WESTCONNECT REGIONAL TRANSMISSION PLANNING

2018-19 PLANNING CYCLE

FINAL REGIONAL STUDY PLAN

APPROVED BY WESTCONNECT PMC ON MARCH 14, 2018

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Contents

1.0 Introduction

The first step of the WestConnect Regional Transmission Planning Process is the development of a Regional Study Plan which identifies the scope and schedule of the study work to be performed during the planning cycle. This document reflects the WestConnect Study Plan (Study Plan) for the 2018–19 planning cycle.

The WestConnect Planning Management Committee (PMC) has responsibility for all WestConnect regional planning activities. The planning process activities described within this Study Plan will be conducted under the direction of the PMC by the Planning Subcommittee (PS) with input from WestConnect Transmission Owners (TOs) and stakeholders as described in greater detail in subsequent sections of this document.

1.1 Process Background

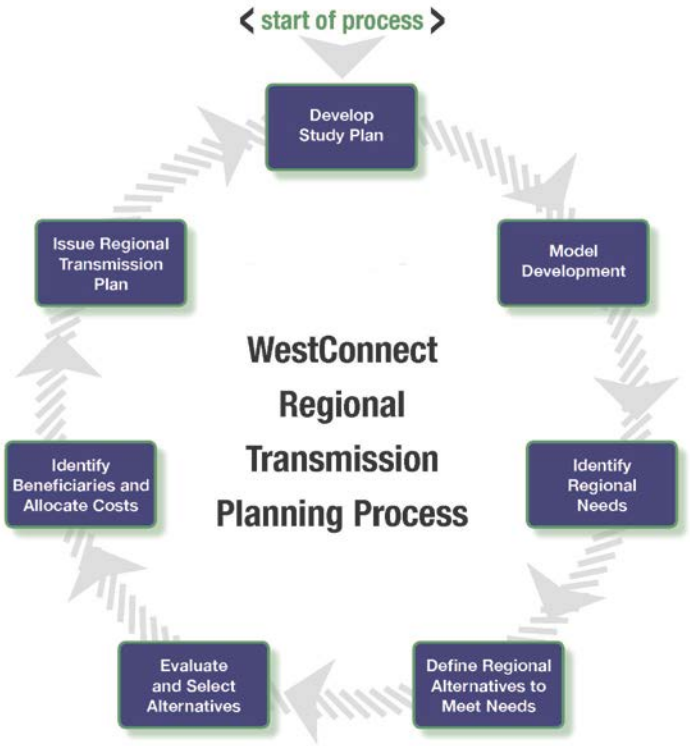
The WestConnect Regional Transmission Planning Process was developed for compliance with Federal Energy Regulatory Commission (FERC) Order No. 1000, Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, (Order No. 1000).[1] The planning process is performed biennially and consists of seven primary steps as outlined in **Figure 1**.

The WestConnect Planning Process is in conformance with Order No. 1000 as supplemented by numerous Compliance Filings and resulting FERC Orders. Readers can access the text of the compliance documentation on the WestConnect website,[2] and are encouraged to consult the compliance documentation and the WestConnect Business Practice Manual (BPM) for additional process information. Also, for TOs that are jurisdictional to the FERC, their FERC-approved tariff may preside over this document.

[1] *All references to Order No. 1000 include any subsequent orders*

[2] www.westconnect.com

Figure 1: WestConnect Regional Transmission Planning Process



The WestConnect Regional Transmission Planning Cycle (planning cycle) commences in even-numbered years, resulting in the development of a Regional Transmission Plan every other year. During the first year of the planning cycle, WestConnect performs system assessments to determine if there are any regional reliability, economic, or public policy needs. If regional needs are identified WestConnect will solicit alternatives (transmission or non-transmission alternatives (NTAs)) from WestConnect members and stakeholders to determine if they have the potential to meet any identified regional needs. WestConnect will then evaluate those alternatives to determine whether any alternatives meet the identified regional needs, and which alternatives provide the more cost-effective or efficient solution. The more efficient or cost-effective regional projects will be identified in the WestConnect Regional Transmission Plan. Any regional alternatives that were submitted for the purposes of regional cost allocation and selected into the Regional Transmission Plan may go through the cost allocation process if they are deemed to be eligible for regional cost allocation. During the last quarter of the process WestConnect will develop and finalize the Regional Transmission Plan (Regional Plan). The Regional Plan will describe the process used to identify regional needs, identify transmission facilities or NTAs selected as the more efficient or cost-effective regional solutions identified regional needs, and document why projects were included or not included in the Regional Plan.

Additional details of the WestConnect Regional Transmission Planning Process can be reviewed in the BPM, which is posted to the WestConnect website.[3]

[3] https://doc.westconnect.com/Documents.aspx?NID=17155

2.0 Overview of 2018–19 Regional Transmission Planning Activities

2.1 Schedule

Table 1 below provides an overview of the expected schedule of activities to be conducted as part of the 2018–19 planning cycle. This schedule is subject to change. Changes to the schedule of activities outlined below will be noticed on the WestConnect website, emailed to stakeholder lists, and discussed at committee meetings.

