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SDG&E's Comments on the CAISO's March 9, 2017 Stakeholder Meeting Presenting Local Capacity Requirement (LCR) Results for the 2018 Resource Adequacy (RA) Compliance Year

Introduction

SDG&E recognizes that these comments are being submitted after the March 23, 2017 due date. At least in part, the lateness of the comments owes to the current process used by the CAISO to allow stakeholders to investigate the details of the CAISO's analysis. Because the CAISO asserts its "final" LCR power flow case contains commercially sensitive information, stakeholders such as SDG&E are forced to perform their own analysis using a "starting point" LCR power flow case that is posted on the CAISO website.[1] SDG&E's initial efforts produced results strikingly different than the CAISO's.

With the much-appreciated cooperation of the CAISO staff, SDG&E quickly learned that data in the "starting point" LCR power flow case posted by the CAISO differed in important ways from data in the "final" power flow case. However, determining whether the difference between SDG&E's and the CAISO's results was due to the differences in data contained in the cases, or to differences in modeling approach, was not obvious and required considerable back-and-forth with the CAISO staff. In the end, there were significant differences in both data and modeling approach.

SDG&E believes the LCR stakeholder process would be enhanced if there were some way for the CAISO to post an "intermediate" LCR case early in the process. An "intermediate" LCR case would give stakeholders the benefit of the CAISO's own vetting process and help to narrow differences in results that arise as a result of different data. While it is too late in the current process to incorporate this suggestion, it is not too late to think about whether an "intermediate" case could be posted for the 2019 RA compliance year process.

Use of Thirty-Minute versus Four-Hour Emergency Ratings

NERC reliability standards permit reliance on emergency ratings for some period of time following an initial transmission contingency. The CAISO assumes the extreme contingency condition -- upon which LCRs are determined -- will last four hours. The CAISO takes the position that unless there is contractual certainty that undispatched generation will be available throughout the full four hour period that is effective in mitigating flows on limiting transmission elements, anything less than a four-hour emergency rating cannot be relied on; i.e., normal ratings must be used.

SDG&E believes the CAISO and stakeholders should consider whether the current policy is overly conservative. In an LCR analysis, the objective is to maximize imports into the LCR area. That often means that there will be considerable existing dispatchable generation within the LCR area that is operating below its Net Qualifying Capacity (NQC) level. For

[1] SDG&E remains unclear as to what commercially sensitive information is included in the CAISO's "final" LCR power flow case.

example, SDG&E's "final" power flow case had 247 MW of headroom available on dispatchable generators within the Greater Imperial Valley-San Diego area.[2] While it is impossible to know in advance how much of this headroom might be subject to a contractual commitment, it seems reasonable to assume that during a one-in-ten heat storm, most existing generation will have a strong economic incentive to be available and to quickly respond (within thirty minutes) to CAISO dispatch signals in the event of critical transmission contingencies.

Of course, generation varies in its effectiveness for mitigating high flows on different facilities. Additionally, there must be effective dispatchable generation on both sides of the constraint. So the decision as to whether a thirty minute emergency rating can be relied on will depend on the specific circumstances of the LCR power flow case. SDG&E notes that while the extreme condition (e.g., loss of a generator, one-year-in-ten heat wave) may be assumed to last four hours, that does not automatically mean that any emergency ratings relied on also have to be valid for that same four hour period. Instead, the question should be whether it is reasonable to assume that for any thirty minute interval within those four hours, dispatchable generation will be available to redispatch sufficient to bring flows back to within normal ratings.

