



Draft Discussion Paper: Cluster 1 and 2 Deliverability Concerns Provision of additional information

Introduction

The ISO is providing this additional public information related to the Cluster 1 and 2 phase 2 studies to assist stakeholders in making assessments about the potential for future deliverability of their projects.

A number of stakeholders have raised concerns that the long development timelines and high costs of network upgrades in adjacent PTO service territories identified for certain Cluster 1 and 2 generation interconnection projects will impede the commercial viability of these projects. The identified need for these upgrades is related to the high volume of generation that was included in the Cluster 1 and 2 phase 2 studies. The ISO is therefore providing stakeholders with engineering estimates of the amount of new generation that could achieve full capacity deliverability status without requiring certain identified high-cost and long construction-time network upgrades.

Background

Stakeholders have raised the concern that the network upgrades identified in Cluster 1 and 2 phase 2 studies include major transmission projects considerably distant from certain generation interconnections. The specific network upgrades of concern are:

- Mohave–Lugo 500 kV line loop-in Pispah 500 kV Substation and series capacitor banks on both Pispah–Nipton and Pispah–Mohave 500 kV lines
- A 31 mile new Colorado River – Red Bluff No.3 line
- A 103 mile new Red Bluff – Valley 500 kV line with series capacitor banks

Besides being perceived as costly, the completion dates for these upgrades are problematic as deliverability would not be ensured for 6 or 7 years out.

Given the excessive amounts of generation currently in the ISO queue, it is highly likely that enough generation in the related study areas will drop out, such that the transmission upgrades are not required. Nonetheless, generator developers have indicated that the uncertainty around these upgrades is prohibiting the LSEs from contracting with them.

Discussion:

Stakeholders have indicated to the ISO that the LSEs and the CPUC would be well positioned to manage this concern if properly equipped with additional information, specifically a proactive determination by the ISO of how much generation would qualify for full deliverability in the Imperial/Riverside East study areas without requiring the major 500 kV upgrades and additions in SCE's territory listed below.

The ISO understands that the LSEs, equipped with this information, will be more comfortable entering into PPAs with generators that they expect will be deliverable and presenting that information as part of their PPA applications to the CPUC. Similarly, this information should enable the CPUC to be comfortable with approving those PPAs, both due to the CPUC's own assessment of the feasibility of excessive quantities of generation moving forward, as well as its ability to restrict the amount of approved PPAs to stay below the threshold that would drive those upgrades.

Thus the ISO's provision of this additional information should enable the LSEs to contract with generators up to the threshold quantity without having to wait for the excessive generation to actually drop out of the queue. In addition, the ISO will continue to provide individual generators with deliverability information that relates to their individual projects in accordance with the generation interconnection procedures.

Methodology and Assumption

The MW amount of generation that would need to withdraw from Clusters 1 and 2 in order to eliminate the need for the identified upgrades depends on where the withdrawn generator projects were located. If the generators that withdraw have relatively lower flow impacts or smaller distribution factors (DFAX) on the Lugo-Victorville line, then the MW amount necessary to withdraw in order to avoid the upgrades is high. If generators with higher flow impacts or higher DFAX withdraw then the MW amount necessary to withdraw in order to avoid the upgrades is low.

The transmission constraint driving the need for the upgrades is the Lugo-Victorville 500 kV tie line with LADWP under various N-2 outages. Only the two most severe outages were investigated:

- Lugo - Pisgah 500 kV lines N-2 outage
- Devers – Red Bluff 500 kV lines N-2 outage