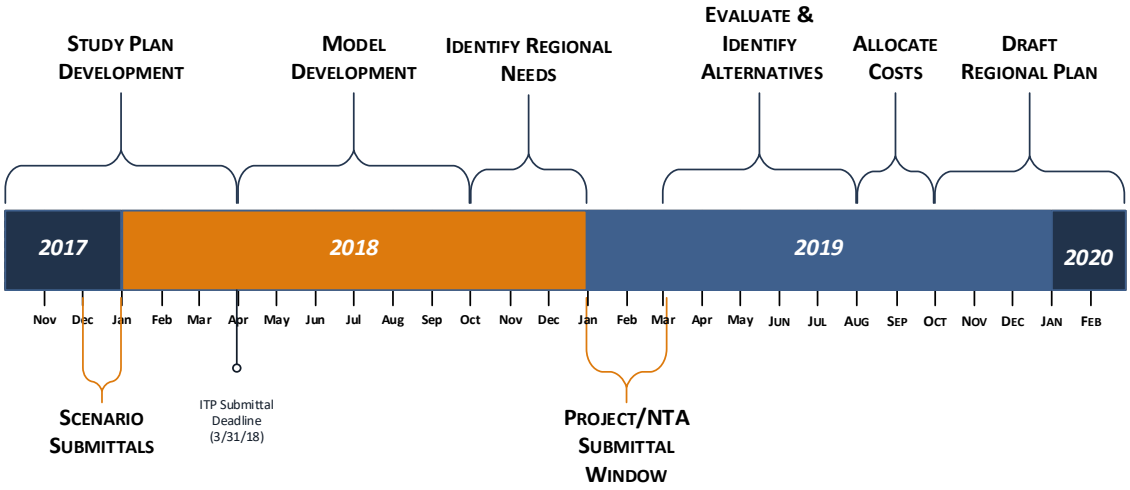
Table 1: Tentative Schedule for 2018–19 Regional Planning Cycle

Due Date	*Quarter*	*2018–2019 Activity*
February 16, 2018	Q1	Draft Regional Study Plan posted to WestConnect website
February 14, 2018	Q1	WestConnect Stakeholder Meeting to present draft Regional Study Plan
February 22, 2018	Q1	Interregional Coordination Meeting
March 14, 2018	Q1	Final Regional Study Plan approved by PMC
March 31, 2018	Q1	Interregional Transmission Project (ITP) submittal deadline[4]
September 2018	Q3	Regional models finalized
December 2018	Q4	Regional transmission needs posted to WestConnect website
December 2018	Q4	Stakeholder meeting to discuss identified regional needs
January 2019	Q5	Submittal window opens for projects to meet the posted regional needs. Submittal window lasts for no less than 30 days
September 2019	Q7	WestConnect posts listing of projects meeting an identified regional need selected for the purposes of cost allocation
November 2019	Q8	Draft Regional Plan posted to WestConnect website
November 2019	Q8	WestConnect meeting to discuss the draft Regional Plan with stakeholders
Two weeks following stakeholder meeting	Q8	Stakeholder comments on draft Regional Plan due to WestConnect
December 2019	Q8	Final 2018–19 Regional Plan posted to WestConnect website

[4] The timing of this ITP submittal deadline early in 2018, as opposed to after the PMC's identification of regional transmission needs, is driven by the fact that the four Western planning regions' coordination activities require, no later than March 31st, an identification of ITPs submitted into the regional processes of all relevant planning regions. For the WestConnect region, the PMC will not begin evaluating whether an ITP may satisfy an identified regional transmission need in the WestConnect region until after the PMC identifies regional transmission needs at year-end 2018.

The 2018-19 regional planning cycle timeline is shown in **Figure 2.**

Figure 2: 2018-19 Planning Cycle Timeline



2.2 Regional Needs Assessment Background

During Quarters 2 and 3 of the 2018–19 planning cycle, the models that are needed to perform the regional transmission assessments will be developed as described in this document. The PMC will conduct an assessment of the region's transmission needs in the 10-year timeframe, using models developed for year 2028. Three types of assessments will be performed during the planning process: reliability (steady state and/or transient), economic (production cost), and public policy. The public policy assessment will utilize the reliability and economic planning tools and models.[5] Cases from the Western Electricity Coordinating Council (WECC) will be used as seed cases and they will include the systems of all WECC TOs. These cases are used as the foundation for the models that WestConnect will develop and use for the regional transmission need assessments.

Members and participants will update the WECC models, as described in more detail below, to ensure the WestConnect footprint is properly represented.[6] To the extent WestConnect receives updated modeling data from TOs outside of the WestConnect planning region during the development of the regional models, it will be considered and, if appropriate, incorporated into the regional models. The PMC will approve the WestConnect models prior to their use in the regional needs assessment. The PMC will not evaluate regional transmission needs for systems outside of the WestConnect planning region.

After the PS completes the regional transmission assessments (as described in Sections 4.0, 5.0, and 6.0) for the studies included in the scope of this study plan, the PS will identify a list of transmission issues resulting from the studies, and make a recommendation to the PMC as to which, if any, regional issues should constitute economic, reliability, or public policy transmission needs. The process for identifying those regional transmission needs for which a regional transmission solution or solutions is sought and evaluated shall utilize various communication channels with stakeholders, including open PMC and PS

[5] *Other Public Policy assessment methodologies may be used at the discretion of the PMC.*

[6] *All parties participating in the model development process, and several other stages of the WestConnect planning process, are required to execute a non-disclosure agreement (NDA) with WestConnect. The agreement is located here: https://doc.westconnect.com/Documents.aspx?NID=17191*

meetings, stakeholder meetings, and the development of a Regional Transmission Needs Assessment Report (which will allow for stakeholder comment and input). This report will be delivered to the PMC for review and approval, and it will contain the PS's recommendation on regional transmission needs for the study cycle. The regional transmission needs will be finalized pending the PMC's approval of the report.

