State of California

M e m o r a n d u m

**Date:** ~~September~~ October ~~10~~22, 2021

**To:** Integrated Resource Planning (IRP), Resource Adequacy (RA), and other stakeholders

**From:** Energy Division Staff, CPUC

**Subject:** Incremental Effective Load Carrying Capabilities (ELCCs) to be used for Mid-Term Reliability Procurement (D.21-06-035)

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**Summary**

Staff publishes the ELCCs to be used by load-serving entities (LSEs) pursuant to D.21-06-035 by directing stakeholders to specific content within the "Incremental ELCC Study for Mid-Term Reliability Procurement" by E3 and Astrapé, dated October 22, 2021, that accompanies this memo. Staff directs LSEs to use the provided ELCCs for 2023 and 2024 compliance dates for in-state wind, out-of-state wind, solar, battery storage, and paired renewables and storage resources. Staff also provides ~~indicative~~ information about the ELCCs for 2025 and 2026 compliance dates for these resource types, as well as for pumped storage hydro~~, out-of-state wind,~~ and offshore wind for 2026 only. The values provided for 2025 and 2026 are to be used for contracts entered on or before November 30, 2022. Contracts entered after then will use updated ~~Final~~ values for 2025 and 2026 that will be provided by the end of 2022. Where an LSE is meeting its obligations for a procurement tranche early it should use the ELCCs for the earlier tranche up to that LSE's obligation for that tranche. At this stage the ELCCs provided here are only for use in the IRP proceeding.

This memo supersedes the version dated September 10, 2021.

**IRP (Rulemaking 20-05-003) Procedural Context, Process, and Use Case for ELCCs**

The Mid-Term Reliability Procurement decision (D.) 21-06-035 Ordering Paragraph (OP) 15 requires:

> *Commission staff shall publish on our web site marginal effective load carrying capability values to be used for the 2023 and 2024 compliance dates in this*

*decision by no later than August 31, 2021 and for the 2025 and 2026 compliance dates by no later than December 31, 2022.*

D.21-06-035 dicta gave some discretion to staff about the scope of the study. Excerpts from section 9.2:

> *This first set of marginal ELCCs will be provided for energy storage at various durations, solar, solar plus storage of various durations and configurations, and wind in various regions, and may also include demand response, in order for LSEs and developers to be able to rely on those values for the 2023 and 2024 capacity required in this order.*
> *In addition, Commission staff will provide guidance on what resource counting LSEs should assume for geothermal, long duration storage, out-of-state wind, and offshore wind for online years through 2028.*
> *For all other resource types, counting will be in accordance with the system resource adequacy NQC [net qualifying capacity] counting rules at the time the contract for the new resource or capacity added to an existing resource is executed.*

Staff engaged consultants E3 and Astrapé to conduct the study to determine the ELCCs under an existing IRP technical services contract. They have written "Incremental ELCC Study for Mid-Term Reliability Procurement" dated October 22, 2021 (the Study) which accompanies this memo. Note that for the reasons described in the Study, staff supports the term "incremental" rather than "marginal" and uses that terminology going forward here.

Staff summarizes the use case for the ELCCs, per the direction given by D.21-06-035 OP 15, section 9.2, and other decision dicta as follows: the ELCC values are to be used to convert the nameplate capacity of a resource into NQC terms for the purpose of assessing an LSE's compliance with its procurement requirements. Staff offers this example: an LSE procuring an incremental 4-hour battery with a nameplate capacity of 100 MW and an online date on or before the compliance date in 2024 can count it towards their D.21-06-035 requirement as 100 MW x 90.7% ELCC = 90.7 MW NQC. The 90.7% is drawn from the Study's Table ES1, Tranche 2.

Tranche 1 ELCCs apply to resources that come online on or before the 2023 compliance date. This includes resources that come online during 2021 and 2022.

Staff highlights the following D.21-06-035 dicta from section 9.2:

> *… excess procurement to meet one year's target can be used to count toward any future year's target.*

Staff connects this possibility with the use of ELCCs as follows. If a single resource is being used by a LSE to comply with multiple tranches, the LSE can count it towards the tranche it first comes online in time for, up to the LSE's obligation for that tranche, using

that tranche's ELCC, and then count the remaining balance of the resource's nameplate capacity towards the next tranche using that tranche's ELCC, and so on. In this way LSEs have equal access to each tranche's ELCCs, regardless of how many resources they are using to comply, and staff expects this to result in procurement of resource types and amounts that meet the reliability need.

