcesReportandMemoweb.pdf

(4) a degradation factor based on reduced output due to wear and tear or reduced operational capability (for example, annual reduction in solar PV output, reduction per cycle in battery output)

(5) for variable resources such as renewables, a load carrying capability metric (either ELCC or another comparable approach)

(6) for demand side resources, a realization factor based on responsiveness to dispatch or price signals

(7) an adjustment for each type of resource based on distance to load and associated transmission and distribution losses

(8) minimum operating level (Pmin), if greater than zero

(9) ramp or displacement rate, i.e., the startup and rolloff time needed before and after a given interval in order for the resource to operate to full effect, during which it may displace other less expensive resources

2. To what extent should flexibility and/or ability for the utility to dispatch a given resource (or resource category) be considered? In other words, should it be treated as a distinct capability or type/category of capacity, or as an enhancement to that resource's capability / capacity offering?

Rather than trying to find a common definition across all modes, it would be better to consider at least three categories relating to resource capability:

(1) the ability to provide "incs and decs" for the annual system coincident peak hour

(2) the ability to meet system peak during other stress hours on a seasonal basis (for example, late summer peaks that are lower than winter peak but occur during low hydro availability)

(3) flexibility to meet balancing and ramping needs within the daily load shape

First, a focus on "incs and decs" (the ability of system operators to increase or decrease resource dispatch to keep supply and demand in balance) relates to system need rather than a comparison or substitution for a specific standard resource, e.g., natural gas combustion turbines or peakers.

Second, all resources including generation, demand side and storage can be covered by this approach. Specifically, the capability of energy efficiency to help meet time defined system needs must be fully valued. In addition, forms of demand response such as grid-integrated water heaters that do not reinject energy into the grid but nonetheless fully contribute to incs and decs must be recognized for both peak load reduction and flexibility value.

Finally, it may be appropriate to provide a separate assessment of sustained resource capability through low-probability, long duration system stress conditions.

3. Similarly, how should potential ancillary services offered by a resource or resource category be considered? Do they represent a distinct category of capacity? Or an enhancement to the available capacity offered by a given resource?

Ancillary services, or more formally, essential reliability services (ERS), comprise a separate set of capabilities for grid operation alongside the traditional definition of capacity as providing enough energy in a given interval to meet demand. Among other things, ERS includes reactive power, fast frequency response, local voltage support and blackstart.

Many or all of these features are available from most resources, with the exception of energy efficiency, but notably, EE reduces the need for ERS across the board. In particular, inverter connected resources such as renewables and battery storage can provide much faster ERS with higher fidelity response to dispatch signals than conventional resources, because inverter power electronics offer those advantages over the electromechanical response of many conventional generators.

In addition, while variable resources like wind and solar are often referred to as "nondispatchable," this is clearly insufficient. Just as conventional generation is held as spin and nonspin reserve, a portion of inverter-based resources can be held to provide reserves and ERS.[2]

A great deal of development of practices and standards lies ahead to enable inverter-based resource ERS, including how to measure and assign monetary value to these attributes, but this holds substantial potential for improving system stability and reliability in the future. And as those resources become a larger portion of the overall resource mix, early research is already being done on how inverter-based resources can be "grid forming" – that is, capable of providing synchronous alignment and short circuit strength – as well as grid following.[3]

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[2] Investigating the Economic Value of Flexible Solar Power Plant Operation, E3, October 2018.

[3] For additional information, see workshop presentations, Grid-forming Inverters for Low-inertia Power Systems, University of Washington, April 2019, https://lowinertiagrids.ece.uw.edu

4. Are there distinct types of capacity that could be separately compensated, assuming that adequate information, communications and control systems are in place? For example, should capacity that has the following capabilities be considered distinctly:
a. Available to meet system Resource Adequacy (RA) needs?
b. Available to meet system flexibility needs?
c. Available in a certain time frame?
d. Available in a certain location?

Aspects relating to this question are discussed above. In summary, we propose considering three modes for resource capability: (1) system annual coincident peak; (2) other stress conditions during the year when it is difficult for supply to match demand; and (3) flexibility for periods in the daily load cycle with substantial up and down ramps.

Additional elements to be considered include transmission or distribution constraints given the geographic location of specific resources, and the duration of capability, including for long-duration system stress events.

5. Utilities and stakeholders have already submitted a good deal of relevant information in the form of presentations and workshop participation. Staff appreciate these contributions and will continue to draw upon them, and interested parties do not need to file the same presentation materials again. However, are there other comments pertinent to the questions asked in Phases I and II (i.e. "What is Capacity," and "How do we value Capacity today?") that you would like to share with all parties, to clarify, deepen, or add nuance to your position or understanding of these issues?

No additional response at this time.

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