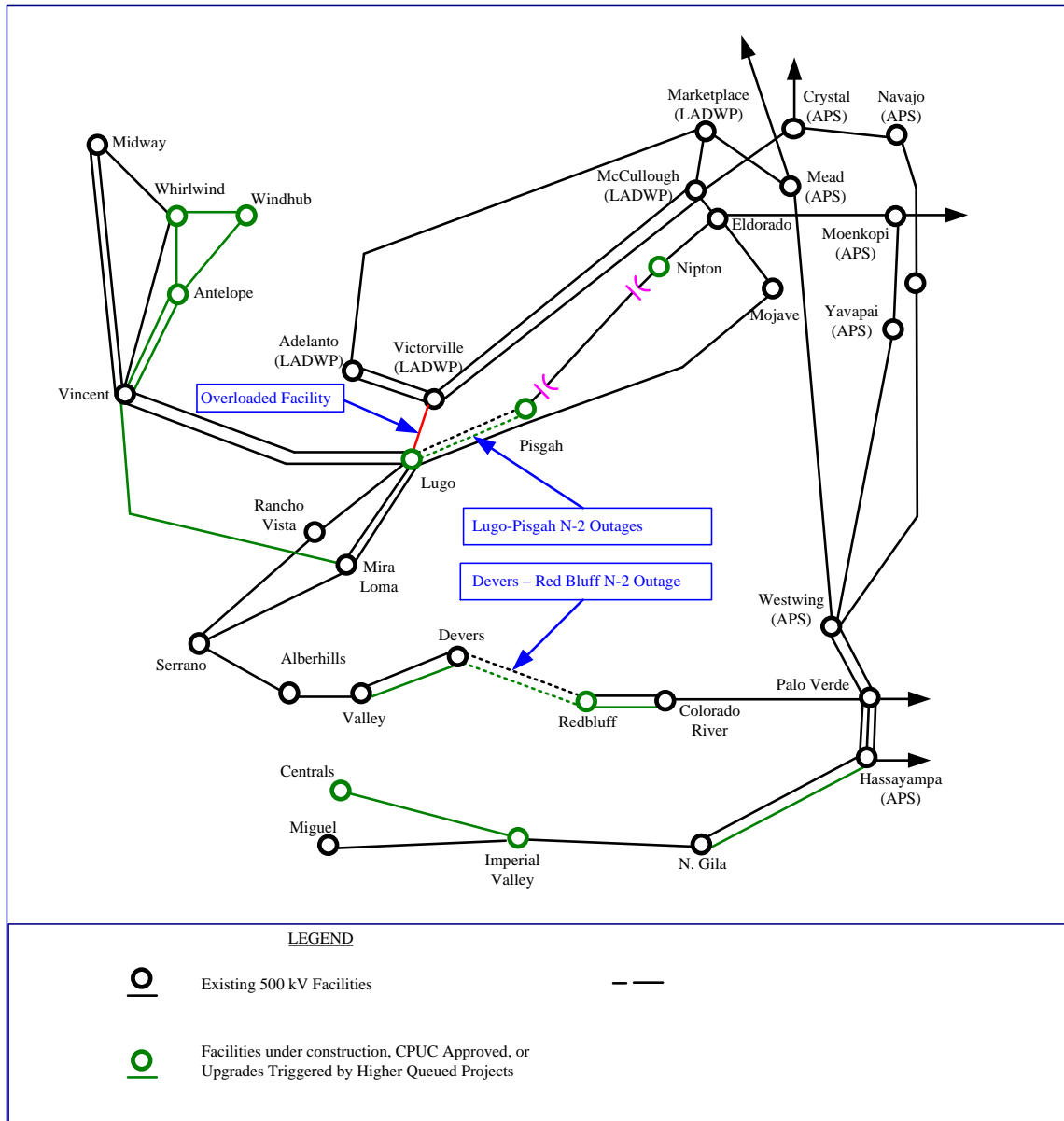
The distribution factors on the Victorville-Lugo line are different for these two outages. In fact the withdrawal of some generators may help to eliminate the upgrade triggered

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by the Lugo-Pisgah outage, but may increase the need for the upgrade to mitigate the impacts of the Devers-Red Bluff outage. The MW withdrawal need was examined under both critical outages, and therefore the results of this analysis may be driven by the Lugo-Pisgah or the Devers-Red Bluff outages.

Also, the requirement for series compensation on the Eldorado –Nipton (future substation) – Pisgah 500 kV circuit is not clear at this time, as it is affected directly by certain projects' status, size and timing. The results have therefore been tested with and without 70% series compensation on the Nipton to Pisgah 500 kV line.

Figure 1. One-Line Diagram Cluster 1 & Cluster 2 Pre-Mitigation



Two generation withdrawal scenarios described below were considered in order to demonstrate effectiveness of the withdrawn generators located in different areas.

- Scenario A: Remove all Cluster 1 & Cluster 2 phase 2 generators with DFAX greater than 7% along with a few higher queued projects as needed to avoid the limiting constraint.
- Scenario B: Remove any cluster generators with highest DFAX as needed to avoid the limiting constraint.

