



California ISO
Shaping a Renewed Future

2012/2013 Conceptual
Statewide Transmission
Plan Update

2013/2014
Transmission
Planning Cycle

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Introduction

The development of the Conceptual Statewide Transmission Plan is pursuant to section 24.4.4 of the ISO tariff. The 2012/2013 Conceptual Plan is an update to the 2011/12 Conceptual Plan and will be used as an input into the 2013/2014 planning cycle as a part of the ISO's annual transmission planning process. The content drew largely on the past efforts of the California Transmission Planning Group ("CTPG") in which the ISO participates.

This conceptual plan takes a statewide perspective rather than focusing only on the ISO footprint. As such, it includes potential transmission upgrades or additions at a high level across the state needed to meet the state's goal of 33 percent renewable energy by 2020.

The ISO's current analyses indicates that this ISO conceptual statewide plan includes sufficient new transmission additions, both within the ISO footprint and in the footprints of certain other California balancing authority areas¹ as discussed below, to accommodate the addition of 32.1 TWh of renewable energy to serve California load by the year 2020. The ISO 2013/2014 transmission planning process will continue to assess the transmission infrastructure requirements within the ISO balancing authority area.

The purpose of this statewide conceptual plan is to ensure the simultaneous feasibility of the ISO's Comprehensive Transmission Plan and the transmission plans of other California BAAs, and coordinate planning with regional and sub-regional transmission planning processes and entities, including interconnected BAAs. As a result this conceptual statewide plan includes the transmission facilities the other California BAAs are contemplating for purposes of meeting 33 percent renewable goal. As described further in the next section, the ISO and these other entities have shared information regarding their planning efforts in the context of the collaborative activities of the CTPG. CTPG activities have currently been on hold as the regional entities have been working through the FERC Order 1000 requirements and assessing the role for an entity such as CTPG. Importantly, the transmission projects proposed for other BAAs have been or will ultimately be approved through their own transmission planning processes. Accordingly, the ISO is not seeking stakeholder comment regarding these non-ISO BAA projects nor will the ISO evaluate their merits. Rather, the ISO has included non-ISO BAA projects to provide a complete picture of how transmission projects within the ISO BAA fit into an overall statewide plan.

¹ There are five California Balancing Authorities: Sacramento Municipal Utility District (SMUD), Turlock Irrigation District (TID), Imperial Irrigation District (IID), Los Angeles Department of Water and Power (LADWP) and the ISO.

This conceptual statewide plan reflects the ISO's conceptual vision regarding the transmission upgrades and additions that may be needed within the ISO footprint based on, among other things, the ISO's base case assumptions, studies of several sensitivity scenarios, other studies and analyses that the ISO has previously discussed with stakeholders in the 2012/13 transmission planning cycle, as well as input from the CTPG and other planning processes. With the release of this conceptual statewide plan the ISO provides an opportunity for interested parties to submit comments and recommend modifications to the plan as it pertains to projects within the ISO BAA, including alternative transmission and non-transmission elements, potential interstate transmission lines and proposals for access to resources located in areas not identified in the plan.

Development of the ISO Conceptual Statewide Plan

The ISO developed this conceptual statewide plan by combining the results of the ISO's own planning studies performed under its Order 890 transmission planning process with the results of its collaborative work with the transmission planning entities participating in the CTPG². CTPG activities have currently been on hold as the regional entities have been working through the FERC Order 1000 requirements and assessing the role for an entity such as CTPG. In previous years, the ISO has used the current CTPG Statewide transmission plan in the development of the ISO Conceptual State Wide Plans. The most recent CTPG plan was posted on March 5, 2012 when the CTPG posted its 2011 Final CTPG California Statewide Transmission Plan (2011 CTPG Plan).

A primary goal of the 2011 CTPG Plan was to develop a conceptual statewide "least regrets" transmission plan, which individual CTPG members that are planning entities for their respective BAAs could consider and assess in greater detail as part of their own respective planning processes. Following the least regrets principle, the 2011 CTPG Plan updated the list of "high potential" and "medium potential" transmission elements identified in CTPG's 2010 transmission plans. The list of these high and medium potential transmission elements can be found in Table 3 of the CTPG's Plan.³

The 2011 CTPG Plan identifies in section 1.1 of the report areas of high potential and medium potential for transmission reinforcement to alleviate potential constraints. The report notes that CTPG is not a transmission or generation project decision-making body. Decisions relating to the addition of new transmission, generation or other actions for mitigating identified reliability standard violations will be made by project sponsors, by applicable BAs, and by regulatory entities with jurisdiction over those decisions.