Study Area

The WestConnect planning process evaluates the regional transmission needs solely of the WestConnect planning region, which is defined as the combined footprints of signatories to the Planning Participation Agreement (PPA) within the TO Member Sector. TO Members participating in the WestConnect 2018–19 planning process and the systems considered in the regional transmission needs assessment include:

- Arizona Electric Power Cooperative, Inc.
- Arizona Public Service
- Basin Electric
- Black Hills Energy
- Colorado Springs Utilities
- El Paso Electric
- Imperial Irrigation District
- Los Angeles Department of Water and Power
- NV Energy
- Platte River Power Authority
- Public Service Company of New Mexico
- Sacramento Municipal Utility District
- Salt River Project
- Tucson Electric Company
- Transmission Agency of Northern California
- Tri-State Generation and Transmission
- Western Area Power Administration (Desert Southwest, Rocky Mountain, Sierra Nevada)
- Public Service Company of Colorado (Xcel Energy)

WestConnect does not conduct FERC Order 1000 regional transmission needs assessments for TOs that are not WestConnect members. The approximate footprint of member a TOs is shown in **Figure 3.**

Figure 3: Approximate Footprint of WestConnect Member TOs and Participating TOs

The following PMC Members from the Independent Transmission Developer Member Sector and Key Interest Group also participate in the planning effort:

- American Transmission Company
- Black Forest Partners
- Excelon
- Southwestern Power Group
- TransCanyon
- Western Energy Connection, LLC
- Xcel Western Transmission Company
- Natural Resources Defense Council

Local versus Regional Transmission Issues

For the purposes of the regional transmission needs assessment, a single-system need impacts only the TO-footprint in which it resides. Single TO transmission issues and non-member issues are not within the scope of the WestConnect regional transmission planning process, and are not considered regional transmission needs. However, for the sake of completeness and study transparency, the study process will include a review of all single-system transmission issues to ensure that in combination, none of the issues are regional in nature and/or co-dependent. Any single-system issues are the responsibility of the affected TO to resolve, if necessary.

Regional needs are generally defined by impacts to more than one Transmission Owner. However, the PMC may determine that in some instances, the multi-TO impacts are local, rather than regional, in nature. In such cases, WestConnect will provide an explanation as to how impacts are classified.

2.3 Opportunities for Stakeholder Involvement

The WestConnect regional planning process is performed in an open and transparent manner to attain objective analysis and results. WestConnect invites and encourages interested parties or entities to participate in and provide input to the regional transmission planning process at all planning process levels. Stakeholders also have opportunities to participate in and provide input to local transmission plans as provided for in each Member TO's OATT.

WestConnect planning meetings are open to stakeholders (with the exception of PMC closed sessions). Stakeholders' opportunities for timely input and meaningful participation are available throughout the WestConnect planning process. More specifically, WestConnect will accept and consider stakeholder comments on the following reports planned for the 2018–19 planning cycle:

- Study Plan;
- Model Development Report;
- Regional Needs Assessment;
- Alternative Evaluation (if applicable);[7]
- Cost Allocation (if applicable);[8]
- Regional Transmission Plan.

[7] *The Alternative Evaluation will only occur if a regional need is identified*

[8] *Cost Allocation will only occur if a project seeking cost allocation is identified and chosen as the more efficient or cost effective alternative to meet an identified regional need*

In addition, WestConnect will conduct at least two stakeholder meetings per year to update stakeholders on the planning process and collect input. Additional meetings may be scheduled as needed. Notice of all stakeholder meetings and stakeholder comment periods will be posted to the WestConnect website.

2.4 Interregional Coordination

WestConnect will coordinate planning data and information with the three other established Planning Regions in the Western Interconnection (California ISO, ColumbiaGrid, and Northern Tier Transmission Group) by:

- Participating in annual interregional coordination meetings;
- Distributing regional planning data or information such as:
  - Draft and Final Regional Study Plan
  - Regional Transmission Needs Assessment Report
  - List of Interregional Transmission Projects (ITPs) submitted to WestConnect
  - Assessments and selection of ITPs into Regional Plan
  - Draft and Final Regional Transmission Plan
- Sharing planning assumptions if and when requested and subject to applicable confidentiality requirements; and
- Participating in a coordinated ITP evaluation process, as necessary, when an ITP is submitted to WestConnect as an alternative to meet an identified regional need.

The process WestConnect intends to utilize to conduct its interregional coordination activities is described in the WestConnect Regional Planning Process BPM posted to the WestConnect website.[9]

Interregional Transmission Project Submittals

An ITP is defined in the common tariff language developed for the Order 1000 interregional compliance filings as a proposed new transmission project that would directly interconnect electrically to existing or planned transmission facilities in two or more planning regions and that is submitted into the regional transmission planning processes of all such planning regions. If an ITP proponent desires to have their project evaluated to meet an identified regional need, they must submit their project to WestConnect via the WestConnect Regional Project Submittal Form no later than March 31, 2018, at which time they do need not identify which regional transmission need the project proposes to address. ITP proponents can also have their project evaluated for inclusion in the Base Transmission Plan by participating in the process described in Appendix A.[10]

[9] http://www.westconnect.com/planning_order_1000_bpm.php

[10] *Additional details regarding the ITP submittal and evaluation process can be found in the WestConnect Business Practice Manual*

3.0 Base Transmission Plan

WestConnect creates the regional base transmission plan at the beginning of each planning cycle to establish the transmission network topology that is reflected in the regional planning models for the 10-year timeframe and evaluated in the regional needs assessments. The base transmission plan consists of the "planned" incremental transmission facilities included by TOs in local transmission plans,[11] as well as regional transmission facilities identified in previous regional transmission plans that are not subject to reevaluation.[12] It also includes any assumptions member TOs may have made with regard to other incremental regional transmission facilities in the development of their local transmission plans. "Conceptual" transmission projects are not included in the base transmission plan.

The base transmission plan may also include transmission projects under development by independent transmission companies (ITCs) in the WestConnect planning region, to the extent there is sufficient likelihood associated with these projects to warrant their inclusion in the base transmission plan. A description of the criteria used to identify projects for inclusion can be found in the WestConnect BPM.