The following cases were studied:

- Scenario A with the 70% compensation on the Pisgah-Nipton line
- Scenario A without the 70% compensation on the Pisgah-Nipton line
- Scenario B without the 70% compensation on the Pisgah-Nipton line

The fourth scenario, Scenario B with the 70% compensation on the Pisgah-Nipton line, was not studied as the results could reasonably be conservatively estimated as being close to the low end of the range of Scenario A with the 70% compensation on the Pisgah-Nipton line.

Results

Table 1 provides a very high level summary of the range of MW withdrawal need to avoid the delivery network upgrades identified above. Given that there is approximately 13,500 MW of generation in the ISO queue that significantly flow across the Victorville-Lugo 500 kV constraint under the N-2 outage conditions described above, approximately 9,900 MW to 12,000 MW can be accommodated as fully deliverable without the need for the major upgrades listed above. As a comparison, the renewable portfolios under study in the 2011/12 ISO transmission planning process have no more than approximately 7000 MW of renewable generation that significantly flow across this constraint during N-2 conditions.

Table 1. Summary of Results

	Low End of Range	High End of Range
With Nipton-Pisgah 70% series compensated	1500 MW	2600 MW
Without Nipton-Pisgah 70% series compensated	2000 MW	3700 MW

Tables 2 through 4 present brief summaries on the MW withdrawal need to avoid the delivery network upgrades identified above.

Lowest level of generation withdrawal need under Scenario A.

With 70% compensation on the Pisgah-Nipton line in service, approximately 2600 MW generation including 1600 MW of Cluster 1 & Cluster 2 phase 2 projects and about 1000 MW of other cluster generators are required to withdraw under Scenario A. . The Lugo-Pisgah double outage is critical with the low level of the required MW withdrawal.

Highest level of generation withdrawal need under Scenario A.

With no series compensation on the Pisgah-Nipton line, approximately 3700 MW generation including 1600 MW of Cluster 1 & Cluster 2 phase 2 projects and about 2000 MW of other cluster generators are required to withdraw under Scenario A. The lack of series compensation on the Pisgah – Nipton plays a significant role to boost the need to withdraw generation. The Devers – Red Bluff double outage is critical on the high level of MW withdrawal need.

Lowest level of generation withdrawal need under Scenario B.

If the most effective generators in the ISO queue withdraw (i.e., highest DFAX values), which is Scenario B, only about 2000 MW of generation is required to withdraw, assuming that the Pisgah-Nipton line is not series compensated. These generators are located in the Eldorado/Mojave/Searchlight areas. The generators located in the Pisgah area help to eliminate the upgrade triggered by the Lugo-Pisgah outage, but aggravate the Devers-Red Bluff outage.

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Table 2. MW Withdrawal Need --Scenario A with the 70% compensation on Pisgah-Nipton

		Lugo-Pisgah N-2 outage	Devers-Red Bluff N-2 outage
Lugo-Victorville line loading	%	98%	99%
Total MW withdrawal	MW	2626	2000
Description of the MW withdrawal		About 1600 MW C1 & C2 generators and 1000 MW other generators assumed withdrawn	About 1000 MW C1 & C2 generators and 1000 MW other generators assumed withdrawn

Table 3. MW Withdrawal Need - Scenario A without the 70% compensation on Pisgah-Nipton

		Lugo-Pisgah N-2 outage	Devers-Red Bluff N-2 outage
Lugo-Victorville line loading	%	98%	101%
Total generation withdrawal	MW	2626	3646
Description of the MW withdrawal		About 1600 MW C1 & C2 generators and 1000 MW other generators assumed withdrawn	About 1600 MW C1 & C2 generators and 2000 MW other generators assumed withdrawn

Table 4. MW Withdrawal Need - Scenario B without the 70% compensation on Pisgah-Nipton

		Lugo-Pisgah N-2 outage	Devers-Redbluff N-2 outage
Lugo-Victorville line loading	%	94%	98%
Total generation withdrawal	MW	2021	2021
Description of the MW withdrawal		About 2000 MW generators located in EOL except the Pisgah area assumed withdrawn	About 2000 MW generators located in EOL except the Pisgah area assumed withdrawn

ISO Next Steps:

The ISO intends to take the following steps:

- Post this discussion paper to obtain broader stakeholder input regarding the usefulness of this information.
- Initiate discussions with the LSEs and the CPUC to assess their use of the information.