³ http://www.ctpg.us/images/stories/ctpg-plan-development/2012/2012-03-05_2011finalstatewidetransmissionplan.pdf

In addition to the identified projects within the 2011 CTPG Plan, the ISO has also updated the transmission projects from the 2013 West Connect Annual Ten-Year Transmission Plan⁴, which includes the planning activities of SMUD, Transmission Agency of Northern California and the Imperial Irrigation District. The Los Angeles Department of Water and Power 2012 Ten-Year Transmission Assessment⁵ was also used to update the identified projects in Table 3.

The conceptual plan for the ISO BAA is based on the numerous studies and analyses conducted by the ISO, as well as inputs it has received from stakeholders. The majority of the present ISO plan consists of several transmission upgrades in the ISO BAA that are under development to access renewable generation in CREZs where substantial amounts of commercial development are already underway. The ISO conceptual statewide plan also includes some upgrades in the LADWP BAA intended to access renewable generation in the Tehachapi area. There are also several transmission upgrades in the IID BAA intended to access renewable generation in the Imperial County area. All of these projects plus several potential solutions to address three identified constrained areas within the ISO BAA constitute the ISO Conceptual Statewide Plan for the 2012/2013 planning cycle. Table 1 provides a comprehensive listing of the projects and needs that comprise this plan.

⁴ http://www.westconnect.com/final_reports_2013.php

⁵ http://www.oatias.com/LDWP/LDWPdocs/FINAL_2012_Ten-Year_Transmission_Assessment_12-18-2012_full_version.pdf

Table 1 – Projects Comprising the ISO 2012/13 Conceptual Statewide Plan

Balancing Authority	Area	Transmission
ISO	S. Nevada-East of Lugo area	Build Jasper 230 kV station. Build Coolwater – Jasper - Lugo 230 kV line.
ISO	S. Nevada-East of Lugo area	Build Primm 230 kV station. Rebuild existing 115kV Coolwater-Dunn Siding-Baker-Mountain Pass-Eldorado line to 230kV between Mountain Pass and El Dorado creating new 230kV Ivanpah-Primm No. 1 line and new 230kV Primm-El Dorado No. 1 line [EITP (Eldorado - Ivanpah 115 to 230 kV conversion)]
ISO	S. Nevada-East of Lugo area	Eldorado - Lugo 500 kV line loop-in to the new Pisgah 500 kV substation and
ISO	East of Palm Springs area	New Colorado River and RedBluff 500 kV substation, PVD 1 loop-in to Colorado River and RedBluff, and second Colorado River- RedBluff - Devers -Valley 500 kV line
ISO	East of Palm Springs area	West of Devers 230 kV reconductoring
ISO	Tehachapi area	Tehachapi Renewable Transmission Project
ISO	Tehachapi area	Add 500/230 kV transformer #2 and #3 at Whirlwind substation
ISO	Carrizo area	Build two new substations and loop Morro Bay - Midway #1 and #2 230 kV lines into them. Reconductor from Second station to Midway both circuits.
ISO	Bay Area	South of Contra Costa reconductoring
ISO	Path 15 area	Borden - Gregg 230 kV line reconductoring
ISO	Imperial County	Upgrades west of Mirage substation to increase transfer capacity on Path 42
ISO	Imperial County	Upgrades west of the Miguel 500 kV substation
ISO	San Joaquin Valley Area	Central California upgrade, including Gates 500/230 kV transformer Gates-Gregg 230 kV line, 230 kV reactor at Wilson for reliability in area and increase utilization of Helms pump storage facilities for integrating renewable energy resources
ISO	Imperial Valley Area	Imperial #3 transformer
ISO	Humboldt Area	Humboldt 60 kV upgrades
ISO	San Joaquin Valley Area	Warnerville-Bellota 230 kV line reconductoring
ISO	San Joaquin Valley	Wilson-Le Grand 115 kV line reconductoring

