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PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION

Agenda ID # 16587
RESOLUTION E-4929 (Rev. 1)
August 23, 2018

R E S O L U T I O N

Resolution E-4929. Liberty Utilities (CalPeco Electric) LLC Verification for the 89 MW Load Trigger for Phase 2 of the Line 625/650 North Lake Tahoe Powerline Upgrade Project Pursuant to D.15-03-020. Request for Approval under Advice Letter (AL) 64-E-A.

PROPOSED OUTCOME:

- This Resolution denies Liberty Utilities (CalPeco Electric) LLC (“Liberty CalPeco”) authorization to commence with construction of Phase 2 of the Line 625/650 North Lake Tahoe Powerline Upgrade Project. The protest by NTCAA is valid. Liberty CalPeco AL 64-E-A is denied.

SAFETY CONSIDERATIONS:

- Liberty CalPeco is required by Public Utilities Code Section 451 to provide services that promote the safety, health, comfort, and convenience of their patrons, employees and the public.

ESTIMATED COST:

- Liberty CalPeco has estimated the cost of Phase 2 construction at approximately \$9 million. This Resolution denies funding for Phase 2 at this time.

By Advice Letter 64-E-A, filed on February 22, 2018.

SUMMARY

This Resolution denies Liberty CalPeco Advice Letter 64-E-A, with an effective date of today. On February 22, 2018 Liberty CalPeco filed AL 64-E-A, an amendment to AL64-E filed on October 14, 2016. AL 64-E-A requests approval pursuant to D.15-03-020 to construct Phase 2 of the Line 625/650 North Lake Tahoe Powerline Upgrade Project (“Line 650 Upgrade Project”). This Resolution denies Liberty CalPeco authorization to commence with construction of Phase 2 of the Line 650 Upgrade Project based on a technical review of the AL and all supporting documentation. This Resolution finds the protest submitted by the North Tahoe Citizen Action Alliance (“NTCAA”) is valid. Commission approval of Liberty CalPeco AL 64-E-A is denied without prejudice, with an effective date of today. The Resolution requires that future requests by Liberty CalPeco for approval to construct Phase 2 and/or Phase 3 of the Line 650 Upgrade Project be filed as an Application or a Petition for Modification to D.15-03-020.

INTRODUCTION

On February 22, 2018 Liberty CalPeco filed Advice Letter 64-E-A, an amendment to AL64-E filed on October 14, 2016, requesting approval pursuant to D.15-03-020 to construct Phase 2 of the Line 625/650 North Lake Tahoe Powerline Upgrade Project (“Line 650 Upgrade Project”). The Decision ordered that upon approaching the load trigger of 89 MW, Liberty CalPeco would (1) conduct a “new network study” to provide verification that peak load had reached a “trigger point” of 89 MW, and (2) to provide documentation supporting the construction commencement timeline for Phase 2.

Pursuant to D.15-03-020, Liberty engaged the services of Ascension Power Engineering (“Ascension”) to perform the new network study. The Ascension 2016 Transmission Study (“Ascension Study”) determined that (1) the NTS experienced peak demand of 88.7 MW during 2015-2016 on December 31, 2015 at 17:55 hours, and (2) it concluded that the system would experience reliability issues that justified the construction of Phase 2 of the project.

D.15-03-020 authorized the CPUC’s Energy Division (“Energy Division”) to conduct an independent analysis to verify the Ascension Study findings. To effectively review the Ascension Study, the Energy Division sought expertise from the California Energy Commission (“CEC”). On July 20, 2017, the CEC’s Siting Transmission and Environmental Protection Division (“CEC staff”) provided the Energy Division with a Staff Assessment of the Ascension Study. The CEC Staff Assessment recognized that the “trigger point” of 89 MW had been reached, but found that at the 89 MW load level no significant system reliability issues were identified that required mitigation by construction of Phase 2.

As a result, Energy Division issued Draft Resolution E-4883 which upheld the protest of NTCAA and denied Liberty CalPeco permission to construct Phase 2 of the Line 650 Upgrade Project. Following the issuance of Draft Resolution E-4883, Energy Division staff, CEC staff, Liberty CalPeco and NTCAA held technical meetings to clarify a number of issues related to the Ascension Study and the CEC’s Staff Assessment of the Ascension Study. Following these technical discussions, Liberty CalPeco provided two Addendums to the Ascension Study to Energy Division to correct errors and deficiencies. Following provision of the two Addendums by Liberty CalPeco, additional analysis of the revised date required by Energy Division significantly delayed the finalization of Draft Resolution E-4883 and it was ultimately withdrawn. Due to the length and complexity of the administrative record associated with AL 64-E, Energy Division requested that Liberty CalPeco file a supplement to AL 64-E to address the remaining technical issues identified by the CEC staff. On February 22, 2018, Liberty CalPeco filed AL 64-E-A. This Resolution analyzes and offers a disposition on AL 64-E-A.

BACKGROUND

On March 26, 2015, D.15-03-020 certified the California Environmental Quality Act (“CEQA”) Environmental Impact Report for the entire Line 650 Upgrade (multi-phase) Project, and it also granted Liberty CalPeco a permit to construct Phase 1 of the Line 650 Upgrade Project. Phase I approval allowed the immediate upgrade of the 60 kV 650 Line from Truckee to Kings Beach by installing new tubular steel power poles and new conductor rated to eventually operate at 120

kV. Liberty CalPeco commenced Phase I construction in spring 2016, and completed construction in fall 2016.

Phase 2 of the project is designed to allow the upgrade of three substations and enable the 650 Line to operate at 120 kV. D.15-03-020 conditioned approval for Phase 2 construction on completion of a new network study to accurately identify the peak load trigger points. D.15-03-020 identified critical errors in the original network study supporting Liberty CalPeco's application for a Permit to Construct (PTC) the Line 650 Upgrade Project.

On October 14, 2016, Liberty CalPeco filed AL 64-E, seeking CPUC authorization pursuant to D.15-03-020 to construct Phase 2 of the Line 650 Upgrade Project. The Ascension Study was attached to AL 64-E as evidence that the system (1) reached the "trigger point" and (2) reliability would be compromised in the absence of Phase 2 construction.

AL 64-E was timely protested by the North Tahoe Citizen Action Alliance ("NTCAA") on November 3, 2016. NTCAA took issue with the Ascension Study finding that the "analysis, calculations, and data in the advice letter contained material errors and omissions." NTCAA reiterates their belief that the 89 MW "trigger point" is erroneous and based on the network study contained in Liberty CalPeco's original application. NTCAA states that the intent of D.15-03-020 was to require a new, complete and accurate network study to determine the actual peak load "trigger" point at which the North Tahoe System will experience overload and voltage violations. NTCAA asserts that if reaching the 89 MW peak load was the only technical prerequisite there would have been no reason for the Commission to require a new network study. NTCAA cites numerous passages in D.15-03-020 to support their conclusion.

NTCAA alleges that Liberty CalPeco is not in compliance with D.15-03-020 Ordering Paragraph number 2 because the Ascension Study does not document and justify all data and assumptions for the new network study. NTCAA alleges the following errors and omissions: exclusion of the Kings Beach Diesel Generating Station capacity from the model; exclusion of the North Tahoe System interties to Incline Village and South Lake Tahoe; failure to include infrastructure upgrades that would have a material effect on N-1 conditions; load transfer to Nevada Energy ("NVE") and their ownership within the model; and load data assumptions. Finally, NTCAA argues Liberty CalPeco failed to deliver a new network study that identifies accurate, defensible peak load triggers that could be used by the Commission to approve Phase 2 of the Line 650 Upgrade Project.

Liberty CalPeco Reply to NTCAA

On November 10, 2016 Liberty CalPeco responded to the protest of NTCAA. Liberty CalPeco claims that the bulk of the NTCAA Protest impermissibly raises issues outside the scope of AL 64-E and which are irrelevant to the three preconditions of D.15-03-020.

Liberty CalPeco reports that Phase 1 construction is complete. With respect to Phase 2 and Phase 3 approval, Liberty CalPeco identifies the three key requirements listed in D.15-03-020 as preconditions to commencing construction on these subsequent phases:

- 1) Verification that load growth on the North Tahoe System is approaching 89 MW;

- 2) A new network study to verify load growth predicates and that load growth outside the system is not the basis for meeting trigger points; and
- 3) A Tier 2 Advice Letter.

According to Liberty CalPeco the most critical aspect of D.15-03-020 is the requirement that North Tahoe System load reach the 89 MW “trigger point” for Phase 2 approval and 100 MW for Phase 3 approval. Liberty CalPeco points out that the Final Environmental Impact Report (“FEIR”) assessed the environmental impact of all three phases and D.15-03-020 granted the authority to commence construction on Phase 2 and 3 upon demonstration that the peak load triggers were attained.

Liberty CalPeco claims that NTCAA’s insistence that the 89 and 100 MW triggers should be reevaluated are wrong, pointing out that the MW values for these trigger points have been used consistently in the FEIR analysis, and D.15-03-020 specifically incorporates the triggers into Ordering Paragraph 1(b) and 1(c). Accordingly, Liberty CalPeco asserts that the need to establish new triggering points is also wrong and the NTCAA protest should be rejected and AL 64-E timely approved.