The base transmission plan is developed using project information collected via the WestConnect Transmission Plan Project List (TPPL), which serves as a project repository for TO member and TO participant local transmission plans as well as ITC projects. The TPPL data used for the 2018–19 planning cycle was based on updates submitted as of January 26, 2018, with subsequent updates to the data made by members in the following weeks. The list of base transmission plan projects and details about the process used to identify the 2018–19 Base Transmission Plan are summarized in Appendix A and Appendix B.

3.1 Summarizing the 2018-19 Base Transmission Plan

As part of the planned activities for 2018, WestConnect intends to create summary information regarding the base transmission plan. The summary information will be developed using data in the TPPL and will include summary information regarding 2018-19 Base Transmission Plan, such as:

- Cost information;
- Line mileage information;
- Voltage information;
- State-level summaries;
- Information on how the 2018-19 Base Transmission Plan has changed as compared with the 2016-17 Base Transmission Plan, including a list of projects that have gone into service, new projects added to the Base Transmission Plan, and other summary statistics.

The base transmission plan summary information will be included in the 2018-19 Model Development Report, which is scheduled to be completed by the end of Q3, 2018. When the 2018-19 Regional Transmission plan describes the planned projects in the region, this summary information will be used and, if necessary, updated to include any additional regional projects selected into the plan as the more efficient or cost effective solution to a regional need.

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[11] Developed in accordance with Order No. 890 local planning processes

[12] There were no regional transmission projects identified to meet regional need(s) in the 2016-17 Planning Cycle

4.0 Regional Reliability Assessment

The regional reliability needs assessment will be performed on power flow models developed by WestConnect. The study cases to be used for the regional reliability assessment are summarized in **Table 2**, below.

Table 2: Power Flow Cases for Regional Reliability Assessment

WestConnect Base Case Name	Case Description	WECC Seed Case
2028 Heavy Summer	Summer peak load conditions during 1500 to 1700 MDT, with typical flows throughout the Western Interconnection.	2028 Heavy Summer (28HS1)
2028 Light Spring	Light load conditions with high wind and solar dispatch. Case includes new wind/solar *capacity* consistent with what is planned by TOs or required by enacted public policy.	2028 Light Spring (28LSP1)

The process and scope for regional model development the regional reliability assessment is described further in this section. The models will be developed during Quarters 2 and 3 of the planning cycle. The PMC will approve the regional power flow models and contingency list at the end of Q3 before they are used to assess regional reliability transmission needs. The regional reliability assessment will take place in Quarter 4.

4.1 Model Development Process

WestConnect will review and modify WECC seed cases[13] identified in this study plan through coordination with Subregional Planning Group (SPGs) and member TOs.[14] Each TO member in SWAT and SSPG will compile their updates and submit change files individually to WestConnect for compilation. TO members in CCPG will make updates and compile them into a single master change file for the subregion before submitting the data to WestConnect.

After collecting initial updates through the process described above, WestConnect will compile the regional power flow models through a phased approach:

1. Review and revise WECC power flow base case topology, including transmission lines, transformers, connectivity, reactive devices and corresponding power flow data. These changes do not include load magnitudes and resource levels or status.

2. Review and revise interchange flows and schedules, iterating between any loads and resources revisions.

3. Provide remedial action schemes (RAS) and contingency definitions based on modeled topology.[15]

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[13] The regional power flow models will be developed in a format accessible by users of either the GE PSLF or Siemens PTI PSS/E power flow applications.

[14] The WestConnect Subregional Planning Groups consist of the Southwest Transmission Planning Group (SWAT), the Sierra Subregional Planning Group (SSPG), and the Colorado Coordinated Planning Group (CCPG).

[15] When submitting contingencies, PSLF or PowerWorld users should use the WECC RAS and Contingency File Format while PSS/E users should use "CON" files or spreadsheet format.

The process utilized for model development, including coordinating with the WestConnect TO Members, independent transmission developers, and other stakeholders in the development of these cases, will be conducted and managed by the planning consultant at the direction of the Planning Subcommittee.

4.2 Key Assumptions

In developing the models for use in the regional reliability assessment, WestConnect must make a number of assumptions as it relates to generation, transmission, and load modeling. Descriptions of the assumptions that will be used in developing the study cases are provided below:

- **Transmission Assumptions –** Existing transmission system plus 2018-19 Base Transmission Plan, with TO members confirming the inclusion/exclusion of projects through the process described above.
- **Demand Forecasts –** Provided by TO member and embedded in WECC seed cases, specific to season and condition of study case. May be updated as necessary by TO members.
- **Generation Projects** – Existing and planned generation facilities.
- **Renewable Generation –** Existing and planned renewable generation, with sufficient generation modeled to meet any enacted public policy requirements.
- **Public Policy Requirements –** If not otherwise captured in renewable generation modeling, enacted public policies are to be reflected in the study cases.
- **Major Path Flows and Interchange** – Path flows and interchange will be established based on the generation, load, and system condition being modeled in the study case.
- **Operating Procedures** – Any special operating procedures required for compliance with NERC reliability standards will be considered and included in the power flow cases.
- **Protection Systems** – The impact of protection systems including RAS required for compliance with NERC reliability standards will be included in the power flow cases.
- **Control Devices and Reactive Resources** – Any special control devices or reactive resources will be included in the power flow cases, including shunt capacitors/reactors, static var compensators, synchronous condensers and other voltage control devices.
- **Contingency List** – Participants will provide the contingency list in the WECC RAS and Contingency Format (available in GE PSLF and PowerWorld Simulator). A list of contingencies to be studied will be developed by the TOs/SPGs and provided to the PMC concurrent with the final review of the base cases. The PS along with the PMC can add to the list if needed. To minimize flagging of local issues, contingencies will be limited to N-1 contingencies for elements 230-kV and above, generator step-up transformers for generation with at least 200 MW, and specific member-requested N-2 contingencies. If a participant provides justification as to why lower voltage contingencies might impact the system in a regional manner, the PS may decide to include those contingencies.

