ITP Evaluation Process Plan

HVDC Conversion Project

June 14, 2018

The goal of the coordinated Interregional Transmission Project (ITP) evaluation process is to achieve consistent planning assumptions and technical data of an ITP to be used in the individual regional evaluations of an ITP. The joint evaluation of an ITP is considered to be the joint coordination of the regional planning processes that evaluate the ITP. The purpose of this document is to provide a common framework, coordinated by the Western Planning Regions, to provide basic descriptions, major assumptions, milestones, and key participants in the ITP evaluation process.

The information that follows is specific to the ITP listed in the ITP Submittal Summary below. An ITP Evaluation Process Plan will be developed for each ITP that has been properly submitted and accepted into the regional process of the Planning Region to which it was submitted.

ITP Submittal Summary

Project Submitted To:	California Independent System Operator (California ISO), WestConnect
Relevant Planning Regions[1]:	California ISO, WestConnect
Cost Allocation Requested From:	Not requested

The Relevant Planning Regions identified above developed and have agreed to the ITP Evaluation Process Plan.

1 ITP Summary

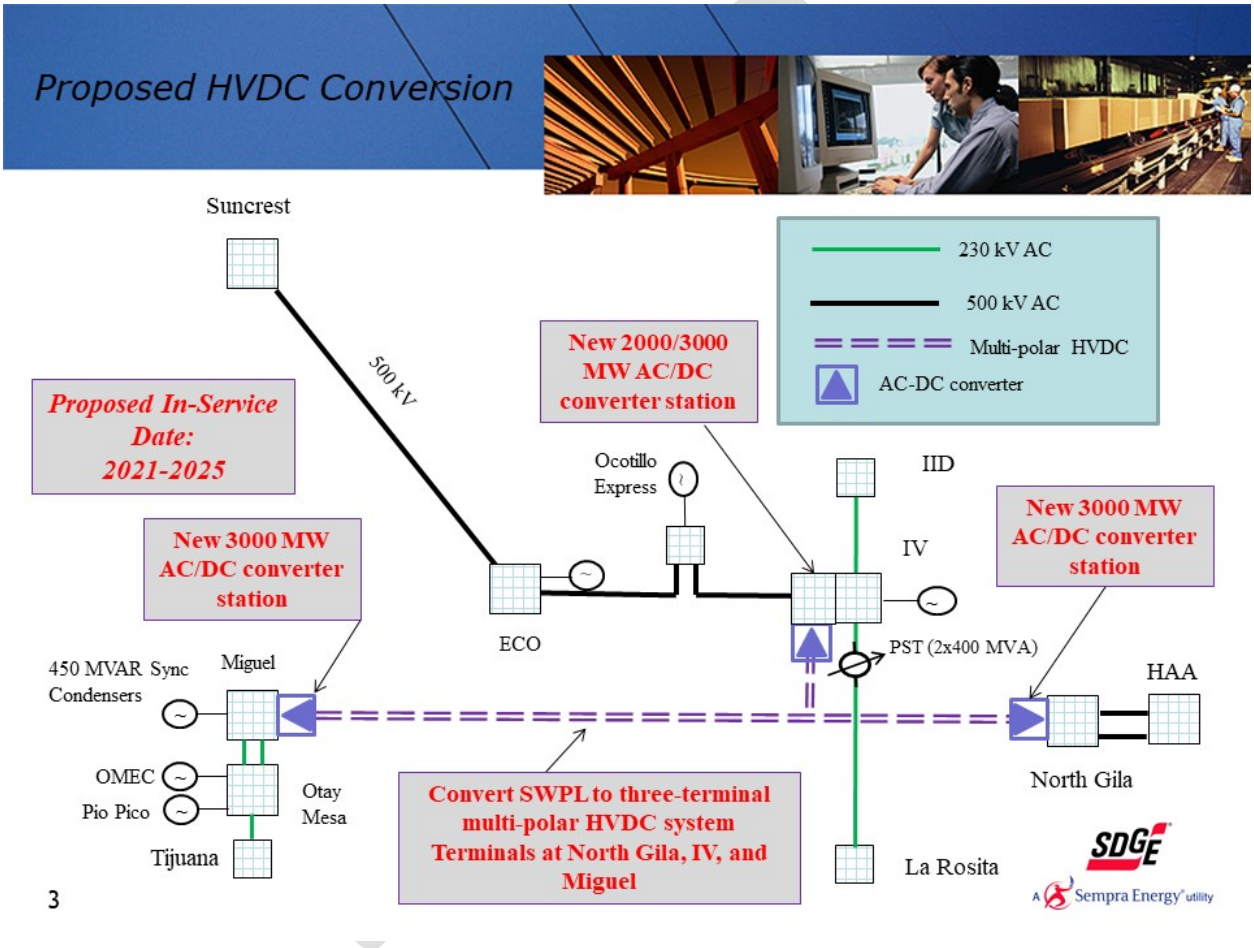
San Diego Gas and Electric (SDG&E) submitted the HVDC Conversion Project to WestConnect and the California ISO as an ITP. The proposed project would convert a portion of the 500 kV Southwest Powerlink (SWPL) to a multi-terminal, multi-polar HVDC system with terminals at North Gila (500 kV), Imperial Valley (500 kV), and Miguel Substations (230 kV). The proposed project is intended to optimize the transfer capability on existing infrastructure which SDG&E states will lead to significant interregional benefits such as solving an existing loop flow issue for