Liberty CalPeco asserts that the Ascension Study justified and documented all data and assumptions, and presents the requisite power flow plots for the new network study. Liberty CalPeco rejects NTCAA’s assertion that the Ascension Study predetermined the validity of the 89 MW Phase 2 trigger point. Liberty CalPeco reports that the sum total of the actual peak load demand recorded on December 31, 2015 was 88.7 MW and the Ascension Study assessed the 88.7 MW of peak load distributed among the substations in the same manner experienced on December 31, 2015 and determined that the load limit exceeded the reliability limit of the North Tahoe System, validating that the Phase 2 improvements would be necessary.

The Ascension Study explains that Liberty CalPeco’s ability to rely on the Kings Beach Diesel Generating Station is significantly restricted by the diesel engines environmental permits. Liberty CalPeco’s reports their use of this resource is limited to 360 machine hours in a calendar year, half of the permitted 720 machine-hours shared equally between Liberty CalPeco and NVE. Liberty CalPeco states that, given the presences of six generating units, 360 machine hours restricts the continuous usage of the facility to only one 2-1/2 day period of plant operation each calendar year. Liberty CalPeco claims that by starting and loading sufficient diesel units to be prepared for and avoid an N-1 contingency problem, the allocation of the diesels would be rapidly exhausted.

Liberty CalPeco responded to NTCAA’s challenge of the Ascension Study’s assessment of repair and restoration time for line outages by pointing out that the principals at Ascension have more than 15 years of experience managing electric utility operations. Ascension has managed electric utility operations across Nevada and eastern California, including the NTS itself during the period of Sierra Pacific Power Company ownership. Ascension has managed numerous restoration efforts after fires and storms, and has the appropriate background and expertise to assess repair and restoration times for outages. Accordingly, Liberty CalPeco asserts that lengthy outage durations in mountainous terrain are a fact; and that Ascension’s determination to not rely on the Kings Beach diesels in the Ascension Study is reasonable given the expected length of outages and the limited hours of diesel generation available.

In response to NTCAA allegations that the Ascension Study should have included distribution ties to Incline Village and South Lake Tahoe, Liberty CalPeco assert that NTCAA misconstrues those distribution connections. Liberty CalPeco defends the Ascension Study modeling as customary and representative of prudent utility practice, and necessary to avoid study complications. Liberty CalPeco emphasizes that while NVE has confirmed its willingness to provide electricity in an “emergency”, and on an “as available” basis, Liberty CalPeco can’t consider NVE a source for firm backup from Incline Village.

Liberty CalPeco reports that the distribution tie to South Lake Tahoe is extremely limited in its capacity as only one line connects Meyers with Tahoe City. Accordingly, the Ascension Study does not assume the system interties to Incline Village and South Lake Tahoe will be available to enable Liberty CalPeco to meet peak loads.

Liberty responded to the NTCAA allegation that the Ascension Study failed to take into account the load transfer capability of the upgraded 7203 and 7300 lines by arguing that NTCAA is attempting to propose project alternatives that were rejected in the FEIR.

Liberty CalPeco next responded to the NTCAA questions regarding load transfers to NVE and facility ownership. Liberty CalPeco points out that the Ascension Study power flow model transfers 4 MW of load back to NVE’s Incline Village substation and actually reduces load and relieves system constraints. Furthermore, Liberty CalPeco argues facility ownership has no bearing on the Ascension Study.

Liberty CalPeco claims that the Ascension Study has verified that load growth is approaching 89 MW and that load growth outside of its own system is not the basis for the increase. Furthermore, Liberty CalPeco suggests that Energy Division should disregard the historical load chart presented by NTCAA arguing that D.15-03-020 focused on future load growth.

Liberty CalPeco claims to have appropriately measured Liberty and non-Liberty customer demand at the eight substation load measuring points identified in D.15-03-020. Table 1 demonstrates that Liberty CalPeco’s December 2015 peak load was 2.3 MW higher than the reference loads from the 2011 study, and shows that Liberty CalPeco’s load in the 2015 peak hour was a higher percentage of the total load measured at the eight substations.

Lastly, Liberty CalPeco disputes the NTCAA claim that loads served radially from Truckee have no significant effect on power flows south of Truckee nor on voltages at Tahoe City and Northstar. Liberty CalPeco claims that Truckee loads have nearly one-to-one effect upon the loading on the North Truckee 120/60kV transformer, which becomes the limiting element in some of the critical contingency scenarios in the Ascension Study.

On July 20, 2017 the CEC provided the CEC Staff Assessment of the Network study Included in Liberty Utilities (Liberty CalPeco Electric) LLC Advice Letter 64-E (“Staff Assessment”) to Energy Division. The Staff Assessment reviewed the new network study and conveyed CEC Staff’s conclusions back to Energy Division. Using all relevant documents at their disposal the CEC staff completed essentially a four-part analysis: (1) review of NTS loads; (2) review of the Ascension Power Engineering network study; (3) an evaluation of whether or not the diesel generators at Kings Beach could be used to mitigate high line loading identified in the network

study; and (4) an evaluation of a transmission mitigation alternative to issues identified in the network study.¹ In short, the CEC Staff Assessment aimed to determine whether the 89 MW trigger threshold had been reached, whether the Ascension network study accurately assessed the peak loads, and most importantly, whether including the diesel generation assets, as recommended by NTCAA, would mitigate loading issues - allowing the North Lake Tahoe System to operate reliably even at the 89 MW load level.

Energy Commission Staff Conclusions

1. The North Tahoe System load has reached the 89 MW “trigger point” as demonstrated by the coincident peak measured on 12/24/16. However, justification for the Upgrade Project appears to not be solely a function of the 89 MW “trigger”, but also of the proportional load distribution across the North Tahoe System. Both a one-percent escalation of the 2015/2016 coincident peak loads as well as the 2016/2017 coincident peak loads results in cases exceeding 89 MW. However, the results do not demonstrate that both cases have criteria violations requiring mitigation by the Upgrade Project.
2. The network study performed by Ascension and submitted by Liberty CalPeco found network issues under contingency conditions that are apparently mitigated by the Upgrade Project, based on proportional load distribution that occurred during the 2015/2016 coincident winter peak.
3. Energy Commission staff evaluated whether operating the Kings Beach Diesel Generators at 2 MW, 4 MW and 6 MW could solve the contingency issues identified in the Ascension network study and found that 2 MW would reduce loading on the Truckee-Squaw Valley 60 kV line and would solve the low voltage issue at the Tahoe City Substation. In order to mitigate the overload on the Truckee transformer, 6 MW are needed.
4. Energy Commission staff evaluated replacing the copper conductor on the Truckee-Squaw Valley 60 kV line (line 609). From a network perspective, this alternative does solve the primary system issue (high loading on the Truckee-Squaw Valley 60 kV line) that was used to justify Phase 2 of the Upgrade Project in the Ascension network study. The environmental impacts or costs of this option have not been analyzed in the CPUC’s proceeding or environmental document for the project.

It should be noted that the North Truckee 120/60 kV transformer would reach 105.5% of loading in the event of the loss of Line 132. However, this transformer is owned and operated by NVE, and is not in the control of Liberty CalPeco.

¹ CEC Staff Assessment, page 2.

Draft Resolution E-4883

On August 18, 2017, the Commission issued Draft Resolution E-4883 to address the NTCAA protest of Liberty CalPeco AL 64-E. Applying the technical expertise contained in the CEC Staff Assessment, Draft Resolution E-4883 denied Liberty CalPeco authority to construct Phase 2 of the Line 650 Upgrade Project by upholding the protest of NTCAA.

On August 23, 2017, Energy Division served the CEC Staff Assessment and supporting technical files on the interested parties to the Advice Letter. On August 28, 2017, Liberty CalPeco informed Energy Division of an error in the CEC's load model, which the CEC staff acknowledged on August 31, 2017. The CEC was able to demonstrate that the error in the CEC Staff sensitivity analysis did not alter the overall findings regarding the need for Phase 2 of the Line 650 Powerline Upgrade Project. While the correction resulted in increased loading on the Truckee-Squaw Valley line, it did not result in an overload.

On September 25, 2017, Liberty CalPeco, Energy Division staff, CEC staff and NTCAA participated in a technical conference call to discuss the Draft Resolution, the supporting CEC Staff Assessment, and related issues. The technical call was intended to provide clarification of findings in the Draft Resolution and facilitate the comment process. During the call, Liberty CalPeco addressed the issues raised by the CEC Staff Assessment. On September 27, 2017 an additional technical call was held to resolve specific measurement issues raised in the first call. At the conclusion of the second technical call CEC staff and Energy Division staff asked Liberty CalPeco to provide additional information to supplement the Ascension Study. Liberty CalPeco provided the supplemental information on September 29, 2017 in the Ascension Study 9/28 Addendum.