4.3 Study Methodology and Criteria

An assessment of the WestConnect regional power flow cases will be conducted to ensure the WestConnect planning region as a whole is in compliance with applicable North American Electric

Reliability Corporation (NERC) standards and WECC regional criteria for the 2028 planning horizon. The assessment will include steady state contingency analysis and transient stability analysis. The following standards and criteria are applicable for the assessment:

- Table 1 Planning Events from NERC TPL-001-4 Transmission System Planning Performance Requirements; [16] and
- WECC TPL-001-WECC-CRT-3.1 Transmission System Planning Performance. [17]

Transmission elements of 100 kV and above will be monitored for performance along with any Member specified lower voltage Bulk Electric System (BES) elements.

Steady State Contingency Analysis

Power flow contingency analyses will be performed for all power flow areas within the WestConnect planning footprint. More specifically, the assessment will evaluate performance of the regional system under Normal system conditions consistent (TPL Category P0) with normal ratings and voltage ranges and under certain emergency system conditions and planning event contingencies (TPL Category P1, P2, P4, P5 and P7) with appropriate post-contingency ratings and voltage range.[18]

Transient Stability Analysis

The transient stability performance of the regional system will be studied consistent with the standards and criteria provided above to identify any occurrences of under frequency load shedding, sufficient frequency recovery (e.g. undamped oscillations), and general instability (e.g., cascading trips). WECC criterion will be used to defined acceptable voltage recovery and system performance.

WestConnect members will be invited to submit specific contingencies for inclusion in the transient stability analysis. These contingencies will be limited to those that may have a regional impact, including but not limited to major generator and transmission trips with and without faults.

4.4 Regional Reliability Needs

When conducting the regional reliability assessment, violations of standards or criterion creating reliability issues that the PMC determines to be regional in nature will be identified as a regional reliability need. By definition, regional reliability needs are identified by reliability issues that impact more than one TO Member system. Specifically, in the event a simulated outage produces one or more NERC TPL violations in more than one member TO system, those violations may result in the identification of a regional reliability-driven transmission need.

If a single-system reliability violation is identified, the violation will be referred back to the appropriate TO for resolution. The affected TO will have an opportunity to identify mitigation for the violation, and new data will be accepted (or the violation will remain in the study results). The PS will review the mitigation and make a recommendation to the PMC to include the mitigation in the study. Upon approval by the PMC, the modeling for the mitigation will then be incorporated back into the regional

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[16] http://www.nerc.com/files/TPL-001-4.pdf

[17] https://www.wecc.biz/Reliability/TPL-001-WECC-CRT-3.1.pdf

[18] *P4, P5 and P7 contingencies are optional and must be volunteered by TO members*

power flow model. Single-system reliability violations typically do not cause a regional reliability-driven transmission need.[19] In the event a simulated outage produces NERC TPL violations in more than one TO Member's system, that violation will first be referred to the affected TOs and discussed with the PS to determine if the violation is local in nature. However, issues that impact more than one TO may result in the identification of a regional reliability-driven transmission need. Once finalized, regional reliability needs will be posted to the WestConnect website and described in the Regional Needs Assessment documentation.

5.0 Economic Assessment

The regional economic needs assessment will be performed using a production cost model developed by WestConnect. The cases to be used for the regional economic assessment is summarized in **Table 3**, below.

Table 3: Production Cost Model Case Summary

WestConnect Base Case Name	Case Description	WECC Seed Case
2028 Base Case	Business-as-usual, expected-future case with median load and hydro conditions and representation of resources consistent with enacted public policies.	WECC 2028 Anchor Data Set

The process used by WestConnect to develop the regional production cost model is described in the following section. The analysis used to perform the regional economic assessment is also included. The models will be developed during Quarters 2 and 3 of the 2018-19 planning cycle. The PMC will approve the regional economic model before it is used to assess regional economic transmission needs. The regional reliability assessment will take place in Quarter 4.

5.1 Model Development Process

The WECC 2028 Anchor Data Set (ADS) 10-year production cost model will be reviewed and updated by WestConnect during Quarters 2 and 3 of the 2018–19 planning cycle consistent with the process described below.

The PS will initiate and coordinate a review of the data and assumptions contained within the WECC ADS dataset by the WestConnect members, participants, and stakeholders. Once the data and assumptions have been reviewed by the TO Members, WestConnect will compile any changes submitted by the TO Members to create the 2028 Base Case production cost model. Once compiled, the Planning Subcommittee will perform a series of initial test and benchmarking studies with the goal of validating the output of the WestConnect 2028 Base Case. Comparisons with historical path flows, typical wind/solar operation, historical generator dispatch, and forward-looking resource and transmission projections will be performed at the discretion of the Planning Subcommittee to help vet the model results. Once the case has been vetted, the PMC will approve the regional model and direct the PS to

[19] *They may be certain exceptions, such as when a jointly owned contingency causes reliability issues in a single area*

finalize the regional economic assessment. The Planning Subcommittee will also develop and conduct sensitivities, as discussed in more detail in Section 5.3.

5.2 Key Assumptions

Specific data and assumptions to be reviewed by the TO Members will include, but are not limited to:

- In general, any changes needed to make data and assumptions consistent with the 2028 Heavy Summer and Light Spring cases described earlier in the Study Plan;
- Peak and energy demand forecasts for the planning horizon (including Energy Efficiency (EE) and Distributed Generation (DG);
- Incremental resources assumed to be used to meet load and public policy requirements within the planning horizon;
- Incremental transmission facilities modeled within the planning horizon (i.e., the PCM topology must be consistent with the base transmission plan and power flow model topology);
- Branch switching throughout the year;
- Fuel price assumptions including carbon;
- Unit operating characteristics; and
- Load, resource, and transmission bus assignments to balancing authorities.