[1] With respect to an ITP, a Relevant Planning Region is a Planning Region that would directly interconnect electrically with the ITP, unless and until a Relevant Planning Region determines that the ITP will not meet any of its regional transmission needs, at which time it will no longer be considered a Relevant Planning Region.

multiple parties (APS, SDG&E, IID, and CENACE), reducing the interdependency of the southern West of River 500 kV system with IID's bulk power system, minimizing permitting and new ROW requirements, and integrating with newly installed synchronous condenser installations. SDG&E points out in their project submittal that all of the project's proposed changes and conversions would occur within existing rights of way and within or adjacent to existing substations. Therefore, environmental and permitting related impacts would be minimized.

A project map of the proposed project is shown in Figure 1.

Figure 1: Project Map
(Source: HVDC Conversion Project Summary)



2 ITP Evaluation by Relevant Planning Regions

The California ISO has been identified as the Planning Region that will lead the coordination efforts with the other Relevant Planning Regions identified for the ITP. In this capacity, the California ISO will organize and facilitate interregional coordination meetings and track action items and outcomes of those meetings. For information regarding the ITP evaluation conducted within each Relevant Planning Region's planning process, please contact that Planning Region directly.

Given that the joint evaluation of an ITP is considered to be the joint coordination of the regional planning processes that evaluate the ITP, the following describes how the ITP fits into each Relevant Planning Region's process. This information is intended to serve only as a brief summary of each Relevant Planning Region's process for evaluating an ITP. Please see each Planning Region's most recent study plan and/or Business Practice Manual for more details regarding its overall regional transmission planning process.

2.1 California ISO

The project sponsor states that the high voltage transmission path from Arizona through North Gila, Imperial Valley, Miguel/Suncrest, and the San Diego-area 230 kV system, has been the major path for transferring renewable energy into Southern California. Now, even more renewable generation to the east of Arizona will attempt to meet Southern California's 50% RPS goals, making the path even more stressed. The proposed project can improve and even remove certain regional reliability limitations. It can control pre-and post-contingency flow on the bulk power system in Southern California, including neighboring systems in the Imperial Valley (IID) and Baja California (CENACE); increase San Diego import capability by 500-1000 MW or more by mitigating worst N-1-1 contingency (Sunrise & SWPL); reduce San Diego, Greater Imperial Valley/San Diego, and Western L.A. basin local capacity needs; and increase the WOR and EOR path ratings; among other benefits

For the regional neighboring systems the project sponsor states that the proposed project can control both pre- and post-contingency loop flow through neighboring systems. This contributes to the project's ability to reduce overall system losses as well as the need for system upgrades in neighboring systems. The proposed project will also allow both the CAISO and neighboring balancing authorities greater flexibility in system operation and generation dispatch, particularly with regards to renewables (i.e. allowing balancing authorities in Arizona and Southern California to better align peak demand with peak renewable generation across a wider footprint) which would, when combined with the IV phase-shifting transformers (PSTs), also allow IID and CENACE substantial control over scheduled flows between CAISO and these neighboring balancing authorities.

