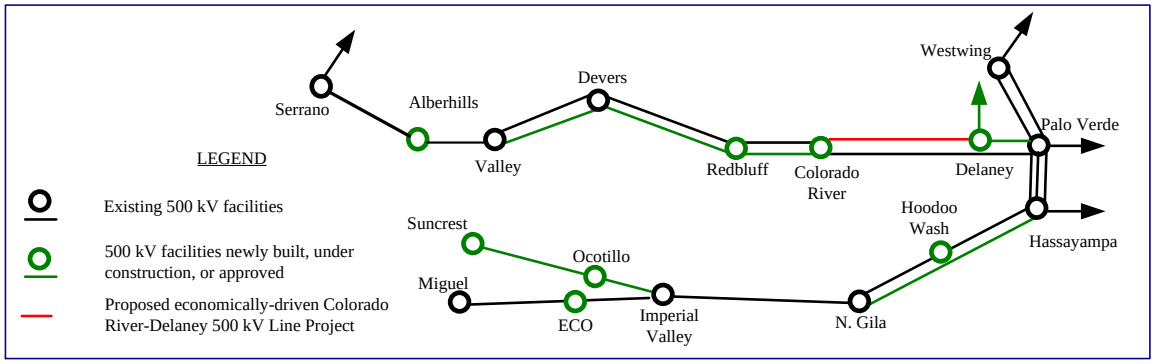
Delaney – Colorado River 500 kV Transmission Line Project Description, Key Selection Factors, and Functional Specifications for Competitive Solicitation

Description and Functional Specifications of Proposed Economically Driven Colorado River – Delaney 500 kV Line Project

Description

In the 2013-2014 Transmission Plan, the ISO has identified an economically-driven need for a 500 kV transmission line between SCE owned Colorado River 500 kV substation and APS owned Delaney 500 kV substation, as depicted below. Note: Delaney substation and the Delaney – Palo Verde transmission line are currently planned for construction.



The estimated cost of the proposed 500 kV line is $300 million in 2014 dollars. This estimated cost does not include facilities necessary at the Delaney and Colorado River substations that will be installed by the owners of those substations, because these facilities are not included in the scope of this competitive solicitation. This cost estimate does include the requisite transmission line series compensation, which is within the scope of the competitive solicitation scope.

Functional Specifications

Transmission Line Functional Specifications

Overhead Line Construction

Line Terminus 1: Colorado River Substation 500 kV Bus

Line Terminus 2: Delaney Substation 500 kV Bus

Nominal Phase to Phase Voltage: 500 kV

Minimum Line Continuous Ampacity - Summer: 3,800 Amps

Minimum Line Continuous Ampacity – Winter: 3,800 Amps

Minimum Line 4 Hour Emergency Ampacity – Summer: 5,200 Amps

Minimum Line 4 Hour Emergency Ampacity – Winter: 5,200 Amps

Minimum Line 30 Minute Emergency Ampacity – Summer: 5,600 Amps

Minimum Line 30 Minute Emergency Ampacity – Winter: 5,600 Amps

Approximate Line Impedance: (0.0012 to 0.0015) + j(0.027 to 0.033) pu (100 MVA base)

Maximum Line Resistance: 0.0015 pu (100 MVA base)

Approximate Line Length: 115-140 miles

Approximate Switched Shunt Line Reactor Capacity: 75 MVAR switched shunt reactor connected to the line at Colorado River terminal, 75 MVAR switched shunt reactor connected to the line at Delaney terminal. Note: the shunt reactors are not included in the scope of this competitive solicitation. The ISO expects that these will be part of the equipment installed in Delaney and Colorado River substations to terminate the line.

Approximate Series Compensation Level: 35% Total. Project Sponsor must include provisions to automatically bypass the series capacitor due to faults in the series capacitor. Project sponsor shall also include a means to isolate the series capacitor to facilitiate maintenance.

Location of Series Compensation: Approximately in the middle of the Colorado River-Delaney 500 kV line or equivalent compensation near the line termination station(s).

Minimum Series Capacitor Continuous Ampacity - Summer: 2,700 Amps

Minimum Series Capacitor Continuous Ampacity – Winter: 2,700 Amps

Minimum Series Capacitor 4 Hour Emergency Ampacity – Summer: 2,700 Amps

Minimum Series Capacitor 4 Hour Emergency Ampacity – Winter: 2,700 Amps

Minimum Series Capacitor 30 Minute Emergency Ampacity – Summer: 3,645 Amps

Minimum Series Capacitor 30 Minute Emergency Ampacity – Winter: 3,645 Amps

Latest In Service Date: May 1, 2020

Support Structures: Single circuit structures

Shield Wire Required: Optical ground wire (minimum 6 pairs of fibers)

Failure Containment Loading Mitigation (anti-cascade structures, etc.): Per applicable codes

Shield Wire Ground Fault Withstand Ampacity: Coordinate with interconnecting entities

Aeolian Vibration Control (Conductor and Shield Wire): Vibration dampers must be installed on all conductors and overhead shield wires, with the exception of slack spans.

Transmission Line Minimum BIL: 1,800 kV with solidly grounded systems

Minimum ROW Width: Per applicable codes

Route Requirement: The transmission solution was developed on the basis that route would meet the applicable NERC/WECC standard so that Part 1.1.1 of Section E. Regional Differences of Standard FAC 010-2.1 related to the common mode contingency does not apply to the Colorado River-Palo Verde and Colorado River-Delaney 500 kV lines. In response to a stakeholder comment, the ISO has reviewed this requirement, and agrees that alternatives that include multiple circuit structures can be included for review providing that the project sponsor provide the mitigation for meeting system performance requirements as provided by NERC/WECC reliability standards with no reduction in overall reliability. Further, the ISO will assess if this configuration reduces the net financial benefits of this economically-driven project. The ISO prefers a transmission solution that proposes sufficient spatial diversity that eliminates a common mode contingency.

Governing Design and Construction Standards: (GO 95, NESC Code, applicable municipal codes)

Additional Information

The economic justification for this project is dependent on its estimated cost, and as a result the CAISO will carefully consider binding cost caps and other cost containment measures, as well as cost management information.

The approved project sponsor will be responsible for the interconnection costs to terminate the new transmission line inside Delaney substation. These costs will be eligible for cost recovery in accordance with ISO tariff Section 26.1.

Key Selection Factors

The ISO has identified an economically driven need for a 500 kV transmission line between SCE owned Colorado River 500 kV substation and APS owned Delaney 500 kV substation. The key qualification criteria and selection factors as denoted in the ISO tariff are:

- 24.5.4 (a) – the current and expected capabilities of the Project Sponsor and its team to finance, license, and construct the facility and operate and maintain it for the life of the solution. (This key selection factor is important because this 500 kV transmission line will be a major component in the ISO's bulk transmission system).
- 24.5.4 (d) – the proposed schedule for development and completion of the transmission solution and demonstrated ability to meet that schedule of the Project Sponsor and its team; (This key selection factor is important because the economic benefits to ratepayers may decrease if the project goes into service later than May 2020).

- 24.5.4 (j) – demonstrated cost containment capability of the Project Sponsor and its team, specifically, binding cost control measures the Project Sponsor agrees to accept, including any binding agreement by the Project Sponsor and its team to accept a cost cap that would preclude costs for the transmission solution above the cap from being recovered through the CAISO's Transmission Access Charge, and, if none of the competing Project Sponsors proposes a binding cost cap, the authority of the selected siting authority to impose binding cost caps or cost containment measures on the Project Sponsor, and its history of imposing such measures. (This key selection factor is important because the justification for this project is based on economic benefits to ratepayers).