Comments on Draft Resolution E-4883

On October 16, 2017, Liberty CalPeco submitted comments to Draft Resolution E-4883. In short, Liberty CalPeco accepted that the conclusions reached in the Draft Resolution were based on technical conclusions contained in the Staff Assessment prepared by CEC staff in support of the Energy Division. Liberty CalPeco believed that due to the acknowledged errors in the CEC Staff Assessment, the CEC Staff Assessment is now in agreement with the conclusions in the Ascension Study and AL 64-E. As such, Liberty CalPeco argues the Draft Resolution E-4883 proposed denial of AL 64-E should not stand. Accordingly, Liberty CalPeco requested that the Draft Resolution be revised to approve AL 64-E, authorizing construction of Phase 2 of the North Lake Tahoe Upgrade Project.

Liberty CalPeco once again stated their belief that technical verification of the attainment of the 89MW load "trigger" would alone be sufficient for Commission approval of Phase 2 construction. Liberty CalPeco continued to disagree with the Draft Resolution's interpretation of D.15-03-020 that the 89 MW threshold would mark the point at which a new and accurate network study would be initiated, believing instead that the 89 MM peak load represented a threshold for immediate and automatic approval of AL 64-E.

Additionally, Liberty CalPeco claimed that the CEC Staff Assessment and the Draft Resolution improperly disregard the contingency overload of the North Truckee 120/60 kV transformer.

Liberty CalPeco asserts that the CEC Staff Assessment and Draft Resolution misconstrued the seriousness of the overload because the transformer is owned by NVE.

Liberty CalPeco takes issue with the CEC's characterization of the Line 609 loading. The CEC notes that while the line reaches 99.8% of its winter rating, it did not overload. Liberty CalPeco argues that line loading in excess of 98% must be regarded as requiring immediate mitigation.

CEC Staff Assessment of the Liberty Utilities 2016 Transmission Study Addendum Versions 9-28-17 and 10-30-17

On November 21, 2017, CEC staff issued a second Staff Assessment with the purpose of evaluating the two new Liberty CalPeco Ascension Study Addendum versions. Prior to delivery of the CEC staff's second Staff Assessment, the CPUC held two technical conference calls in late September (9/25, 9/27) between Liberty CalPeco, CEC staff, and NTCAA to discuss CEC staff's findings and conclusions provided to the CPUC in the July 2017 CEC Staff Assessment. As a result of these discussions, CPUC staff directed Liberty CalPeco to update the Ascension Study and submit the results to the CPUC as an addendum. On September 28, 2017 Liberty CalPeco submitted the requested study addendum to the CPUC (Ascension Study Addendum version 9-28-17).

At the request of CPUC staff, CEC staff reviewed Ascension Study Addendum version 9-28-17 and again found it to be incomplete: plots for eight contingency cases were missing, some plots mislabeled, and a tabular summary of the results of other contingency cases were not provided. Additionally, CEC staff power flow studies identified issues with modeling of load beyond the Hobart tap. Lastly, there was some ambiguity surrounding the availability of shunt capacitor banks. In an attempt to correct these deficiencies CEC staff submitted a data request on October 17, 2017 to Liberty CalPeco through CPUC staff.

On October 30, 2017 CEC staff received a revised version of the Ascension Study Addendum Version 10-30-17), which corrected deficiencies identified by staff in Ascension Study Addendum Version 9-28-17.

The analysis performed for Liberty CalPeco by Ascension examined ten contingencies. Of these ten contingencies, three resulted in criteria violations. The three critical contingencies are an N-1 outage of the North Truckee-Martis 120 kV (Line 132), and N-1 outage of Martis-Squaw Valley 120 kV (Line 132) and an N-1 outage of Truckee-Northstar 60 kV (Line 650) CEC staff simulation results confirmed these three critical contingencies. While the Phase 2 Upgrade Project would solve all the criteria violations, the CEC found that use of the existing Kings Beach diesel generators would also mitigate the criteria violations.

Regarding the North Truckee-Martis 120 kV (Line 132) outage, CEC staff confirmed that the combined use of 1 Brockway capacitor and 3 Kings Beach diesel generators would mitigate all four identified criteria violations.

The Martis-Squaw Valley 120kV (Line 132) outage could be mitigated by use of 1 Brockway capacitor or the use of two diesel generator units.

The Truckee-Northstar 60 kV (Line 650) outage could be mitigated by three different means; one is the use of 1 Brockway capacitor and 1 diesel generator; a second is use of 2 Brockway capacitors; and a third is the use of 2 or 3 diesel generator units.

Liberty CalPeco Supplemental Advice Letter 64-E-A

On February 22, 2018 Liberty CalPeco submitted AL 64-E-A, as supplement to AL 64-E for the purpose of addressing issues identified in the November 21, 2017 CEC Staff Assessment of the Ascension Study Addendum Versions 9-28-18 and 10-30-17 including the use of the existing Kings Beach Diesel Generating Station capacity to mitigate identified criteria violations identified in the 10-30-17 Addendum.

In AL 64-E-A Liberty CalPeco acknowledges that both the CEC Analysis and Ascension Study show that output of the Kings Beach Diesel Generating Station could resolve overloads and voltage violations and outage contingencies. However, Liberty CalPeco continued to argue that the limitations on operating hours of the diesel engines in order to comply with air quality regulations virtually eliminate the use of those generators as a useful outage mitigation tool.

Regarding loss of the 132 Martis-Squaw Valley, the contingency event results in low voltage at Squaw Valley.

Finally, Liberty CalPeco states that one of the Phase 2 project goals is the decommissioning and replacement of the aging and failing Brockway substation. The substation is nearly 60 years old and constructed of wood poles and timbers, many of which are weathering and twisting with age.

NOTICE

Notice of AL 64-E-A was made by publication in the Commission's Daily Calendar. Liberty CalPeco states that a copy of the Advice Letter was mailed and distributed in accordance with Section 4 of General Order 96-B.

PROTESTS

On March 15, 2018 NTCAA protested Liberty CalPeco's AL 64-E-A. NTCAA objects to the repeated reference in AL 64-E-A to "attainment of the 89MW load trigger" arguing that the CEC Staff Analysis definitively rejects the 89 MW peak load level as being the sole justification of Phase 2 is technically discredited. NTCAA points out that Liberty CalPeco's Ascension Study removes a power plant from operating the way it was designed and has been functioning for over 40 years. The Kings Beach Diesel Generating Station was rebuilt with new engines and generators in 2008 at a cost of about \$12 million according to NVE. NTCAA insists that the elimination of the diesels is unprecedented from all previous models. NTCAA asks that if the diesels are virtually useless and discounted as NTS infrastructure as Liberty CalPeco claims, the diesels should then also be removed from the Liberty CalPeco rate base.

NTCAA submitted a load table based on Liberty CalPeco and Sierra Pacific Power load data. The table indicates that average peak load over the past 21 years averages 58.8MW for the four

substations comprising the North Tahoe System loop—the subject of the upgrade. For the entire system owned by three utilities (Liberty CalPeco, NVE, and Truckee Donner PUD) the average peak load over 21 years is 82.4MW. NTCAA points out that variation of year to year loads are due to the weather's influence on the Northstar and Squaw Valley/Alpine Meadows ski resorts. Winter peak load occur between Christmas and New Years for about 4-5 hours a day for 7-9 days, while resorts slowly wind down and people turn on lights and heat at home. NTCAA points out that these represent very short peaks and could easily be reduced or “shaved” by battery storage at both ski resorts.

NTCAA insists that there has not been load growth on the loop proposed for upgrade. Net load growth has occurred in Truckee between 1996 and 2016. NTCAA believes that unloading the 650 Line from NVE's Truckee Substation relieves the stress on NVE's transformer—attributable to new growth in Truckee—and enables new load growth for NVE at the Truckee Substation. It is NTCAA's position that Liberty CalPeco should not be responsible for paying for the entire upgrade because the relocation of the 650 Line to the North Truckee substation operating at 120kV gives sufficient capacity for the upgraded Kings Beach substation to supply the two 14.4 kV distribution lines for backup to Incline Village. This was called for in the 1996 Capacity Plan for the North Tahoe System by NVE.

NTCAA points out that the NVE plan presented in 1996 is exactly Phase 2 of the Line 650 Upgrade Project, involve improvements that are NVE's responsibility, but if approved in this AL, are upgrades that would be funded solely by Liberty CalPeco customers. NTCAA suggests that Liberty CalPeco ratepayers should be impacted only to the extent of the proportional benefits of Phase 2. As such, Liberty CalPeco ratepayers would pay for the new dismantling of the Brockway substation, while NVE would pay for the remainder of Phase 2 costs.

In conclusion, NTCAA believes the evidence of net load growth occurring entirely in Truckee, with half of it from outside the Liberty Calpeco service territory, is precisely what the Decision was intended to guard against. NTCAA argues that the new “network study” fails to identify new trigger points for Phases 2 and 3. Therefore, if Phase 2 costs are shared by NVE and the project moves forward, then the Commission must also recognize this has nothing to do with Phase 3. NTCAA asks: if Phase 2 could be approved for other reasons than Liberty CalPeco capacity issues and would be independent of any connection to Phase 3, how would the Commission consider approval of Phase 3? Finally, NTCAA believes that technological and economic advances in battery storage should be considered to shift the short, steep predictable North Tahoe System load peaks.