5.3 Study Methodology and Criteria

To evaluate the potential for regional economic needs in the WestConnect planning footprint, WestConnect identifies congested elements through forward-looking production cost modeling. Using results from base case model runs and sensitivities, the PS will review metrics such as congested hours and congestion cost for regional transmission elements greater than 100 kV and WECC transfer paths (or other defined interfaces in the WestConnect footprint) along with any Member specified lower voltage BES elements.

Regional transmission with significant congestion are identified and verified through Planning Subcommittee review, historical benchmarking, and follow-up study. Given the regional focus of the WestConnect process, the Planning Subcommittee will limit their analysis to:

- Transmission (or paths/interfaces) between multiple WestConnect member TOs;
- Transmission (or paths/interfaces) owned by multiple WestConnect member TOs; and
- Congestion occurring within the footprint of multiple TOs that has potential to be addressed by a regional transmission project or NTA.[20]

[20] Congestion within a single TO's footprint (and not reasonably related or tied to other TO footprints) is out of scope of the regional planning effort and is alternatively subject to Order 890 economic planning requirements.

Sensitivities

WestConnect will also conduct sensitivity studies on the 2028 Base Case economic model to better understand whether regional transmission congestion may be impacted by adjusting certain input assumptions subject to significant uncertainty. Sensitivity analysis intended to make relatively minor adjustments that would still remain within the expected future framework of the base models. This sensitivity analysis may include variables such as:

- Load forecast;
- Hydro conditions (e.g., wet vs. dry);
- Natural gas prices;
- Emissions cost (e.g., CO_2); and
- Other modeling parameters.

By adjusting individual input assumption subject to uncertainty, the sensitivity assessment will help WestConnect understand how sensitive Base Transmission Plan economic performance is to key variables. The PS will make recommendations to the PMC regarding how sensitivity analysis will be incorporated into the study process.

5.4 Regional Economic Needs

The process to assess congestion will include a vetting of any congested elements. That process is also intended to allow the PS to make a determination as to whether congestion issues are regional in nature. After this vetting process, the PS will produce a list of the congested elements that were identified in the base case. The PMC may further evaluate that list of congested elements, and determine which should constitute regional economic needs. The objective is to arrive at a set of congested transmission elements that warrant being tested for the economic potential for a regional project solution, recognizing that the presence of congestion does not always equate to a regional need for congestion relief at a particular location.

6.0 Public Policy Assessment

The WestConnect Regional Planning Process is intended to identify regional needs and the more efficient or cost-effective solutions to satisfy those needs. Enacted public policy (e.g., but not limited to, Renewable Portfolio Standards, energy efficiency/demand side management and distributed generation standards, and IRPs) is considered in the regional planning process through its inclusion in regional planning models. Non-enacted or proposed public policies may be considered as part of the scenario planning process.

Enacted public policies are considered early in the planning process and are incorporated into the base models through the roll-up of local TO plans and their associated load, resource, and transmission assumptions. The PS has discretion to identify which enacted policies, if any, should be verified through the regional process to ensure they are properly represented in the regional base models. [21]

[21] Enacted public policies that are subject to significant uncertainty within the planning horizon are also considered. These types of public policies may be studied through the development of regional scenario models.

Stakeholders, through their participation in the regional planning process, will have the opportunity to provide feedback to WestConnect as it evaluates public policy-driven transmission issues and determines what issues may constitute regional transmission needs. The PMC, which is charged with identifying regional public policy-transmission needs for the WestConnect region, will consider a recommendation from the Planning Subcommittee for each of the public policy analyses described in Section 6.2.

6.1 Public Policy Requirements

WestConnect begins the evaluation of regional transmission needs driven by public policy requirements by first identifying a list of enacted public policies that impact local TO plans in the WestConnect planning region. The list, below in **Table 4**, summarizes those enacted public policies that will be reflected in regional base economic and power flow models.

Table 4: Enacted Public Policies Incorporated into Planning Process

Enacted Public Policy	Description
Arizona Renewable Energy Standard	Requires IOUs and retail suppliers to supply 15% of electricity from renewable resources by 2025), with a minimum of 30% of the renewable resources provided by distributed generation
California SB350	Requires IOUs and municipal utilities to meet a 50% RPS by 2030 and also requires the establishment of annual targets for energy efficiency savings
California AB398/SB32	Requires the California State Air Resources Board to approve a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions level in 1990 to be achieved by 2020 and to ensure that statewide greenhouse gas emissions are reduced to at least 40% below the 1990 level by 2030.
Colorado SB 07-100	Requires IOUs to identify Energy Resource Zones, plan transmission to alleviate constraints from those zones, and pursue projects according to the timing of resource development in those zones
Colorado HB10-1001	Established Colorado Renewable Energy Standard (RES) to 30% by 2020 for IOUs (Xcel & Black Hills)
Colorado SB13-252	Requires cooperative utilities to generate 20% of their electricity from renewables by 2020
Colorado HB10-1365	Requires rate regulated utilities in CO with coal-fired generation to reduce emissions on the smaller of 900 MW of generation of 50% of a company's coal generation fleet. Full implementation to be achieved by 12/31/2017
Nevada SB123	To reduce emissions from coal-fired generators, requires reduction of at least 800 MW generation capacity from coal-fired generation plants, addition of at least 350 MW of generating capacity from renewable energy facilities, and construction of at least 550 MW of generating capacity from other types of generating plants by 2020.