In SDG&E's "final" power flow case, SDG&E found that following the loss of the 500 kV North Gila-Imperial Valley line, it was possible to increase the output of unloaded dispatchable generators within the Greater Imperial Valley-San Diego area by 168 MW, and decrease the output of generators east of North Gila, with the result that flows on IID's S-line dropped from the emergency rating of 407 MVA to the normal rating of 370 MVA. This is evidence that it should be possible to rely on the emergency rating of S-line. SDG&E estimates that if the emergency rating of the S-line can be relied on for purposes of determining LCRs, LCRs will be reduced by 168 MW compared to relying only on the normal rating of the S-line. Our analysis shows that for G-1 contingency the S-Line is pre-loaded to almost 37 MVA (93 Amps) and it takes 30 minutes for G-1/N-1flow to increase the conductor temperature to that allowed for continuous rating (not even the emergency rating!). Thus during this time, if CAISO could replace 168 MW of IV generation by the same amount of import to the SDG&E's load area (or use the available headroom of the available generators in the SDG&E basin), then the SDG&E's LCR could also be decreased by almost 168 MW.

Consistency in Time-of-Day Assumptions is Needed

The CAISO's existing LCR methodology generally requires that the modeling is performed assuming imports into the CAISO balancing authority are equal to established Maximum Import Capability (MIC) amounts. MIC amounts are set based on import flows that occurred during historical peak load hours. Historically, peak load hours have been in the 2:00 pm to 6:00 pm PST timeframe.

[2] The amount of headroom would increase to 1091 MW if existing Encina units 2-4 were available during the summer of 2018.

In the CAISO's LCR analysis for the 2018 RA compliance year, a peak "load-shift" adjustment is applied to the CEC's forecast peak loads to account for the effect of increasing behind-the-load meter rooftop solar. The rooftop solar has the effect of depressing peak loads in the 2:00 pm to 5:00 pm timeframe, with the result that a new peak-load is emerging in the 6:00 pm – 7:00 pm timeframe.

The result of the peak load-shift adjustment is to create inconsistency between the MIC assumptions used in the modeling and the peak loads used in the modeling. SDG&E recommends that cases based on the upcoming WECC anchor data sets with Pmax set to NQCs be utilized in future LCR studies.

A related issue involves the assumed dispatch level of certain generators that have a material impact on the determination of LCRs for the Greater Imperial Valley-San Diego area and for the LA Basin area. The CAISO's modeling assumes certain gas turbines in the Yuma area are operating at full output. SDG&E understands the CAISO makes this assumption based on the expectation that if California is in a one-in-ten peak load condition, then Arizona is likely to be in a similar condition. However, as noted above, the peak load-shift adjustment is meant to recognize that the highest CAISO balancing authority area loads will be occurring in the 6:00 pm to 7:00 pm timeframe; which may be well after the time when Arizona would find it necessary to run gas turbines in the Yuma area. It may therefore be inconsistent to model the Arizona gas turbines at full output in an LCR case where a peak load-shift adjustment is being used.

The CAISO's modeling assumes the La Rosita-U1 (IV-GEN2-U1) gas turbine new Mexicali – which can be physically switched between the CAISO and CENACE balancing authorities – is off-line.[3] This modeling is inconsistent with how the CAISO is treating the Yuma area gas-turbines. To say it the other way around, the CAISO's modeling of the Yuma area gas-turbines is inconsistent with how it is modeling the La Rosita-U1 (IV-GEN2-U1) gas turbine new Mexicali. The La Rosita-U1 (IV-GEN2-U1) gas turbine modeling is important because it is effective in mitigating S-line flows under contingency conditions.

<u>The Output of YCA Cogeneration Unit in the Yuma Area is Directed by SDG&E. YCA Should be Assumed Off-Line During Critical Contingency Conditions.</u>
Because SDG&E has contractual rights to control when YCA operates, LCR modeling should assume that the plant is off-line during the extreme conditions assumed for purposes of determining LCRs. Specifically, if the TDM combined cycle plant is off-line during a one-in-ten heat wave, SDG&E would ensure that the YCA plant is not operating. This will help to reduce S-line flow should there be a subsequent outage of the 500 kV North Gila-Imperial Valley line.

[3] According to the CAISO, CENACE has provided the CAISO with a letter that states that the LRP-U1 unit should be assumed to be off-line during the summer of 2018. It seems odd to remove this gas turbine from service during the summer when loads within the CENACE balancing authority will be at their highest levels.