DISCUSSION

D.15-03-020 found the ZGlobal network studies that Liberty CalPeco used to support its Application for PTC (A.10-08-024) seeking CPUC approval to upgrade the North Tahoe System, were insufficient to support the need to construct Phase 2 and Phase 3. D.15-03-020 ordered a new network study to resolve the conflicting claims being made by NTCAA and Liberty CalPeco regarding the need and timing of the NTS System Upgrade Project, Phases 2 & 3. D.15-03-020

states, “We reiterate that a new network study must form the basis for the trigger point assessments for Phases 2 and 3. The flaws in the existing planning documents leave those documents insufficiently reliable for such use.”²

D.15-03-020 references Appendix P4 to the Final EIR, which states:

- “Given the goal of correctly identifying the trigger points, such points must be based on system models that are accurate”.
- “It is not possible to correctly identify the trigger points for Phases 2 and 3 without the completion of a new network study.”
- “All data and assumptions for a new network study should be documented and justified along with the results and power flow plots, with the final deliverable being trigger points for Phases 2 and 3”.³

D.15-03-020 addressed comments on the Proposed Decision by NTCAA: “NTCAA’s comments on the EIR, its prepared testimony, and its briefs have urged a relook at the planning horizon for the second and third stages of the Proposed Project. The proposed decision agrees that the timing should be reexamined given acknowledged flaws in the planning documents. The proposed decision does not abandon the 89 MW and 100 MW demand growth triggers, however, nor does the record support that result.”⁴ By not “abandoning”, but just as importantly not “supporting” the “triggers”, the Commission indicated that it lacked sufficient evidence to determine the appropriate Phase 2 construction commencement point. The order for a new network study would provide for a new, independent assessment free of the flaws that undermined the credibility of the ZGlobal study. The purpose of the study would be to develop a technical evidentiary record that could either support the established “triggers” or replace them with more accurate demand level “triggers”. Clearly, simple verification of the achievement of the established load level “triggers” would not require the order of a new network study, based on “accurate system models” and independently reviewed by the Energy Division supported by technical expert consultants.

The Commission had to determine when the new network study would commence and since the Commission had not abandoned the established “triggers”, they were determined to be the appropriate commencement point—not for Phase 2 approval—but for the commencement of the new network study. In referencing the 89 MW and 100 MW trigger points that were established by planning documents in the Liberty CalPeco application for a PTC, the Commission relied on a prudent, record based, commencement point for the new network study that would ultimately determine if the 89 MW and 100 MW triggers were accurate indications of NTS peak load capacity, and if not, what the correct triggers should be. Liberty CalPeco interprets the 89 MW target referenced in D.15-03-020 as the exclusive test for receiving Commission approval of

² D. 15-03-020 page 43.

³ D. 15-03-020 page 41.

⁴ D. 15-03-020 page 46.

Phase 2. This standard disregards that D.15-03-020 determined that the established “triggers” may not represent the actual operating capacity of the North Tahoe System. . Based on the discussions contained in D.15-03-020 in their totality, we do not agree with the Liberty CalPeco interpretation.

Support for the Commission’s conclusion that the new network study must reevaluate the established “triggers” is abundant. In D.15-03-020 Ordering Paragraph 1 (b), the Commission ordered: “Construction of Phase 2 shall not commence without verification that load growth on the North Tahoe Transmission System is approaching 89 megawatts (MW), as further specified in Ordering Paragraphs 2 and 3”.

Ordering Paragraph 2 states: “Liberty Utilities LLC, shall perform a new network study to verify the load growth predicates that warrant commencement of Phase 2 and of Phase 3; all data and assumptions for the new network study must be documented and justified along with results and power flow plots, with the final deliverable being the construction commencement timeline (i.e., the “trigger points”) for Phase 2 and for Phase 3. Liberty Utilities new network study analysis must identify and explain any “other considerations” that affect its identification of the trigger points and must verify that load outside its own system is not the basis for the trigger points.”

The intent of the new network study was not simply verification of the previously established “triggers” but rather a full reevaluation of the North Tahoe System so that an accurate construction commencement timeline (“deliverable”) could be established. In other words, the cited “triggers” represented a starting point for reevaluation of the actual load capacity of the North Tahoe System, and not an accepted load level capacity for the North Tahoe System. The phrase “identification of trigger points” implies that the established triggers were not intended to prompt construction commencement, but to only initiate a new network study that would identify an accurate timeline that the original flawed studies could not. Therefore the established 89 MW peak load “trigger” is not the threshold for construction to commence, it is merely the “trigger” for a new and accurate network study to develop as a “deliverable” a defensible construction commencement timeline based on an accurate assessment of North Tahoe System load carrying capabilities.

Moreover, D.15-03-020 acknowledged the difficulty of determining the actual amount of Liberty CalPeco load within the larger North Tahoe System. The new network study would be expected to quantify the load of Liberty CalPeco within the “network” of Liberty CalPeco, Nevada Energy, and Tahoe Donner PUD substations that comprise the system.

To enable Energy Division review of the Liberty CalPeco new network study, D.15-03-020 ordered that the commencement request for Phases 2 and 3 be both filed as a Tier 2 Advice Letter, declining Liberty CalPeco’s request for a Tier 1 filing and stating: “A Tier 2 AL is subject to our staff’s compliance review and we conclude that is appropriate here”.⁵ The decision then allows Energy Division to “utilize the consultants already contracted under the

⁵ D. 15-03-020 page 41.

terms of the Mitigation Monitoring Compliance Reporting Program (MMCRP) to assist with the review: “Energy Division should not recommend approval of either AL unless the information offered to verify, respectively, the 89 MW and 100 MW construction triggers is compliant with the requirements of this decision.”⁶

To effectively review the ordered Tier 2 filing, the Commission initially attempted to contract technical assistance under the existing MMCRP contract as recommended in D.15-03-020. Unfortunately, timely modification of the existing contract to include an engineer qualified to independently review the Liberty CalPeco filing and perform the required power flow analysis proved difficult. To prevent further delay, the Commission turned to experts at the CEC to assist with the review. The CEC Staff Assessment finds that the showing in AL 64-E as supplemented by AL 64-E-A does not support approval of Phase 2 of the Line 625 Upgrade Project at this time.

In AL 64-E and again in AL 64-E-A, Liberty CalPeco states that use of the Kings Beach Diesel Generating Station to mitigate transmission outage contingencies was previously rejected through the proceeding that led to D.15-03-020. In fact, a diesel generating alternative was considered and rejected. However, this alternative, described in the FEIR on page 3-81 “Utilizing Additional Diesel Generation to Provide Reliable Capacity for Transmission Outages”, proposed constructing one or more additional diesel generating stations outside the Lake Tahoe Basin to provide power during system failures. However, the FEIR was silent on the issue of the continued use of the existing Kings Beach Diesel Generating Station, currently permitted for 721 hours of annual operation. In fact, the existing back up capacity of the Kings Beach Diesel Generating Station to meet North Tahoe System peak load was clearly understood to be an integral operational component of the North Tahoe System. Furthermore, it was not until the CEC’s Staff Analysis identified significant errors in the Liberty Utilities 2016 Transmission Study, resulting in Addendum Versions 9-28-18 and 10-30-17, that it could be determined with confidence that the current diesel generating capacity is adequate to meet all the contingency violations identified in the Transmission Study.

Use of the upgraded and permitted Kings Beach Generating Station has been verified in our technical analysis to be a viable mitigation for transmission system issues at the current 90.5 MW North Tahoe System peak load level. In fact, there is excess capacity in terms of operating hours available to Liberty CalPeco North Tahoe System operators, as records show that the diesel turbines haven’t run more than 366 hours (2017), or a little over half of their permitted allowance, in any of the last 5 years.

To fully understand the efficacy of the Kings Beach Generating Stations it is important to understand that the North Tahoe System peaks in the winter, usually during the winter holiday season when North Lake Tahoe occupancy rates are high. When the North Tahoe System reached a system peak of 90.5 MW, it could be best described as a “needle” peak—exactly the scenario that could be mitigated effectively with the existing and recently refurbished diesel turbines. However, when conditions in the North Lake Tahoe are not attracting large numbers of

⁶ D. 15-03-020 page 42.

winter holiday visitors, the North Tahoe System peak can fall precipitously. In 2017/2018, because of few winter holiday visitors, the system peak only reached 81.47 MW.

It is apparent that NTCAA's assertion that the existing backup diesel generating capacity in Kings Beach could be an effective mitigation for system peak loading conditions, and should have been incorporated into the Ascension Study, is accurate. The continued omission of this key piece of infrastructure represents a critical failure to accurately model North Tahoe System peak load capacity. Because of this omission, the Commission finds that the protest of NTCAA is valid, at least in part. Additionally, the Commission is in agreement with NTCAA's assertion that the Ascension Study fails to effectively identify new "trigger" points for Phases 2 and 3. The CEC Staff Analysis indicates that "trigger" points established by Z-Global are inaccurate, as the North Tahoe System can continue to operate reliably at the 89 MW load and beyond. The actual North Tahoe System reliability limits remain unknown at this time. Nevertheless the significant reduction in 2017/2018 peak load indicates that the North Tahoe System peak load varies greatly year to year, and may not soon again reach the 2016/2017 peak load of 90.4MW.