Enacted Public Policy	Description
Nevada SB374	Requires net metering be available to each customer-generator who submits a request to the company.
Nevada Renewable Portfolio Standard	The percentage of renewable energy required. Increases every two years until it reaches 25 percent by 2025.
New Mexico Efficient Use of Energy Act	Require utilities to include cost-effective EE and DR programs in their resource portfolios and establish cost-effectiveness as a mandatory criterion for all programs.
New Mexico Renewable Energy Requirements	Subject to the Reasonable Cost Threshold (RCT), the RPS Rule outlines renewable energy requirements that are a function of PNM's retail energy sales. • No less than 10% of retail energy needs for calendar years 2011 through 2014; • No less than 15% of retail energy needs for calendar years 2015 through 2019; • No less than 20% of retail energy needs for calendar year 2020 and subsequent years

6.2 Study Methodology and Criteria

The regional base models, including both power flow and production cost, will reflect the enacted public policies identified above. The data to reflect the public policies will be provided by TOs as the enacted public policies are already reflected in TO's transmission plans and generation data. In some instances, the Planning Subcommittee may choose to verify (through spreadsheet based analyses) that the appropriate load, resources, or transmission are included in the models. Once the models are compiled, reviewed, and ultimately approved by the PMC, the Planning Subcommittee will perform economic and reliability assessments (as described in Section 4.0 and Section 5.0) using the regional base models to determine if there are any regional transmission issues. The Planning Subcommittee will seek to determine if those issues are related to enacted public policy and therefore may constitute a public policy-driven transmission need.

The second component of the WestConnect regional public policy planning process allows for the Planning Subcommittee, in consultation with stakeholders, to review local (TO) public policy-driven transmission projects and make suggestions as to whether the TO's project may constitute a public policy-driven regional transmission need. As a part of its effort to "roll-up" local transmission plans to compile the regional base transmission plan, WestConnect will provide stakeholders with a list of public policy-driven transmission projects that are included in TOs' local plans. After reviewing this information, stakeholders are invited to make a recommendation to the Planning Subcommittee whether any local public policy-driven transmission projects may suggest consideration/identification of a regional transmission need. The Planning Subcommittee will consider the suggestion and make a

recommendation to the PMC as to whether it should be identified as a regional public policy-driven transmission need.

6.3 Regional Public Policy-driven Transmission Needs

If any regional public policy needs are identified, the need will be identified and described in the Regional Need Assessment report and posted to the WestConnect website.

7.0 Solutions to Regional Needs

After the Regional Need Assessment Report is finalized, regional needs will be posted to the WestConnect website and project solution submittal window will open. Upon closure of the submittal window, WestConnect will initiate an evaluation of the benefits and costs of proposed solutions to identify if any is a more efficient or cost-effective regional solution.

If no project solutions are submitted, WestConnect will seek to develop solutions to needs. The amount of technical planning rigor dedicated to seeking a WestConnect-developed regional solution will be informed by planning discussions held at the PS and PMC. These discussions and decisions made in investigating potential regional solutions proposed by WestConnect (in the absence of proposed solutions) will be documented in the Regional Plan.

In the event that no regional transmission needs are identified, the PMC will not collect transmission or non-transmission alternatives for evaluation (as there will be no regional transmission needs to evaluate the alternatives against).

8.0 Scenario Studies

In addition to the regional needs assessment, WestConnect also conducts information-only scenario[22] studies that look at alternate but plausible futures. They represent futures with resource, load, and public policy assumptions that are different in one or more ways than what is assumed in the Base Cases.

Proposals for scenarios enter into the planning process through a 30-day open submittal window, which opens during Quarter 8 of the previous planning cycle. During the open window, stakeholders may provide proposals for specific scenarios they would like for WestConnect to include in its Study Plan for the upcoming planning cycle. The PMC and Planning Subcommittee can also develop scenarios for inclusion in the Study Plan.

Once the scenario proposals are received, the PS evaluates the scenarios and makes a recommendation (documented through the Study Plan) to the PMC on which ones should be evaluated in the study cycle. The PS may work with individual requestors to clarify the intent of the scenarios. The PS may also recommend combining scenarios that appear to have common goals, themes, or modeling assumptions.

The PMC also 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

[22] The term "scenario" may be used differently in other documents, including the cost allocation section of the common tariff.

scenario—whether it be reliability, economic, or public-policy based—constitutes additional investigation by the Planning Subcommittee. Since the assessment of a scenario is different than an "expected future" base case such assessments may provide useful information for future planning cycles, especially if the scenario appears likely to become an expected future for the region. Also, results from the scenario assessments may be help the region identify emerging opportunities for infrastructure (generation, transmission, or otherwise). Any transmission issues that might come to light as a result of the WestConnect scenario assessments are not to be confused with the WestConnect task under Order No. 1000 to identify regional transmission needs and to solicit for proposals to more cost effectively or efficiently satisfy such needs. In other words, the WestConnect scenario assessments do not obligate TO members of WestConnect to any responsibility outside the scope of Order No. 1000.

WestConnect also provides the opportunity for stakeholders to provide suggestions that might allow for more efficient or cost-effective alternatives to the regional plans. These types of suggestions may be different from the scenarios mentioned above. They may also be different than proposals to meet identified regional needs. These types of suggestions may be submitted at any time, but have the most potential to contribute to the regional planning process if they are presented through the scenario submission window. The PMC will consider such suggestions on a case-by-case basis to determine if any such suggestions warrant analyses, and how to incorporate any analyses into the regional planning process. Stakeholders submitting such suggestions are expected to provide evidence as to how their proposals might result in a more efficient or cost-effective regional plan. As with scenarios, the PMC will determine whether the PS should assess any suggestions.