This same approach should be used if an LSE is meeting its obligations in a tranche early, regardless of how many resources it is using. In other words, ~~i~~the LSE should count the resources using the ELCCs for that tranche, but only up to the LSE's obligation for that tranche.

**ELCCs In Effect for 2023 and 2024 Compliance Dates**

Staff directs stakeholders to information within the Study which is in effect for the 2023 and 2024 compliance dates associated with D.21-06-035 procurement as follows:

Table ES1 Tranche 1 and Tranche 2 columns -

- In-state land-based wind
- Out-of-state wind: Wyoming
- Out-of-state wind: New Mexico
- Solar
- Battery storage, for 4, 6, and 8-hour durations

For battery storage durations other than those provided in Table ES1, stakeholders can use linear interpolation between the closest durations that are provided. For example, for 5-hour battery storage the ELCC is the average of 4-hour and 6-hour battery storage ELCCs.

Table ES2 provides the heuristic that is to be used for -

- Paired wind and storage resources, including hybrids
- Paired solar and storage resources, including hybrids

The heuristic draws on the ELCCs of the constituent resources in Table ES1. For hybrids with storage durations of longer than 4-hour, the generator capacity should be, at minimum, the percentage of the storage capacity stated in Table ES2 linearly scaled upward with storage duration.

Study section titled "Approach for Other Resources Not Modeled" -

- Geothermal

Staff has considered this section of the Study and directs LSEs to count incremental geothermal capacity contributions using the system resource adequacy program NQC counting rules at the time the contract is executed.

**~~Indicative Information for~~ ELCCs for 2025 and 2026 Compliance Dates**

~~At this stage s~~Staff ~~only~~ provides ~~indicative~~ information about the ELCCs to ~~consider~~ use for the 2025 and 2026 compliance dates~~, which are not yet in effect for those compliance dates~~, with reference to information in the Study as follows. These ELCC values are to be used for contracts entered on or before November 30, 2022. These values will be revisited by staff prior to provision of ~~final~~ updated ELCCs for 2025 and 2026, which will be forthcoming ~~prior to~~ during December ~~31,~~ 2022:

Table ES1 Tranche 3 and Tranche 4 columns -

- In-state land-based wind
- Out-of-state wind: Wyoming
- Out-of-state wind: New Mexico
- Solar
- Battery storage, for 4, 6, and 8-hour durations

For battery storage durations other than those ~~shown~~provided in Table ES1, stakeholders can use linear interpolation between the closest durations that are provided. For example, for 5-hour battery storage the ELCC is the average of 4-hour and 6-hour battery storage ELCCs.

Table ES1 Tranche 4 column -

- Pumped storage hydro, for 8 and 12-hour durations
- ~~Out-of-state wind: Wyoming~~
- ~~Out-of-state wind: New Mexico~~
- Offshore wind

Staff notes that these long lead-time resources are eligible to count towards earlier tranches of D.21-06-035 but directed E3 and Astrapé to focus on Tranche 4 given they are much more likely to be applicable to that.

Table ES2 provides the heuristic that applies ~~is likely to continue to apply~~ for Tranches 3 and 4, as well as for the earlier tranches, for -

- Paired wind and storage resources, including hybrids
- Paired solar and storage resources, including hybrids

The heuristic draws on the ELCCs of the constituent resources in Table ES1. For hybrids with storage durations of longer than 4-hour, the generator capacity should be, at minimum, the percentage of the storage capacity stated in Table ES2 linearly scaled upward with storage duration.

Staff directs LSEs to use the ELCCs for resources for Tranche 4 whether they come online by the 2026 compliance date or by the compliance date in 2028, if an extension has been allowed by the Commission, as provided for by OP 5.

Study section titled "Approach for Other Resources Not Modeled" -

- Geothermal

Staff has considered this section of the Study and directs LSEs to count incremental geothermal capacity contributions using the system resource adequacy program NQC counting rules at the time the contract is executed~~'s guidance for the resource counting to be used for geothermal is as per the potential process described in this section of the Study. In summary, for geothermal staff expect to compare the system RA program NQC percentage at the time of contracting with the expected capacity factor of the particular resource during priority times of the day and year, to check for reasonableness~~.

Staff refers to "contracts entered" above to mean fully executed and without non-standard clauses that would allow either party to the contract to rescind the contract.

