



April 25, 2023

Neil Miller  
VP Transmission  
California Independent System Operator Corporation  
250 Outcropping Way  
Folsom, CA

Subject: Alternative to the CAISO proposed Trout Canyon – Lugo 500 kV transmission line

Mr. Miller:

The California Independent System Operator Corporation’s (“CAISO”) Draft Transmission Plan dated April 3, 2023, identifies a preferred solution to the Lugo – Victorville 500 kV Area Constraint, the proposed Trout Canyon – Lugo 500 kV transmission line, and an alternative solution considered for mitigating that constraint, the Eldorado – Lugo 500 kV No.2 Line. The two proposed transmission solutions have identified cost estimates of \$1.5-2 billion and \$2.1 billion, respectively. Lotus Infrastructure Global Operations, LLC (“Lotus”), formerly Starwood Energy Group Global, Inc. (“Starwood Energy”) respectfully submits this letter to request the CAISO to immediately consider an additional project alternative that will mitigate the issues for this constraint at materially lower cost and materially lower project execution risk: Mead - Adelanto Project Upgrade (“MAP Upgrade Project” or “Project”).

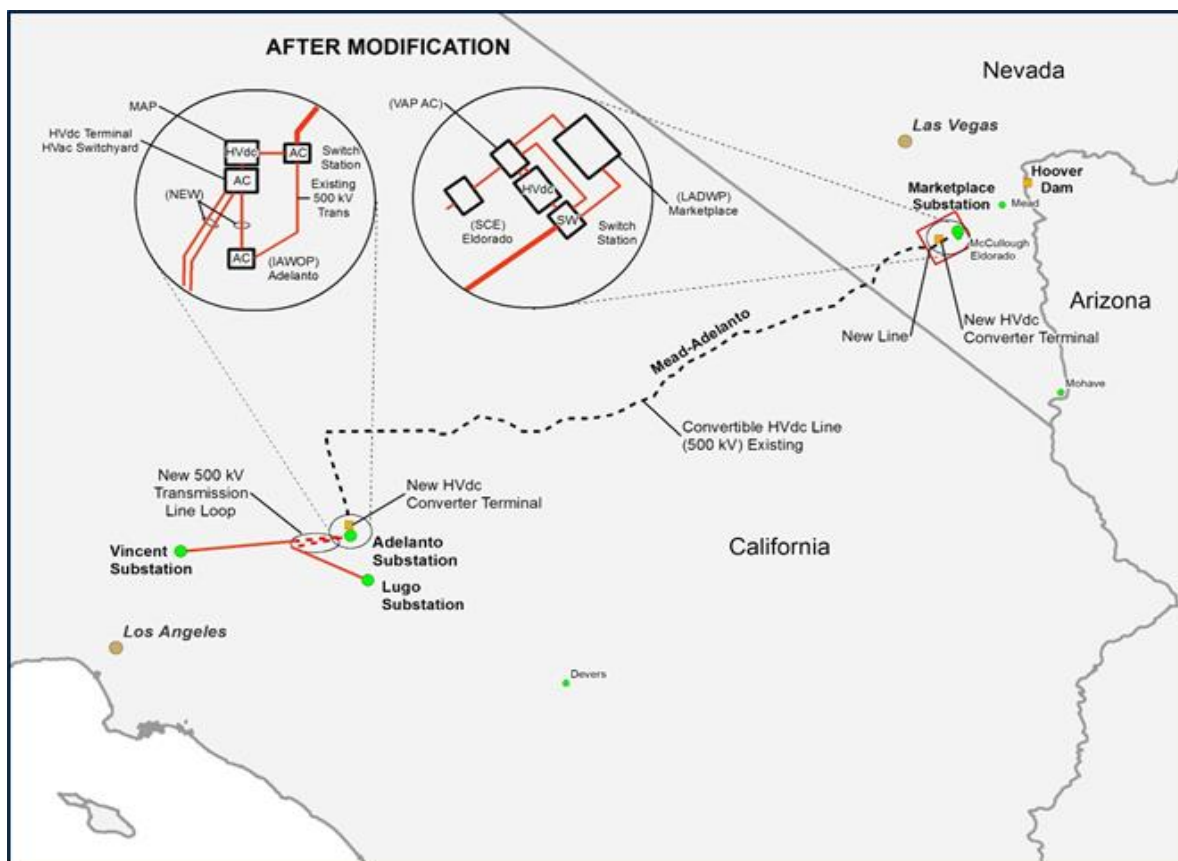
#### Project Description

The MAP Upgrade Project involves the conversion of the MAP transmission line from its existing High-Voltage Alternating Current operation (“HVAC”) to High-Voltage Direct Current (“HVDC”) operation, increasing capacity from 1,291 MW AC to 3,500 MW DC.

#### Project Scope

The MAP Upgrade Project can achieve the projected increase in capacity at a materially lower cost than alternatives by primarily leveraging existing assets. The Project would use existing conductors, towers, and insulators, and as such, no significant modifications would be required to the existing 202 miles of MAP transmission facilities. Using the existing transmission facilities as the foundation, the Project requires the construction of two HVDC converter terminals: one near the Marketplace Substation in Southern Nevada and the second near the Adelanto Substation in Southern California. The Project also requires some modifications/upgrades to the existing transmission facilities external to this line to improve system reliability and to integrate the new transmission capacity into the transmission system. These upgrades include (i) an approximately 1.5 mile HVAC line from the Marketplace converter station to the Eldorado Substation, (ii) two approximately 17-mile single circuit HVAC lines connecting the 500 kV AC bus at the Adelanto converter station to the existing Vincent-Lugo 500 kV lines and (iii) one additional short 500 kV

HVAC line each from the AC buses at each converter station to the Marketplace and Adelanto substations, respectively.



