ELCC modeling standards
June 15 UM 2011 Workshop

Using E3's Principles of Capacity Valuation Report and stakeholders' filed comments and workshop discussions, Staff makes this preliminary straw proposal for ELCC modeling standards. Staff intends for the straw proposal below to capture all use cases related to ELCC modeling standards. Staff welcomes and anticipates feedback on this preliminary straw proposal at the upcoming Workshop to identify opportunities for further clarification and other improvements. Straw proposals related to hybrid resource combinations and value of capacity are forthcoming for those future Workshops.

Requirements for the determination of the capacity contribution of a resource for planning and reliability purposes

1. Unless otherwise waived by the Commission, the capacity contribution of all types of supply-, and demand-side resources will be determined using the resource type's (or group of hybrid resources') Effective Load Carrying Capability (ELCC). "ELCC is calculated by 1) calculating system reliability, 2) adding the desired resource to the resource portfolio, and then 3) removing perfect capacity until the original level of reliability is restored."[1,2]
2. Annual values for last-in ELCCs should be derived for each resource class. (throughout this straw proposal "ELCC" refers to "last-in/marginal ELCC")[3, 4]
    a. The yearly values should match the life of the resource or the IRP study period, whichever is less.
    b. The yearly values should be updated in each IRP.
    c. "Defining representative resource classes should capture a meaningful distinct set of characteristics such as plant design, age, and geography for renewable resources and duration and efficiency for energy storage."[5] In an IRP appendix, each utility should provide yearly resource ELCCs which can be used in other dockets. At the request of Staff/stakeholders for a demonstrated purpose, the utility should add a new resource class unless the utility can demonstrate that computing that new ELCC value is expected to be within 5 percent of an existing ELCC value.[6]
    d. As inputs are available, the utility will compute the ELCCs of energy efficiency and demand side management programs.
    e. For modeling simplicity, five-year intervals can be used for later years beyond year 10, with the annual values within each five-year period set equal to each other unless a different basis is warranted and reasonable given the findings of the ELCC modelling analysis.
    f. The ELCC computations should reflect best estimates of resource retirements as of the time of the study.

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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 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%.

[4] 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.

[5] This requirement is reproduced from E3's December 15, 2020 Principles of Capacity Valuation Report.

[6] For example, Staff expects that a hybrid resource with storage equal to 50 percent of the renewable resource nameplate will need a new resource class because its ELCC value will be sufficiently different than with storage equal to 25 percent of the renewable resource nameplate.

g. Resource additions should not be included unless they are contractually committed and utilities should not include non-firm purchases in its supply-side resources.[7]
h. 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. Yearly ELCC values should be used for procurement decisions that are not evaluated using the full IRP model.

3. For any application of ELCC analysis, the modelling must include reasonable estimates of the distribution of output for variable generation resources.
    a. Modeling the output of existing resources must:
        i. Use no less than eight years of the most recent output data for the resource. Where eight years of actual data are not available, the utility must use synthetic data that reasonably represents future actual data with respect to mean and variance. Synthetic data sources must be independently generated from third party vendors.
        ii. Include adjustments to historic weather and generation data, as appropriate, to reflect potential impacts of climate change. In that case, the utility must also separately identify the climate change related impact on the distribution of the resource output.
    b. Modeling the output of new resources must:
        i. Use a data source based on no less than eight years of the most recent weather-related data. Where eight years of actual data is not available, the utility must use synthetic data from a third-party source that reasonably represents future actual data with respect to mean and variance.
        ii. Include adjustments to historic weather and projected generation data if appropriate to reflect the potential impacts of climate change. In that case, the utility must also identify the impact of the climate change on the distribution of the resource output.
4. With each IRP filing, utilities should include 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.
5. Duration of energy storage and demand response should be modeled to capture the effects of multi-day weather events.

Other issues discussed by stakeholders that Staff choose not to include in Straw proposal:

1. Transmission and distribution constraints
2. Ancillary benefits
3. Planning reserve margins
4. Data requirements for modeling gas plant outages
5. Resource adequacy

[7] 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.