The HVDC Conversion Project was submitted into the 2016-2017 interregional coordination cycle where the California ISO considered the proposed project in the context of California's 50% RPS goal where accessing out-of-state renewable resources for California was considered in the proposed project's assessment at a "high" or "cursory" level. The effort to perform an "informational" assessment of California procurement of out-of-state resources was concluded and documented in the 2017-2018 Transmission Plan[2].

California renewable procurement portfolios for the 2018-2019 transmission planning cycle were provided to the California ISO in early 2018 by the California Public Utilities Commission and provide direction that all renewable procurement to achieve the 50% RPS goal to be considered by the California ISO's planning process be obtained from within California. As such, the 2018-

[2] http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf

2019 planning process will consider the HVDC Conversion Project in the context of increasing San Diego import capability, reducing the San Diego and Greater IV/San Diego local LCR for contingencies studied to establish LCR requirements in the area, integrating with newly installed synchronous condenser installations to improve system voltage profiles within the California ISO region, and to consider the need for a continued reliance on the "Safety Net" load-shedding scheme. The California ISO will coordinate its studies with WestConnect and as appropriate, will jointly consider analysis results and develop recommendations and input refinements should further analysis be conducted in future study cycles.

The California ISO will develop the detailed modeling information for the GridView and GE PSLF computer programs and exchange that information with WestConnect commensurate with existing data confidentiality requirements.

2.2 WestConnect

WestConnect's 2018-19 Regional Study Plan was approved by its Planning Management Committee (PMC) in March of 2018.[3] The study plan describes the system assessments WestConnect will use to determine if there are any regional reliability, economic, or public policy-driven transmission needs. The models for these assessments are built and vetted during Q2 and Q3 of 2018. If regional needs are identified during Q4 of 2018, WestConnect will solicit alternatives (transmission or non-transmission alternatives (NTAs)) from WestConnect members and stakeholders to determine if they have the potential to meet the identified regional needs. If an ITP proponent desires to have their project evaluated as a solution to any identified regional need, they must re-submit their project during this solicitation period (Q5) and complete any outstanding submittal requirements. In late-Q5 and Q6 of the 2018-19 planning cycle, WestConnect will evaluate all properly submitted alternatives to determine whether any meet the identified regional needs, and will determine which alternative(s) provide the more efficient or cost-effective solution. The more efficient or cost-effective regional projects will be selected and identified in the WestConnect Regional Transmission Plan. Any regional or interregional alternatives that were submitted for the purposes of cost allocation and selected into the Regional Transmission Plan as the more efficient or cost-effective alternative to an identified regional need will then be evaluated for eligibility for regional cost allocation, and subsequently, for interregional cost allocation.[4]

WestConnect regional needs assessments are performed using Base Cases as identified in the regional study plan. Base Cases are intended to represent "business as usual," "current trends," or the "expected future". WestConnect may also conduct information-only scenario studies that look at alternate but plausible futures. In the event regional transmission issues are observed in the assessments of the scenario studies, these issues do not constitute a "regional need", will not result in changes to the WestConnect Regional Transmission Plan, and will not result in

[3] https://doc.westconnect.com/Documents.aspx?NID=18068&dl=1

[4] Please see the WestConnect Business Practice Manual for more information on cost allocation eligibility.

Order 1000 regional cost allocation. The WestConnect PMC has ultimate authority to determine how to treat regional transmission issues that are identified in the information-only scenario studies. They will determine whether an issue identified in a scenario —whether it be reliability, economic, or public-policy based—constitutes additional investigation by the Planning Subcommittee.

HVDC Conversion Project representatives and other stakeholders are encouraged to participate in the development of the Base Cases to be studied in WestConnect's 2018-19 Planning Cycle. These studies, as outlined in Figure 2, will form the basis for any regional needs that ultimately may lead to ITP project evaluations in 2019. Stakeholders are also encouraged to participate in the development of the scenarios identified in WestConnect's 2018-19 Study Plan. These studies are also outlined in Table 1.