For these reasons, approval of Phase 2 by AL 64-E-A is premature. At this time, Liberty CalPeco should continue to depend on the use of the backup generation in Kings Beach and specifically, the ability to dispatch incremental levels of generation as suggested in the CEC Staff Assessment, to achieve the necessary reliability during peak load conditions. There are also a number of factual issues that can only be appropriately addressed by the Commission in a formal proceeding.

NTCAA points out that new technology, such as advanced energy storage, not yet economic even a few years ago when the EIR/EIS was drafted, is now increasingly viable. The Commission is in agreement that these new technologies represent potential mitigation to the characteristic short duration load peaks inherent to the North Tahoe System and should be evaluated by Liberty CalPeco. In fact, on January 28, 2018, Liberty Utilities announced via a Press Release that it is pursuing development of an 8 MW battery storage facility to be located at Squaw Alpine.

"The project proposal includes installation of a battery energy storage system of up to eight megawatts near Gold Coast, an existing on-mountain facility at Squaw Valley, in an area currently used for materials storage. At this time, it is envisioned that the system would be owned, operated and maintained by Liberty Utilities, while Squaw Valley Ski Holdings would provide the land to house the battery storage system. The project is subject to review and approval by the California Public Utilities Commission and Placer County prior to commencement of construction."⁷

⁷ <http://squawalpine.com/explore/blog/olympic-valley-microgrid>

NTCAA asserts that Phase 2 of the Line 650 Upgrade Project provides direct benefits to NVE and its ratepayers by “unloading” the 650 Line from NVE’s Truckee substation and relieving stress on NVE’s transformer thus enabling NVE to serve new load growth at the Truckee substation. Additionally, NTCAA asserts that Phase 2, by bringing 120 kV to the new Kings Beach substation would provide capacity for the two 14.4 kV distribution lines to provide emergency backup to NVE customers in Incline Village, Nevada.

The Commission acknowledges that the Liberty CalPeco service territory was formerly served by Sierra Pacific Power Company, NVE’s California utility. As such, North Tahoe System planning was integrated between NVE and its California entity. NVE has retained North Tahoe System assets including their Truckee Substation, distribution lines, and right to use half the hours of the Kings Beach Generating Station diesels. It is reasonable to assume that the 1996 Capacity Plan for the North Tahoe System by NVE continues to serve as the basis for North Tahoe System planning regardless of the new ownership structure. NTCAA’s argument for equitable cost sharing between Liberty CalPeco and NVE based on relative benefit makes sense in the context of the recent restructuring of the utility. As such, Liberty CalPeco should address sharing of Phase 2 costs relative to benefit with NVE when Liberty CalPeco next seeks Phase 2 approval from the Commission.

Due to contested factual issues about the current need to construct Phase 2 of the project, Liberty CalPeco should seek Commission approval for the Line 650 Upgrade Project Phase 2 in a formal proceeding - when Liberty CalPeco has completed a new network study which complies fully with D.15-03-020 by identifying and documenting new and accurate North Tahoe System peak load “trigger” points for Phase 2 Commission approval. Liberty CalPeco should analyze potential benefits of the Line 650 Upgrade Project Phase 2 to NVE ratepayers and describe an appropriate distribution of costs between Liberty CalPeco and NVE. Additionally, Liberty CalPeco should analyze any new technologies that have the potential to reduce North Tahoe System load peaks.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review and comment prior to a vote of the Commission. Section 311(g)(2) provides that this 30-day period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day comment period for the draft of this resolution was neither waived nor reduced. Accordingly, this draft resolution was mailed to parties for comments.

On July 9, 2018 Liberty Utilities submitted comments. Liberty believes that the reasoning outlined in Draft Resolution E-4929 is flawed in that it ignores key findings of the upgrade Decision including reducing dependence on the Kings Beach Diesels and the failing Brockway Substation. The Liberty Utilities comments provide no new findings and essentially reiterate Liberty’s position in its AL 64-E-A filing. Therefore, the Liberty comments are non-substantive.

FINDINGS

1. The Commission approved D.15-03-020 on March 27, 2015. D. 15-03-025 approved the construction of the North Tahoe System Upgrade Project in three phases, and approved Phase 1 for immediate construction. D.15-03-020 ordered the approval for Phases 2 and 3 will be dependent upon a new and accurate network study demonstrating that the peak load target threshold of 89 MW had been reached, and further, that at the 89 MW peak load level, construction of Phase 2 was necessary to mitigate system criteria violations.
2. D.15-03-020 ordered Liberty CalPeco to file a Tier 2 Advice Letter with Energy Division when the system peak load reached 89 MW with a new network study attached demonstrating that the peak load threshold had been reached, that the load growth is not from outside the system, and to accurately document that system violations would occur at the 89 MW demand level, and that the violations could be mitigated by Phase 2 construction.
3. D.15-03-020 ordered Energy Division to evaluate the new Liberty CalPeco network study to ensure that accurate, documentable, and justified “trigger points” for Phases 2 and 3 were established. D.15-03-020 recommended that technical assistance from an existing Energy Division contract be used, if necessary. Ultimately, Energy Division was provided technical assistance by the California Energy Commission’s Siting Transmission & Environmental Protection Division.
4. On October 14, 2016 Liberty CalPeco filed AL 64-E which contained a new network study by Ascension documenting that the 89 MW threshold had been met and requesting approval from the Commission for Phase 2 construction.
5. On November 3, 2016 NTCAA protested AL 64-E alleging amongst other things, that the Ascension network study manipulated fundamental assumptions. And specifically, the Ascension Study modeled the NTS in an emergency state with the Kings Beach diesel generators producing zero real power (MW) and either severely reduced or no reactive power (MVAR).
6. On November 10, 2016 Liberty CalPeco responded to the NTCAA protest of AL 64-E arguing that AL 64-E met the three primary preconditions that D.15-03-020 required for commencement of construction of Phase 2.
7. On January 5, 2017 Energy Division staff issued a data request to Liberty CalPeco seeking amongst other things, North Tahoe System 2016 winter peak load data.
8. On July 20, 2017 Energy Division received the first CEC Staff Assessment of the Network study included in Liberty Utilities (Liberty CalPeco Electric) LLC Advice Letter 64-E.
9. The CEC Staff Assessment found that the Liberty CalPeco North Tahoe System has reached the designated 89 MW peak load trigger identified in D.15-03-020. The CEC Staff Assessment concluded that at the 90.5 MW level the North Tahoe System did not experience reliability criteria violations that required mitigation by Phase 2 of Line 650 Upgrade Project.
10. CEC staff evaluated operating the Kings Beach diesel backup generators at incremental levels of 2 MW, 4 MW, and 6 MW and concluded that incremental use of the existing

- diesel generation could solve contingency issues identified in the Ascension Network Study.
11. On August 18, 2017 the Commission issued Draft Resolution E-4883 to address the NTCAA protest of AL 64-E. Draft Resolution E-4883 denied Liberty CalPeco authority to construct Phase 2 of the Line 650 Upgrade Project by upholding the protest of NTCAA.
 12. On August 23, 2017 Energy Division served the CEC Staff Assessment and supporting technical files on parties to the proceeding.
 13. On September 25, 2017 and again on September 27, technical calls were held to discuss measurement issues associated with the Ascension Study.
 14. On September 28, 2017 Liberty CalPeco submitted the first of two Ascension Study Addendums correcting deficiencies identified by CEC staff.
 15. On October 16, 2017 Liberty CalPeco submitted comments on Draft Resolution E-4883.
 16. On October 30, 2017 Liberty CalPeco submitted the second of two Ascension Study Addendums correcting deficiencies identified by CEC staff.
 17. On November 21, 2017 CEC staff submitted the second of two CEC Staff Assessments of the Ascension Study, finding that the use of incremental diesel generation and/or capacitors could mitigate all criteria violations occurring on the North Tahoe System.
 18. On February 22, 2018 Liberty CalPeco submitted AL 64-E-A to supplement AL 64-E.
 19. On March 15, 2018 NTCAA protested AL 64-E-A.
 20. Liberty CalPeco failed to identify new and accurate peak load “triggers” for Phase 2 and 3 approvals as required by D.15-03-020.
 21. Liberty CalPeco omitted an important North Tahoe System component, the Kings Beach diesel backup generation from the network study.
 22. The Protest of NTCAA is valid.

THEREFORE IT IS ORDERED THAT:

1. The request of Liberty CalPeco for approval to construct Phase 2 of the North Tahoe Upgrade Project is denied without prejudice.
2. The protest of NTCAA is upheld.
3. Liberty CalPeco should seek approval for the Line 650 Upgrade Project Phase 2 and/or Phase 3 in a formal proceeding - when Liberty CalPeco has completed a new network study which complies fully with D.15-03-020 by identifying and documenting new and accurate North Tahoe System peak load “trigger” points for Phase 2 and 3 Commission approvals. Liberty CalPeco should analyze potential benefits of the Line 650 Upgrade Project Phase 2 to NVE ratepayers and describe an appropriate distribution of costs between Liberty CalPeco and NVE. Additionally, Liberty CalPeco should analyze any new technologies that have the potential to reduce North Tahoe System load peaks.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held August 23, 2018; the following Commissioners voting favorably thereon:

ALICE STEBBINS
Executive Director

State of California

California Natural Resources Agency

M e m o r a n d u m

To: Mary Jo Borak
2017

Date: July 20,

California Public Utilities Commission
Energy Division
505 Van Ness Ave.
(916) 654-4026
San Francisco, CA 94102

Telephone:

From: Deputy Director: SHAWN PITTARD
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Energy Commission Staff Assessment of the Network Study
Included in Liberty Utilities (CalPeco Electric) LLC Advice Letter 64-E

Attached is the Energy Commission staff assessment of the Network Study included in Liberty Utilities (CalPeco Electric) LLC Advice Letter 64-E performed at the request of CPUC staff.