Balancing Authority	Area	Transmission
ISO	San Diego area	Sycamore – Penasquitos 230 kV line
ISO	SCE Area	Lugo – Eldorado 500 kV Line Re-route
ISO	SCE Area	Lugo – Eldorado series cap and terminal equipment upgrade
LADWP	Tehachapi area	Barren Ridge-Haskell 230kV Lines and Barren Ridge-Rinaldi 230kV Line (upgrade)
LADWP	Tehachapi area	230 kV conversion of existing 115 kV line between Haskell Canyon and Sylmar substations and relocate transformers from Olive to Haskell Canyon.
IID	Imperial County	Upgrades east of Mirage substation to increase transfer capacity on Path 42
IID	Imperial County	Midway – Geothermal Area; 230 kV Line Phase 2
IID	Imperial County	Dixieland-Imperial Valley Substation Transmission Project
IID	Imperial County	Highline Substation to El Centro Switching Station (ECSS) Transmission Project
IID	Imperial County	Imperial Valley Substation (IV Sub) to El Centro Switching Station (ECSS) Transmission Project.
IID	Imperial County	Ramon Substation, 225 MVA Transformer Replacement
IID	Imperial County	Coachella #2 230/92 kV Reconductoring Project
IID	Imperial County	North Gila – Highline, 230 kV Transmission Line
IID	Imperial County	Midway-Devers 500 kV Project

The projects listed in Table 1 provide a foundation plan for achieving a 33% RPS and can accommodate a wide range of different resource portfolios that vary with regard to the amounts of distributed generation, out-of-state renewable energy, and large-scale in-state renewable resources. Given this and the fact that there remains substantial uncertainty over renewable energy resource development throughout the state and broader western region, the ISO believes the projects and needs identified in Table 1 for the ISO BAA represent an adequate conceptual plan for now. The ISO BAA portion of this conceptual statewide plan, which is based on studies and analyses the ISO has conducted and assumptions the ISO has developed, consists of several major transmission projects that have been previously approved by the ISO and are fully permitted by the CPUC for construction, plus several transmission projects that the ISO’s interconnection studies have shown are needed to serve the interconnection customers for which those studies were done, but are still progressing through the approval process. Approving additional major transmission now would increase the risk of stranded investment. However, to the

extent the key assumptions behind this assessment change over the next planning cycle (2013/2014) and beyond, the ISO will reevaluate and modify the plan accordingly.

The next section of this report provides an overview of the ISO BAA and includes more information on the renewable transmission upgrades located in the ISO BAA that are included in this ISO conceptual statewide plan. Background and details on the non-ISO BAAs can be found in the 2011 CTPG Plan.

Details of the ISO Conceptual Statewide Plan

California ISO Balancing Authority Area

The California ISO BAA is the largest BAA in California and serves over 80 percent of the electricity demand in the State. Figure 1 is a diagram of the ISO BAA.

Figure 1 – Diagram of ISO Balancing Authority Area



The ISO BAA portion of this conceptual statewide plan consists of several major transmission projects that have been previously approved by the ISO and are fully permitted by the CPUC for construction, plus several transmission projects that the ISO’s interconnection studies have shown are needed to serve the interconnection customers for which those studies were done, but are still progressing through the approval process. These projects are set out in Table 2.