Table 1: WestConnect 2018-19 Transmission Assessment Summary

10-Year Base Cases (2028)	10-Year Scenarios (2028)
Heavy Summer (reliability) Light Spring (reliability) Base Case (economic)	Load Stress Study (reliability) CAISO Export Stress Study (reliability)
May result in the identification of regional needs, requires solicitation for alternatives to satisfy needs	Informational studies that will not result in the identification of regional needs. Alternative collection and evaluation is optional and is not subject to regional cost allocation

3 Data and Study Methodologies

The coordinated ITP evaluation process strives for consistent planning assumptions and technical data among the Planning Regions evaluating the ITP. The Relevant Planning Regions have summarized, in Table 2, the types of studies that will be conducted that are relevant to the HVDC Conversion Project evaluation in each Planning Region. Methodologies for coordinating planning assumptions across the Relevant Planning Region processes are also described.

Table 2: Relevant Planning Region Study Summary Matrix

Planning Study	**California ISO**	**WestConnect**
Economic/Production Cost Model	Using the California ISO PCM Base Case, based on the WECC 2028 Anchor Data Set (ADS), GridView will be used to perform production cost simulation. All model information will	Regional Economic Assessment will be performed on WestConnect 2028 Base Case PCM (based on WECC 2028 Anchor Data Set

	be shared with WestConnect.	
Reliability/Power Flow Assessment	The GE PSLF will be used to perform steady state and as needed, transient analysis. The WECC 2028 ADS and 2028 LSP1 will be modified as needed to accurately model the California network and resources that reflects the ISO's finalized 2017-2018 transmission plan. The HVDC Conversion Project will be added to that model. All model information will be shared with WestConnect.	Regional Reliability Assessment will be performed on WestConnect 2028 Heavy Summer and Light Spring cases

Note that the HVDC Conversion Project evaluation will be conducted by each Relevant Planning Region in accordance with its approved Order 1000 Regional Planning Process. This includes study methodologies and benefits identified in planning studies.

4 Data Coordination

The Relevant Planning Regions will strive to coordinate major planning assumptions through the following procedures.

4.1 Economic/Production Cost Model

The Relevant Planning Regions intend to use the WECC 2028 Anchor Data Set (ADS) as the starting point data set for regional economic planning studies conducted in 2018 and 2019 (as applicable). Each Planning Region intends to update the 2028 ADS with their most recent and relevant regional planning assumptions to reflect its starting point transmission topology and generation data. The Planning Regions will strive to coordinate major updates made to the 2028 ADS as part of their regional model development efforts in late Q3, 2018.[5]

[5] This schedule is dependent on the 2028 Anchor Data Set being provided by WECC no later than the end of Q2, 2018, and the sharing of planning data or assumptions will be subject to applicable confidentiality requirements in each Planning Region.

As an example, the California ISO will update the 2028 ADS to reflect their most recent Transmission Plan.[6] NTTG will ensure that its prior Regional Transmission Plan[7] is reflected. WestConnect will represent their current Base Transmission Plan[8] and ColumbiaGrid will provide major updates to the 2028 ADS based on the information from the latest Biennial Plan[9] to other Planning Regions subject to each region's applicable confidentiality requirements.

Through this coordination of planning data and assumptions, the Relevant Regions will strive to build a consistent platform of planning assumptions for Economic/Production Cost Model evaluations of the ITP.

4.2 Reliability/Power Flow Assessment

Since each Planning Region reflects characteristics and a planning focus that is unique, different power flow models are generally needed to appropriately reflect each region's system and key assumptions. As such, each Planning Region will develop its models and data that accurately reflect their Planning Region, but will seek to coordinate this information with the other Relevant Planning Regions subject to applicable confidentiality requirements. The identification of the starting WECC power flow cases ("seed cases" for the purpose of this evaluation plan), and significant assumptions or changes a Planning Region may make to a seed base case are examples of information that will be considered by each Planning Region and coordinated with the other Planning Regions. As such, the inclusion or removal of major regional transmission projects will be coordinated through existing data coordination processes, but the season or hour of study and particular system operating conditions may vary by Planning Region based on its individual regional planning scope and study plan.