Liberty California Pacific Company, LLC (Liberty CalPeco) is a privately owned utility that provides electric services to the California portion of the Lake Tahoe/Truckee region. In 2015 the CPUC approved Phase 1 of a three phase transmission upgrade project and required submittal of an advice letter showing that specific conditions had been met before proceeding with Phase 2 and Phase 3. These conditions included evidence that Liberty CalPeco's electric loads had reached certain trigger points and network studies showing that, when electric loads reached the trigger points, there would be reliability issues that Phase 2 and Phase 3 would resolve. Advice Letter 64-E is Liberty CalPeco's submittal requesting approval to proceed with Phase 2. CPUC staff requested Energy Commission staff assistance in reviewing Advice Letter 64-E and specifically the network study included in the letter.

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**ENERGY COMMISSION STAFF ASSESSMENT OF THE NETWORK STUDY
INCLUDED IN LIBERTY UTILITIES (CALPECO ELECTRIC) LLC ADVICE
LETTER 64-E**

Introduction

On May 23, 2017 Liberty Utilities requested that the California Public Utilities Commission (CPUC) seek the assistance of the California Energy Commission (Energy Commission) staff for the evaluation of the network study included with the Liberty Utilities California Pacific Electric Company (CalPeco) LLC (Liberty CalPeco) Advice Letter 64-E filed October 1, 2016. Liberty CalPeco submitted Advice Letter 64-E in order to proceed with Phase 2 of the 625 and 650 Line Upgrade Project (Upgrade Project). The CPUC approved the Upgrade Project on March 27, 2015, but separated the approval into three phases. Liberty CalPeco was permitted to proceed with Phase 1 in 2015, but in order to proceed with Phase 2 and Phase 3, Liberty CalPeco was required to submit Advice Letters with the CPUC's Energy Division. The approving order required that the advice letter for Phase 2 show that Liberty CalPeco's peak load was approaching an 89 megawatt (MW) "trigger point" and include a new network study that verified the need for the project at the projected peak load. Liberty CalPeco's Advice Letter 64-E provides an analysis of peak loads and a new network study as required by the CPUC order. In order to complete the processing of Liberty CalPeco Advice Letter 64-E, the CPUC Energy Division requested the Energy Commission review the new network study and convey the conclusions back to CPUC Energy Division. The purpose of this report is to convey those conclusions.

To perform the assessment, Energy Commission staff reviewed the Liberty CalPeco Advice Letter 64-E and other relevant documents, which include:

1. Appendix P4 ("Response to February 14 North Tahoe Citizen Action Alliance (NTCAA)⁸ Comments and Supporting Documents") to the Final EIS/EIS/EIR⁹ (September 2014)
2. CPUC Decision 15-03-020 (March 26, 2015)

⁸ North Tahoe Citizens Action Alliance (NCTAA)

⁹ Environmental Impact Statement (EIS), Environmental Impact Report (EIR)

3. Liberty CalPeco Advice Letter 64-E (October 14, 2016)
4. NTCAA Protest Letter (November 3, 2016)
5. Liberty CalPeco Reply to the NTCAA Protest Letter (November 10, 2016)
6. Liberty CalPeco Data Response to the CPUC Energy Division Data Request 1 (November 10, 2016)
7. Liberty CalPeco Response to the CPUC Energy Division Data Request 2 (January 5, 2017)
8. Liberty CalPeco Advice Letter 75-E (March 3, 2017)
9. NTCAA Protest Letter (March 22, 2017)
10. Liberty CalPeco Letter to CPUC President Picker (May 23, 2017)
11. NCTAA Letter to CPUC President Picker (June 5, 2017)
12. Power Flow data from Liberty Utilities (June 7, 2017)
13. Western Electricity Coordinating Council (WECC) 16HW3a1 PSLF¹⁰ base case

Energy Commission staff completed essentially a four-part analysis: (1) review of North Lake Tahoe Transmission System loads; (2) review of the Ascension Power Engineering network study; (3) an evaluation of whether or not the diesel generators at Kings Beach could be used to mitigate high line loading identified in the network study; and (4) an evaluation of a transmission mitigation alternative to issues identified in the network study.

Energy Commission staff's conclusions are presented at the end of this report following the four-part analysis.

¹⁰ Positive Sequence Load Flow (PSLF). This is the name of the transmission simulation software developed by General Electric (GE) and is often referred to as PSLF or GE PSLF. "16HW3a1" is a naming convention used by the WECC for the data sets developed for use in the PSLF model, and this is a 2016, heavy winter load case.

North Lake Tahoe (NLT) Transmission System Loads

In addition to the peak load information found in the relevant documents listed above, Energy Commission staff also searched for load data submissions Liberty CalPeco may have submitted to the Energy Commission. However, Energy Commission staff found that because Liberty CalPeco has a peak load less than 200 MW, the utility is not required to file peak load data with the Energy Commission. As a result, Energy Commission staff relied solely on the peak load information found in the relevant documents listed above.

The documents listed above indicate that, based on actual metered loads from the 2015/2016 and 2016/2017 winter seasons, the NLT Transmission System had actual coincident peak loads of 88.7 MW and 90.4 MW, respectively, as measured at eight substation load measuring points. This comprises Liberty CalPeco load at the Squaw Valley, Tahoe City, Brockway, Northstar, Glenshire and Truckee substations, and non-Liberty CalPeco load at the Martis Valley (Tahoe Donner Public Utility District load only) and Truckee (both Tahoe Donner Public Utility District load and NV Energy load) Substations. These are actually coincident peak loads based on substation meter reads, not forecasts. Thus, in the winter season prior to submittal of Advice Letter 64-E, the NLT Transmission System had experienced a coincident peak load of 88.7 MW and soon thereafter experienced a coincident peak load of 90.4 MW (the latter as reported in Liberty CalPeco Response to Energy Division Data Request 2 dated January 5, 2017). Based on these submittals, it is reasonable to conclude that the 89 MW “trigger point” described in CPUC Decision 15-03-020 has been reached.

The Energy Commission staff then examined whether the 89 MW threshold actually triggers reliability criteria violations that can be mitigated by the Upgrade Project. Energy Commission staff also considered this load information in light of the stipulation in CPUC Decision 15-03-020 that Liberty CalPeco must verify that load growth outside of its own system is not the basis for the “trigger points.” Both Advice Letter 64-E and the Liberty CalPeco response to Energy Division Request 2 indicate that any load growth between the 2011 study numbers and the 88.7 MW and 90.4 MW actual peak loads is attributable to Liberty CalPeco loads. Furthermore, the non-Liberty CalPeco loads actually dropped during this same time period.

Energy Commission staff observed that the coincident peaks for the 2015/2016 and 2016/2017 winters had significant differences in the proportional amount of the peak loads across the substations comprising the NLT Transmission System. For example, during the coincident peak hour cited for the 2015/2016 winter, the loads at the Squaw Valley and Tahoe City substations were 13.3 MW and 25.2 MW, respectively; while the loads at these same two substations during the

coincident peak hour cited for the 2016/2017 winter were 20.2 MW and 17.9 MW. In other words, the load at the Tahoe City substation was high relative to the Squaw Valley Substation in one year, but in the subsequent year this load relationship was reversed. While Energy Commission staff does not attempt to explain this difference, the record does indicate that the peak load at any individual substation does not necessarily coincide with the time of the coincident system peak. It is also important to point out that this difference in the distribution of coincident peak loads between the two years causes different power flow results on each line between the two years.

Review of the Ascension Power Engineering Network Study

Advice Letter 64-E included a network study completed by Ascension Power Engineering (“Ascension”). Ascension reported that the model it developed for the study was derived from the 2016-2017 heavy winter WECC base case. Energy Commission staff received the model from Liberty CalPeco through a request submitted to Energy Division staff. Separately, Energy Commission staff downloaded the relevant cases from WECC. This enabled Energy Commission staff to verify how the Liberty CalPeco model was derived. Energy Commission staff found that the Ascension study did not make significant changes to the WECC base case outside of changes in the peak load for the Liberty CalPeco system.

Energy Commission staff reviewed Ascension’s network study results of the NLT Transmission System with Phase 1 installed and metered loads from the 2015/2016 coincident peak (88.7 MW). Ascension found three system issues under contingency (N-1) conditions. Energy Commission staff verified these results using the power flow base case provided by Liberty CalPeco, and conducted other power flow simulations using this same base case and the GE PSLF program.