Staff believes that the approach described in this section of this memo gives certainty to LSEs that are planning to contract with resources by November 30, 2022 to meet 2025 and 2026 compliances dates (Tranches 3 and 4), while allowing staff the opportunity to provide updated ELCC values using latest information in December 2022. ~~Staff understands that providing this indicative information for 2025 and 2026 (Tranches 3 and 4) leaves uncertainty for LSEs, developers, and other stakeholders until staff publish final values for these by December 31, 2022 as required by OP 15. Staff has weighed this up against the~~ Information that is likely ~~benefits of allowing for further data~~ to become available in 2022~~,~~ ~~including~~ includes actual vs. modeled performance of storage resources in the CAISO market, load growth and shapes from the latest load forecast, and updates on the likely resource mix of the grid in 2025 and 2026 indicated by procurement progress to be reported by LSEs. Staff does not have an expectation about in which direction the ELCC values for Tranches 3 and 4 may shift from the values provided in the Study, nor if they will change at all. Staff refers stakeholders to ~~finds it beneficial to provide indicative information in the meantime, as well as~~ the considerable discussion of inputs, methodology and results by E3 and Astrapé within the Study. This should enable stakeholders to better understand the key factors regarding a resource's ability to contribute reliability to the system in the mid-term, for the benefit of planning and procurement processes.

**Resource Counting for Resource Types Not Discussed**

Staff notes that there may be some technologies not specifically referred to above, nor in the Study, for which it is reasonable to use the ELCCs discussed above because they will perform similarly. LSEs should provide an engineering assessment that justifies the similar performance of these resources to support compliance in these cases. For example, the battery ELCCs are based on Li-ion but other chemistries should also use these values if they will perform similarly. As another example, technologies other than batteries and pumped storage hydro may be able to provide long duration storage (8

hours or longer duration, per D.21-06-035) and for these technologies LSEs should demonstrate which resource type they are similar to.

For all other resource types, staff directs LSEs to follow this text from section 9.2 of the dicta of 21.06-035:

> *For all other resource types, counting will be in accordance with the system resource adequacy NQC counting rules at the time the contract for the new resource or capacity added to an existing resource is executed.*

Per OP 1 and OP 3, September NQCs should be used. Staff expects this to be applicable to resource types including, but not necessarily limited to: demand response, biomass, and hydro. LSEs are responsible for ensuring individual resources are compliant with all procurement requirements included in D.21-06-035.

**Relationship to ELCCs Used in Other Contexts**

Staff recognizes that ELCCs are used in other contexts and, for the avoidance of doubt, emphasizes that ELCCs discussed in the Study are only for use in IRP – and specifically D.21-06-035 compliance – at this stage. These ELCCs do not supplant the counting rules established in D.19-11-016 and D.20-12-044 for procurement ordered in D.19-11-016.

The RA program also uses ELCCs for resource counting. These differ to those published in the Study for IRP in that they are average ELCCs, are monthly instead of annual values, and are based on different assumptions, specific to their use case for short term resource adequacy. For the avoidance of doubt about whether the IRP ELCCs should be applicable for compliance in the RA program, staff points to the following from section 9.2 of D.21-06-035:

> *We do not see a compelling reason why the ELCC values must be the same for both purposes. The marginal ELCC values will be annual and aim to ensure LSEs develop resources that will meet the mid-term reliability needs of the system identified in this decision.*

Staff also acknowledges the ELCCs used in the renewable portfolio standard (RPS) proceeding. The values were most recently updated via the advice letters filed by the investor-owned utilities in June 2021;[1] those remain the ELCCs that should be used in the RPS program context until stakeholders are notified otherwise in that proceeding.

**Conclusion**

[1] See SDG&E Advice Letter (AL) 3775-E / PG&E AL 6214-E, / SCE AL 4512-E (June 2021) for marginal ELCC values used for RPS procurement

This memo and the accompanying "Incremental ELCC Study for Mid-Term Reliability Procurement" by E3 and Astrapé, dated October 22, 2021, provide the ELCCs to be used for the 2023 and 2024 compliance dates in D.21-06-035, regardless of when the contracts are entered into. The ELCCs for 2025 and 2026 compliance dates are applicable only to contracts entered into on or before November 30, 2022.; ~~F~~for contracts entered after this date LSEs will use updated ELCCs, to be provided by staff in December 2022. The ELCC values result from using latest available data and state of the art methodology, and thereby help ensure procurement pursuant to D.21-06-035 fulfils the reliability need as effectively as possible.

~~The values for 2025 and 2026 are indicative and will be revisited by staff before finalizing in 2022.~~

This memo focuses on the ELCCs to be used for compliance with D.21-06-035. For questions about other aspects of D.21-06-035 please refer to the IRP Procurement Track website[2] where staff has provided a "Frequently Asked Questions" guide.

For additional questions, stakeholders can contact staff at IRPDataRequest@cpuc.ca.gov.

[2] https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/more-information-on-authorizing-procurement/irp-procurement-track