Stakeholders Need a Clear Understanding of How the Different Dispatch Patterns for Generators in the Greater Imperial Valley-San Diego area and in the LA Basin area, Affect the LCRs Calculated for Each Area

SDG&E's LCR modeling makes clear that dispatching certain generators in the Western LA Basin results in lower Greater Imperial Valley-San Diego area LCRs than dispatching other generators outside the Western LA Basin area. Since no one knows in advance which generators may actually be contracted for purposes of the year 2018 RA compliance showings, it would be helpful if some bookend LCR analysis were conducted to show how the Greater Imperial Valley-San Diego area LCRs, and the LA Basin area LCRs, could vary depending on what generation were actually contracted. It is not clear under which methodology the LCR share of SDG&E is determined, from the LCR requirement for the combined areas of LA basin and SDG&E. The outcome of the current process might be inadvertently shifting some of the LCR costs from SCE to SDG&E.

The LCR results provided by the CAISO at the March 9, 2017 stakeholder meeting are based on modeling which assumes, for example, that there is no generation on-line at Alamitos substation in the Western LA Basin. If an alternative assumption were made that generation at Alamitos substation were on-line, SDG&E's LCR analysis suggests that LCRs for the Greater Imperial Valley-San Diego area would be lower.

A bookend analysis would be helpful in understanding the cost tradeoffs between those consumers who pay for the costs of meeting LA Basin area LCRs and those consumers who pay for the costs of meeting the Greater Imperial Valley-San Diego area LCRs.

LCT Study Should Ensure Most Recent NQC Values are Used

The LCT study seems to be utilizing NQC values for renewable resources that are different than those listed on the 2017 NQC list. The ISO should note and explain in its manual why it chooses to use NQC values that are different than designated.

Work with the IID to Find Mutually Beneficial Ways to Mitigate S-Line Loading

It is in all parties' interests to explore different ways of mitigating contingency-based flows on the S-line since the S-line is the binding constraint for the critical contingency condition which establishes LCRs in the Greater Imperial Valley-San Diego area and in the LA Basin area. Several concepts have emerged which warrant further discussion. For example, a Remedial Action Scheme (RAS) that cross-trips the S-line for the outage of the 500 kV North Gila-Imperial Valley line would eliminate the S-line as a limiting element. Installing a reactive "smart wires" device on the S-line not only would help to reduce S-line flows, but also can be used to push more power through the S-line, if the line is not overloaded.

Consider Contractual Mechanisms for Ensuring Key Generators are On-Line During Critical Periods

If there is reason to believe the La Rosita-U1 (IV-GEN2-U1) gas turbine new Mexicali will not be on-line during critical periods in year 2018, it is worth considering whether this unit can be placed under a contract which allows SDG&E to direct the unit's operation during the extreme conditions which determine LCRs. Coupled with an Imperial Valley-La Rosita phase shifter operating policy that provides northbound flow equal to the output of the LRP-U1 gas turbine, the contract could be effective in relieving Even if the generating unit's capacity would not count as RA capacity, the fact that the unit would be running during the extreme condition means LCRs could be reduced.

Implement Phase Shifter Operating Policy that Provides Northbound Flow from La Rosita to Imperial Valley Substation when TDM Trips During 1-in-10 Peak Load Conditions

If a phase shifter operating policy were implemented to provide northbound flows on the 230 kV La Rosita-Imperial Valley line during critical contingency conditions, then the emergency rating of the S-line could be relied on because it would be possible to ensure that flows on the S-line could be reduced from the emergency rating back to the normal rating within 30 minutes of the outage of the 500 kV North Gila-Imperial Valley line. Note that this operating policy would not change Path 45 flow since any northbound flow on the 230 kV La Rosita-Imperial Valley line would be offset by an equivalent southbound flow on the 230 kV Otay Mesa-Tijuana line.