One issue identified by Ascension – a transformer overload at the North Truckee substation due to the loss of line 132 (North Truckee-Martis 120 kV line) – was not sufficient for Ascension to recommend the Upgrade Project.¹¹

A second issue identified by Ascension was low voltage (0.888 per unit) at the Tahoe City substation due to the loss of the Squaw Valley – Tahoe City 60 kV

¹¹ Ascension states that the transformer is not owned by Liberty CalPeco, but is owned and operated by NV Energy. Ascension further states that Liberty CalPeco is not in control of nor do they have the ability to specify operational limits of the transformer. This leads Ascension to not recommend a system improvement based on this N-1 situation.

line. This represents a criteria violation (i.e., voltage must be at least 0.90 per unit but not greater than 1.05 per-unit). In its report (page 16, third paragraph, first sentence), Ascension seems to cite this as a justification for the Upgrade Project (“Therefore, even at the 2015 peak of 88.7 MW, Phase 2 is needed.”). Energy Commission staff agrees that this criteria violation requires mitigation and that, for this power flow case, the Upgrade Project will mitigate the violation.

The third issue identified by Ascension is the loading on the Truckee – Squaw Valley 60 kV line, which is loaded to 98.9-percent of its winter rating due to the loss of the North Truckee – Martis 120 kV line. Although Energy Commission staff notes that this does not constitute a criteria violation, Ascension cites this result as a justification for the Upgrade Project by arguing that when the 2015/2016 winter coincident peak of 88.7 MW is escalated by an annual growth rate of one-percent, the 89 MW trigger would be exceeded in the 2016/2017 winter. In other words, Ascension is suggesting that the loading on the Truckee – Squaw Valley 60 kV line is expected to increase sufficiently in the 2016/2017 winter to justify the Upgrade Project. It is unclear whether Ascension actually ran this case. It is also worth noting that this conclusion is based on the proportional distribution of loads from the 2015/2016 winter coincident peak and Energy Commission staff found a different result when the proportional distribution of coincident peak loads from the 2016/2017 winter is used (see later discussion).

In general, the Liberty CalPeco NLT Transmission System appears robust. **Table 1** shows the loadings on the major facilities under the worst N-1 condition for each particular facility. Outside of the Truckee-Squaw Valley 60 kV line that is heavily loaded under an N-1 outage, none of the other facilities is heavily loaded, even under the worst contingency for that facility. For example, the Truckee - Northstar 60 kV line is the highest loaded line under N-1 conditions and it is only loaded to 68-percent of its rated winter capacity. Because the rest of the NLT Transmission System was not close to overloading, further analysis focused on impacts to the three issues: loading on the Truckee transformer, loading on the Truckee – Squaw Valley 60 kV line and the voltage at the Tahoe City substation.

Table 1
Maximum Loading on NLT Transmission Facilities Under N-1 Conditions

#	Transmission Facility	Maximum Loading Under N-1 Condition (Plot A in MW)	% Loading	Line Outage (contingency)
1	North Truckee 120/60kV transformer	78	105.5%	North Truckee-Martis 120kV line (#132)
2	Squaw Valley 120/60kV transformer	48.5	64.9%	North Truckee 120/60kV transformer
3	North Truckee-Martis 120kV line (#132)	70.4	31.3%	North Truckee 120/60kV transformer
4	Martis-Squaw Valley 120kV line (#132)	62.8	43.2%	North Truckee-Martis 120kV line (#132)
5	North Truckee-Truckee 60kV line (#621)	77.7	67.2%	North Truckee-Martis 120kV line (#132)
6	Truckee-Squaw Valley 60kV line (#609)	39.5	98.9%	North Truckee-Martis 120kV line (#132)
7	Squaw Valley-Tahoe City 60kV line (#629)	48.3	66.8%	Northstar-Kings Beach 60kV line (#650)
8	Kings Beach-Tahoe City 60kV line (#625)	26.1	37.9%	Squaw Valley-Tahoe City 60kV line (#629)
9	Northstar-Kings Beach 60kV line (#650)	39.2	55.3%	Squaw Valley-Tahoe City 60kV line (#629)
10	Truckee-Northstar 60kV line (#650)	49.7	68%	Squaw Valley-Tahoe City 60kV line (#629)

Load Sensitivity Analysis

Energy Commission staff escalated the 2015/2016 winter coincident peak loads by one-percent (only Liberty CalPeco loads were escalated) as documented below in **Table 2** and used these loads to create a new power flow case.¹²

¹² Only real power loads were escalated and not reactive power loads.

Table 2
Liberty CalPeco 2015/2016 Coincident Peak Loads Escalated by 1%

Entity	Load Description	2015/2016	Escalated by 1%
Liberty CalPeco	Squaw Valley	13.3 MW	13.4 MW
	Tahoe City	25.2 MW	25.5 MW
	Brockway	12.3 MW	12.4 MW
	Northstar	9.2 MW	9.3 MW
	Glenshire	2.5 MW	2.5 MW
	Truckee (Liberty CalPeco loads only)	6.7 MW	6.8 MW
	Subtotal Liberty	69.2 MW	69.9 MW
TDPUD	Martis Valley (TDPUD)	7.6 MW	7.6 MW*
	Truckee (TDPUD load only)	10.5 MW	10.5 MW*
NV Energy	Truckee (NV Energy)	1.4 MW	1.4 MW*
	Subtotal Others	19.5 MW	19.5 MW*
	Total North Lake Tahoe Transmission Load	88.7 MW	89.4 MW

* No change

Using this case, Energy Commission staff found that, while the loading on the Truckee – Squaw Valley 60 kV line increased to 99.8-percent of the winter rating following the loss of the North Truckee – Martis 120 kV line, it did not overload.¹³ It is interesting to note that although the 89 MW “trigger” would be exceeded, the loading on this line does not cause a criteria violation requiring mitigation by the Upgrade Project. This result is contrary to that predicted by Ascension. However, the other two issues still remain. These results are summarized in **Table 3**.

Table 3
Comparing Facility Loading Between 2015/2016 Loads and with 1% Escalation

Transmission Element	2015/2016 Loading	w/ 1% Escalation	Contingency
North Truckee Transformer	79.1 MVA ¹⁴ (105.5%)	79.7 MVA (106.3%)	North Truckee - Martis 120 kV line
Truckee – Squaw Valley 60 kV line	39.5 (98.9%)	39.8 MW (99.8%)	North Truckee - Martis 120 kV line
Tahoe City Substation voltage	53.29 (0.888 per-unit)	53.19 (0.887 per-unit)	Tahoe City – Squaw Valley 60 kV line

¹³ Energy Commission staff modified the line rating of the North Truckee – Martis 120 kV line to match the line rating in Appendix C of the Ascension network study.

¹⁴ Mega-Volt Amepere (MVA)

Energy Commission staff then created a sensitivity case to ascertain whether the differing proportional loads across the NLT transmission system from the 2016/2017 coincident peak would lead to a different result. To do this, Energy Commission staff modified Ascension’s power flow base case with the 88.7 MW peak by replacing the substation loads with those listed in the last column of Table DR2-2 from the Liberty CalPeco response to Energy Division data request 2, January 5, 2017.¹⁵ A comparison between the actual 2015/2016 and 2016/2017 coincident peak loads are provided in **Table 4**. Although there is only a 1 MW difference in NLT Transmission System loads between the case with the one-percent escalation of 2015/2016 loads (89.4 MW) and the case with actual 2016/2017 loads (90.4 MW), Energy Commission staff nevertheless believed it worthwhile to examine any difference in the results due to the differing proportional loads.

Table 4
Comparison of Actual 2015/2016 and 2016/2017 Coincident Peak Loads

Entity	Load Description	2015/2016	2016/2017
Liberty CalPeco	Squaw Valley	13.3 MW	20.2 MW
	Tahoe City	25.2 MW	17.9 MW
	Brockway	12.3 MW	10.5 MW
	Northstar	9.2 MW	15.0 MW
	Glenshire	2.5 MW	2.5 MW
	Truckee (Liberty CalPeco loads only)	6.7 MW	7.0 MW
	Subtotal Liberty CalPeco	69.2 MW	73.0 MW
TDPUD	Martis Valley (TDPUD)	7.6 MW	6.6 MW
	Truckee (TDPUD load only)	10.5 MW	9.3 MW
NV Energy	Truckee (NV Energy)	1.4 MW	1.5 MW
	Subtotal Others	19.5 MW	17.4 MW
	Total North Lake Tahoe Transmission Load	88.7 MW	90.4 MW

Using this case, Energy Commission staff re-ran the same N-1 contingencies that created the issues noted by Ascension with the 2015/2016 loads.

Energy Commission staff found that the difference in the proportional distribution of loads between the two cases renders different results even though the difference in total load is minor. Increasing the loads in the Liberty CalPeco system to the 90.4 MW 2016/2017 peak actually reduced the loading for the three issues noted by Ascension. This appears to be caused by a shift in the substation loads, especially at the Squaw Valley and Tahoe City substations

¹⁵ Only real power loads were escalated and not reactive power loads.

(Squaw Valley loads increased by 6.9 MW and Tahoe City loads decreased by 7.3 MW). While the coincident system peak only increased by 1.7 MW, from 88.7 MW to 90.4 MW, there were much larger changes in the loads at specific substations. In other words, justification for the Upgrade Project appears to not be solely a function of the 89 MW “trigger,” but also of the proportional load distribution across the NLT Transmission System.