Please note that Starwood Energy had previously submitted this MAP Upgrade to the CAISO as a proposed TPP Open Window in 2014 and in 2015.

Benefits of the proposed MAP Upgrade Project

The MAP Upgrade Project will result in providing 2,200 MW of additional **controllable** transmission capacity between Southern Nevada and Southern California. HVDC lines will be critical in the face of rising renewables and the resulting pattern of over and under production on the CAISO grid. The MAP Upgrade Project has minimal environmental impact, with the increased transmission capacity associated with this project being achieved without requiring any significant modification/upgrades to the 202 miles of existing MAP transmission facilities. In addition, the physical footprint of the two converter stations is relatively small, at approximately 60 acres per-station, and the total length of the new required transmission line corridor is less than 25 miles. The MAP Upgrade Project will have a small environmental foot print and will take much less time to permit and construct.



The increased transmission capacity associated with the MAP Upgrade Project will facilitate the delivery of energy from new renewable resources (solar, wind and geothermal), as well as from highly economical and environmentally friendly gas-fired resources from the generation-rich Eldorado region (Boulder City, Nevada) and VEA service area to the heart of Southern California, thereby facilitating California in satisfying its Renewable Portfolio Standard targets as well its Greenhouse Gas and carbon emission goals. With the TransWest Express project moving forward, the MAP Upgrade Project would be the ideal solution for delivering Wyoming wind through Southern Nevada into California.

In short, the MAP Upgrade Project is the lowest cost and least environmentally intrusive east-to-west transmission expansion project available to be implemented in a timely manner in this region.

The Lotus team contends that the MAP Upgrade Project is a superior alternative to the CAISO proposed projects:

1. The projected costs of the Trout Canyon – Lugo 500 kV Line and the El Dorado – Lugo #2 500 kV Line noted above are significantly more costly than the MAP Upgrade Project projected costs. Therefore, on a cost basis, these alternative projects are not competitive with the MAP Upgrade Project. As such, the MAP Upgrade Project will assist the CAISO in achieving its goal in the most economic manner.
2. The MAP Upgrade Project not only provides all the benefits of the proposed project alternatives in the Draft Transmission Plan, but it provides *superior* benefits due to its larger effective increase in transfer capacity derived from the project's ability to control power flow independent of the parallel AC line flows so that flow does not change during AC line outage conditions. Specifically, the MAP Upgrade Project will increase the transfer capability from the Eldorado area to Southern California by 2,200 MW, an amount significantly greater than a 500 kV AC line's capability of about 1,200 to 1,600 MW (the existing Eldorado-Lugo and Mohave-Lugo 500 kV lines' allocated transfer capabilities are 1,102 MW each). The MAP Upgrade Project therefore optimizes the use of existing assets in this transmission corridor in a superior manner.
3. The MAP Upgrade Project is faster to construct and environmentally superior alternative because the primary asset supporting the capability increase is an existing transmission line asset rather than a new 180 mile (or longer) 500 kV transmission line over greenfield locations that would result in significant delays and more opposition in permitting for any new line crossing the Mojave Desert. Because the MAP Upgrade Project will be less onerous to permit from an environmental standpoint, it is likely to require less time to permit and construct than the Trout Canyon – Lugo 500 kV Line alternative that cannot be expected to be completed before 2033. The MAP Upgrade Project may also allow for project phasing to energize portions of the project sooner, an option that is not available with the other alternatives previously considered.
4. Based on Lotus's experience constructing the Ten West Link transmission line between Arizona and California, we believe the estimated costs for 180 miles of new 500 kV transmission line appears to be significantly lower than we would expect. Because the MAP Upgrade Project will require much less raw material to accomplish the same system objectives, the risk of budget overruns due to price inflation and other factors is lower because the cost basis of the Project is much lower.



5. This superior option may require certain modifications to the GLW/VEA Area Upgrades project scope as described in the Draft Transmission Plan to optimize use of local capacity, but those changes would be minor compared to the large overall cost savings and significant bulk system benefits associated with the MAP Upgrade Project.

For the reasons detailed above, Lotus respectfully requests CAISO's immediate attention in reviewing and considering the MAP Upgrade Project as a superior and simpler solution to other project alternatives for mitigating the Lugo – Victorville 500 kV Area Constraint from the multiple standpoints of cost, permitting, construction timing, capacity, and controllability. We request a discussion with key CAISO personnel regarding this Project at your earliest convenience to further discuss logistics related to considering this project.

Thank you for your assistance in this important matter. Please feel free to contact me at (408) 204-7630 or via email at [aamirali@lotuspartners.com](mailto:aamirali@lotuspartners.com) to set up a meeting between our teams.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ali Amirali", with a stylized flourish at the end.

Ali Amirali  
Senior Vice President  
Lotus Infrastructure Global Operations, LLC

cc: Robert Sparks (CAISO)  
Jeff Billinton (CAISO)  
Himanshu Saxena  
Jason Crew  
Anik Gandhi  
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