4.3 Cost Assumptions

In order for each Relevant Planning Region to evaluate whether the HVDC Conversion Project is a more efficient or cost-effective alternative within their regional planning process, it is necessary to coordinate ITP cost assumptions among the Relevant Planning Regions. For planning purposes, each Region's cost share of the HVDC Conversion Project will be calculated based on its share of the calculated benefits provided to the Region by the HVDC Conversion Project (as quantified per that Region's planning process). The project cost of the HVDC Conversion Project, as provided in their ITP Submittal form, is provided in Table 3.

[6] California ISO 2017-2018 Transmission Plan
[7] NTTG 2016-2017 Regional Transmission Plan
[8] WestConnect 2018-2019 Base Transmission Plan
[9] ColumbiaGrid Update to the 2017 Biennial Transmission Plan

Table 3: Project Sponsor Cost Information[10]

Project Configuration	Facilities	Cost ($) (in 2016 dollars)
AC-DC Converter Stations	Miguel, North Gila, and Imperial Valley	3 x $200 - $250 million
Ancillary Substation and Site Prep Work	Imperial Valley, North Gila, ECO, and Miguel Substations	$50 - $100 million
Transmission Line Modifications	Sunrise/ECO loop-in Imperial Valley Bypass	$50 million
	Total	$700 - $900 million

4.4 Cost Allocation

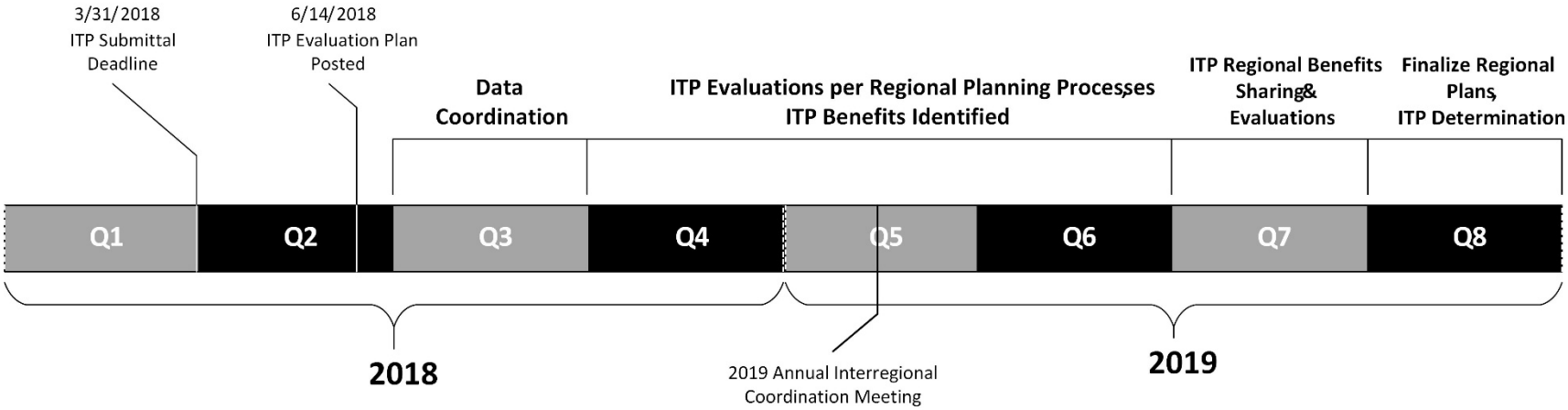
Interregional Cost Allocation does not apply for the HVDC Conversion Project for the 2018-2019 cycle. Cost Allocation was not requested from the California ISO or from WestConnect.

[10] This information is contingent upon verification by the Planning Regions and may be subject to change during the ITP evaluation process

5 Schedule and Evaluation Milestones

The ITP will be evaluated in accordance with each Relevant Planning Region's regional transmission planning process during 2018 and (as applicable) 2019. The ITP Evaluation Timeline, shown in Figure 2, was created to identify and coordinate key milestones within each Relevant Planning Region's process. Note that in some instances, an individual Planning Region may achieve a milestone earlier than other Regions evaluating the ITP.

Figure 2: ITP Evaluation Timeline



Meetings among the Relevant Planning Regions will be coordinated and organized by the lead Planning Region per this schedule at key milestones such as during the initial phases of the ITP evaluations and during the sharing of ITP regional benefits.

6 Contact Information

For information regarding the ITP evaluation within each Relevant Planning Region's planning process, please contact that Planning Region directly.

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