Table 2 – Summary of ISO Transmission Projects

Area	Transmission	Served CREZs	Renewable Deliverability Potential (MW)	ISO approval	CPUC approval	CTPG High potential
S. Nevada-East of Lugo area	Coolwater – Jasper - Lugo 230 kV line (Note 1)	Kramer/San Bernardino-Lucern	600	LGIA	Need to file CPCN	yes
S. Nevada-East of Lugo area	EITP (Eldorado - Ivanpah 115 to 230 kV conversion)	Mountain Pass	1400	LGIA	yes	yes
S. Nevada-East of Lugo area	Eldorado - Lugo 500 kV line loop-in to the new Pisgah 500 kV substation and Pisgah - Lugo 230kV to 500 kV conversion (Note 2)	Pisgah, Mountain Pass	1750	LGIA	Need to file CPCN	yes
East of Palm Springs area	New Colorado River and RedBluff 500 kV substation, PVD 1 loop-in to Colorado River and RedBluff, and second Colorado River-RedBluff - Devers -Valley 500 kV line	Riverside East, Palm Springs	4700	yes	yes	yes
East of Palm Springs area	West of Devers 230 kV reconductoring			Transition Cluster	Pending CPCN	yes
Tehachapi area	Tehachapi Renewable Transmission Project and Whirlwind #2 and #3 500/230 kV transformers	Tehachapi, Fairmont	5500	yes	yes	yes
Carrizo area	Build two new substations and loop Morro Bay - Midway #1 and #2 230 kV lines into them. Reconductor from Second station to Midway both circuits.	Carrizo South, Santa Barbara	900	Transition Cluster	yes	yes
Bay Area	South of Contra Costa reconductoring	Solano	300	Transition Cluster	Need to file CPCN or NOC	yes
Path 15 area	Borden - Gregg 230 kV line reconductoring	Westlands	800	Transition Cluster	Need to file CPCN or NOC	
Imperial County	West of Mirage (Path 42) Upgrades Note 3	Imperial	700	yes	Pending NOC	yes
Imperial County	West of Miguel Upgrades Note 3	Imperial	700	no		
San Joaquin Valley Area	Central California upgrade, including Gates 500/230 kV transformer Gates-Gregg 230 kV line, 230 kV reactor at Wilson for reliability in area and increase utilization of Helms pump storage facilities for integrating renewable energy resources	Westlands	N/A	Yes	No	No

San Joaquin Valley Area	Warnerville-Bellota 230 kV line reconductoring	Westlands	1500	Yes	No	No
San Joaquin Valley Area	Willson-Le Grand 115 kV line reconductoring	Westlands	1500	Yes	No	No
San Diego Area	Sycamore – Penasquitos 230 kV Line	1825		Yes	No	No
SCE Area	Lugo – Eldorado 500 kV line re-route	-	-	Yes	No	No
SCE Area	Lugo – Eldorado 500 kV series cap and terminal equipment upgrade	-	-	Yes	No	No

Notes:

In addition to the projects in Table 2, the ISO has identified other constraints that are expected to limit the delivery of renewable generation.

1. The CPUC has indicated to the ISO that alternatives will need to be considered in the course of the Coolwater-Lugo CPCN application process.
2. The Pisgah-Lugo project is in the CTPG Report and ISO 2011/2012 transmission plan and the generation triggering this upgrade remains in the ISO interconnection process. It was not being included in the 2012/2013 or 2013/2014 transmission planning base cases.
3. The ISO expects that renewable generation development in the Imperial County area will likely create the need for increasing the transfer capability between the Imperial Irrigation District (IID) and ISO systems in two places: across WECC Path 42, and west of the Miguel 500 kV substation. The upgrades related to WECC Path 42 were approved on May 18, 2011 by the ISO Board of Governors. Although the specific transmission facilities to address these constraints are not described here, the needs for these enhancements are part of this conceptual statewide plan.

The ISO will also continue discussions with CTPG members on the transmission paths between northern and southern California (WECC Path 15 and WECC Path 26) which will receive continued review in future planning studies.

Conclusions and Next Steps

The projects that comprise the ISO Conceptual Statewide Plan provide a foundation for achieving a 33% RPS and can accommodate a wide range of different resource portfolios that vary with regard to the amounts of distributed generation, out-of-state renewable energy, and large-scale in-state renewable resources. Given this and the fact there remains substantial uncertainty over renewable energy resource development throughout the state and broader western region, the ISO believes the projects and needs identified in Table 1 for the ISO BAA represent an adequate conceptual plan for now. These projects have either been approved or are currently in some stage of the approval process.

Approving more major transmission now would increase the risk of stranded investment. However, to the extent the key assumptions behind this assessment change over the next planning cycle (2013/2014) and as the CTPG completes future study plans or other regional planning studies are updated, the ISO will reevaluate and modify the conceptual plan accordingly for future ISO planning cycles.

Following the receipt of comments the ISO will utilize both the conceptual plan and the comments it receives as inputs to its continuing process to complete the 2013/2014 Comprehensive Transmission Plan for the ISO BAA. In determining which projects and additional elements should be included in the ISO comprehensive Transmission Plan, the ISO will not give undue weight or preference to the conceptual statewide plan or any other input in its planning process.