Table 5 compares the loading relative to the three issues noted by Ascension (Truckee Transformer, Truckee-Squaw Valley 60 kV, line and the voltage at the Tahoe City substation).

Table 5
Comparing Facility Loading with 2015/2016 Loads and 2016/2017 Loads

Transmission Element	2015/2016 Loading	2016/2017 Loading	Contingency
North Truckee Transformer	79.1 MVA (105.5%)	75.6 MVA (100.8%)	North Truckee - Martis 120 kV line
Truckee – Squaw Valley 60 kV line	39.5 (98.9%)	38.5 MW (96.2%)	North Truckee - Martis 120 kV line
Tahoe City Substation voltage	53.29 (0.888 per-unit)	56.05 (0.934 per-unit)	Tahoe City – Squaw Valley 60 kV line

It is important to note that there may be a fundamental shift in loads from the Tahoe City Substation to the Squaw Valley substation. The highest load seen at the Tahoe City Substation (non-coincident peak) in 2016/2017 was 21.1 MW, while in 2015/2016 Tahoe City had a peak load of at least 25.2 MW. The 2016 number is based on the January 5, 2017 Liberty Utilities Data Response 2, thus did not include all of the 2016/2017 winter season. However, the NLT system typically peaks during the Christmas and New Year holidays, which was included. This difference could be the result of a random annual load fluctuation or some other shift in loads from the Tahoe City Substation to the Squaw Valley Substation. If there has been a permanent shift in the way loads are served, the system issues identified in Ascension study are significantly improved.

Diesel Generation at Kings Beach

Ascension concluded that the six 2 MW diesel generators (12 MW total) at Kings Beach are not considered mitigation for N-1 contingencies in the network study. Ascension’s logic for drawing this conclusion is primarily tied to the view that, due to permit restrictions, Liberty CalPeco can only rely on the Kings Beach generation operating at maximum capacity for 60 hours per calendar year and that winter season outage duration in the NLT Transmission System will likely exceed 60 hours. Liberty CalPeco’s response to Energy Division Data Request 2 listed a number of outages between 1996 and 2005 that lasted longer than 60 hours.

Since each of the turbines has a 60-hour limit it is possible to run fewer than 12 MW for more hours. Thus, Energy Commission staff wondered whether the diesel generators at Kings Beach could in fact be used to lower the loading on the Truckee – Squaw Valley 60 kV line and the North Truckee – Truckee Transformer during an outage of the North Truckee – Martis Valley 120 kV line or whether or not the generators could be used to mitigate the low-voltage issue at the Tahoe City substation when the Tahoe City – Squaw Valley 60 kV line is out.

Energy Commission staff evaluated the impact of running the Kings Beach diesel generators in 2 MW, 4 MW and 6 MW increments using the 2015/2016 peak load case. Energy Commission staff network studies found that running 6 MW of diesel generation at Kings Beach could mitigate all three issues identified in the Ascension network study. Running as few as 2 MW of diesel generation at Kings Beach reduces loading on the Truckee – Squaw Valley line and solves the low voltage issue at the Tahoe City Substation. At least 6 MW of diesel generation at Kings Beach is required to prevent the overload of the Truckee transformer. Liberty CalPeco would be able to use as many as 6 MW for up to 120 hours. These results are summarized in **Table 6**.

Table 6
Loading NLT Transmission Facilities Under N-1 Conditions
With the Diesel Generators at Kings Beach using 2015/2016 loads

Transmission Element	Base Case	2 MW at Kings Beach	4 MW at Kings Beach	6 MW at Kings Beach	Contingency
North Truckee Transformer	79.1 MVA (105.5%)	77.1 MVA (102.8%)	75.7 MVA (100.9%)	73.9 MVA (98.5%)	North Truckee - Martis 120 kV line
Truckee – Squaw Valley 60 kV line	39.5 MVA (98.9%)	38.6 MVA (96.2%)	37.9 MVA (94.2%)	37.2 MVA (92.3%)	North Truckee - Martis 120 kV line
Tahoe City Substation voltage	53.29 (0.888 per-unit)	54.29 (0.905 per-unit)	54.68 (0.911 per-unit)	55.05 (0.918 per-unit)	Tahoe City – Squaw Valley 60 kV line

Truckee - Squaw Valley 60 kV Line Reconductoring Alternative

The Truckee – Squaw Valley 60 kV line is comprised of two segments. One segment is 8.3 miles long and is built with 1/0 copper conductor, which is the lowest rated conductor on the Liberty CalPeco NLT Transmission System (40 MVA winter rating). The second segment is 1.24 miles long and uses 397.5 AA (all-aluminum) conductors (75 MVA winter rating). The 397.5 AA conductor is used for all the 60 kV lines in the NLT Transmission System modeled in the Ascension network study except for the 8.3 mile segment of the Truckee-Squaw Valley 60 kV line.

Energy Commission staff evaluated the impact of replacing the 1/0 copper segment of line 609 with 397.5 AA conductor relative to the three issues identified in the Ascension network study. Specifically, Energy Commission staff analyzed whether the conductor replacement would sufficiently reduce loadings on the North Truckee transformer or the Truckee – Squaw Valley 60 kV line or whether it improved the low-voltage issue at the Tahoe City Substation. Energy Commission staff selected the 2015/2016 peak load case because the loading on

the Truckee – Squaw Valley 60 kV line was actually loaded higher in this case than it was in the 2016/2017 peak load case.

Energy Commission staff found that replacing the 8.3 mile 1/0 copper segment of line 609 with 397.5 AA conductor does result in improvements relative to the three issues identified in the Ascension network study, but does not mitigate all criteria violations. Specifically, the loading on Truckee – Squaw Valley 60 kV drops from 98.9-percent to 58.2-percent; the Truckee transformer loading drops from 105.5-percent (79.1 MVA) to 103-percent (77.2 MVA), but is still a criteria violation; and, the voltage at the Tahoe City substation increases from 0.88 per-unit to 0.89 per-unit, but is still a criteria violation as it does not meet required minimum operating level of 0.90 per-unit. These results are summarized in **Table 7**.

Table 7
Comparing Facility Loading with Truckee – Squaw Valley Reconductor

Transmission Element	2015/2016 Loading	With Reconductor	Contingency
North Truckee Transformer	79.1 MVA (105.5%)	77.2 MVA (103.0%)	North Truckee - Martis 120 kV line
Truckee – Squaw Valley 60 kV line	39.5 (98.9%)	43.7 MW (58.2%)	North Truckee - Martis 120 kV line
Tahoe City Substation voltage	53.29 (0.888 per-unit)	53.41 (0.890 per-unit)	Tahoe City – Squaw Valley 60 kV line

Energy Commission staff notes that the Final Environmental Impact Report considered, but did not evaluate, replacing the conductor on line 609 because it did not solve the reliability issues the 625 and 650 Line Upgrade Project was designed to address.¹⁶ However, we note that this decision was apparently based on the original network study by ZGlobal. The Energy Commission staff network study indicates that replacing the 8.3 miles of 1/0 copper conductor on line 609 solves the primary reliability issue that Ascension cited in the justification for Phase 2 of the Upgrade Project. Energy Commission staff has not evaluated the environmental or costs of replacing the conductor for this line.

¹⁶ Energy Commission staff also notes that Paul Scheurman in his *Report of Findings Re: Need for Upgrade of North Lake Tahoe Electric Transmission System* dated 3/24/2014 states, "However, given the environmental constraints and sensitivities associated with the 609 line outlined in the September 2012 *North Lake Tahoe Electric Transmission System Upgrade Scoping Document* prepared by Tri Sage Consulting, as well as the remoteness of the line it appears impractical to reconductor this line."

Energy Commission Staff Conclusions

1. The NLT Transmission System load has reached the 89 MW “trigger point” as demonstrated by the coincident peak measured on 12/24/16 (per Table DR2-2 from the Liberty CalPeco response to Energy Division data request 2, January 5, 2017). However, justification for the Upgrade Project appears to not be solely a function of the 89 MW “trigger,” but also of the proportional load distribution across the NLT Transmission System. Both a one-percent escalation of 2015/2016 coincident peak loads as well the 2016/2017 coincident peak loads results in cases exceeding 89 MW. However, the results do not demonstrate that both cases have criteria violations requiring mitigation by the Upgrade Project.
2. The network study performed by Ascension and submitted by Liberty CalPeco found network issues under contingency conditions that are apparently mitigated by the Upgrade Project, based on the proportional load distribution that occurred during the 2015/2016 coincident winter peak.
3. Energy Commission staff evaluated whether operating the diesel generators at 2 MW, 4 MW and 6 MW could solve the contingency issues identified in the Ascension network study and found that 2 MW would reduce loading on the Truckee – Squaw Valley 60 kV line and would solve the low voltage issue at the Tahoe City Substation. In order to mitigate the overload on the Truckee transformer, 6 MW are needed.
4. Energy Commission staff evaluated an alternative, replacing the copper conductor on the Truckee – Squaw Valley 60 kV line (line 609). From a network perspective, this alternative does solve the primary system issue (high loading on the Truckee – Squaw Valley 60 kV line) that was used to justify Phase 2 of the Upgrade Project in the Ascension network study. We have not evaluated the environmental impacts or costs of this option.