Scenarios Received for the 2018-19 Study Plan

WestConnect held an open window from December 1, 2017 through January 5, 2018. The following scenarios were received during the open window:

Table 5: Scenarios Received During Open Window

Requestor	Description/Name
ITC	50% RPS
ITC	Coal Retirement
ITC	High Import from California
ITC	Remove Base Transmission Plan Projects In-service After 2022
NRDC	Low Carbon Grid
NRDC	Low Carbon Grid and Seams Issues
Sonoran Institute	50% RPS
WIEB Staff	Low Carbon Grid

These scenarios were reviewed by the PS on January 19, 2018. A representative for each scenario request provided a presentation to the PS to summarize the request and answer questions. The PS also made attempts to consulate the requests. Following the meeting, the PS conducted a survey to collect feedback from members on their preferred scenarios. During the PS meeting on February 13, 2018 the

subcommittee reviewed member feedback and further discussed the scenarios and the number of scenarios that would be appropriate to study. The conversation led to the development of three scenarios, which are outlined below and included in this Study Plan.

8.1 Load Stress Study

The purpose of the Load Stress Study is to test the robustness of the Base Transmission Plan against changes in load. The study will be performed using the peak load condition from the Base Case production cost model. To stress the system, loads will be increased 10%[23] and the generation-load gap will be filled with existing generator capacity not already dispatched in Base Case. In certain areas, renewable capacity may be added if there is not sufficient existing generation to meet the load increase. Details of the redispatch to fill the load-generation gap will need to be addressed through the Planning Subcommittee, the intent of the scenario is to focus on reliability, but a congestion/economic study may be considered if deemed useful.

8.2 CAISO Export Stress Study

The purpose of the CAISO Export Stress Study is to evaluate the reliability of the WestConnect regional system if power flows from the CAISO to WestConnect during CAISO overgeneration conditions. The study will be performed using a realistic CAISO export to WestConnect condition from the WestConnect 2028 Base Case production cost model. The export condition will be defined, technically, based on (1) simulation results from the WestConnect 2028 Base Case production cost model filtered for hours in which the CAISO exports to WestConnect; and (2) technical guidance from the CAISO describing the type of conditions that might cause flows from the CAISO to WestConnect to help reduce the flagged hours (if multiple) to a single hour. The details of the analysis will be determined at a later date by the Planning Subcommittee.

[23] *10% is a guideline and may vary, depending on input from TO's*

Appendix A – Base Transmission Plan Process

To identify TO projects for inclusion in the 2028 base transmission plan, the Planning Subcommittee reviewed the transmission project lists submitted to WestConnect by the TO members and participants via the TPPL, inclusive of the project status (e.g., planned, conceptual). All TO projects designated with a "planned" project status are included in the base transmission plan. As defined by WestConnect, planned facilities include projects that have a sponsor, have been incorporated in an entity's regulatory filings, have an agreement committing entities to participate and construct, or for which permitting has been or will be sought. Individual members and participants reviewed the TPPL project lists and provided any necessary updates with regard to the project status.

The Planning Subcommittee also reviewed the list of non-incumbent projects submitted via the TPPL to see if any of those projects met the threshold identified by the PMC for inclusion in the base transmission plan. These meetings were open to the public and noticed accordingly. Upon reviewing the project information submitted by the project sponsors, the Planning Subcommittee did not identify any non-incumbent projects that warranted inclusion in the base transmission plan.

CAISO Projects

Based on member and participant feedback, the WestConnect Planning Subcommittee considered for inclusion in the regional models two CAISO transmission projects that were recently approved by the CAISO Board of Directors. These projects are:

- Delaney – Colorado River 500 kV, estimated in-service date 2020, and
- Harry Allen – Eldorado 500 kV, estimated in-service date 2020.

Since both projects have been approved by the CAISO Board of Directors, they are currently included in CAISO 10-year planning studies. To align the WestConnect models with that of the CAISO, the projects will also be included in the WestConnect models.[24]

[24] *The Planning Subcommittee did not make any judgment with regard to any interregional aspects of these two projects. They were not submitted for the purposes of cost allocation.*

Appendix B – Base Transmission Plan

The tables below include the planned projects that are slated for inclusion in the Base Transmission Plan. The tables are organized by SPG.

SWAT Base Transmission Plan Projects for 2018-19 Regional Planning Cycle

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Arizona Public Service	North Gila - Orchard 230kV Line	Planned	230 kV	**Y**	2021
Arizona Public Service	TS4 230/69kV Substation	Planned	230 kV	**N**	2020
El Paso Electric Company	Add 345 kV ring bus to VADO substation. Split Newman 345 kV to Afton_N 345 kV line tapping in-and-out to VADO 345 kV bus.	Planned	345 kV	**N**	2025
El Paso Electric Company	Afton North - Airport Transmission Line	Planned	115 kV	**Y**	2019
El Paso Electric Company	Afton North Autotransformer	Planned	345 kV	**Y**	2019
El Paso Electric Company	Anthony to VADO 115 kV transmission line ckt 3. Created from existing Anthony to Arroyo 115 kV transmission line being tapped in and out of new VADO 115 kV substation.	Planned	115 kV	**N**	2023
El Paso Electric Company	East side loop expansion Phase 2	Planned	115 kV	**Y**	2021
El Paso Electric Company	East side loop expansion Phase I	Planned	115 kV	**Y**	2020
El Paso Electric Company	Eastside Loop Expansion Phase I	Planned	115 kV	**Y**	2020
El Paso Electric Company	Lane-Pendale-Copper (16900) 69 kV Line Rebuild & Reconductor	Planned	Below 115 kV	**Y**	2018
El Paso Electric Company	Leasburg Substation 33.6 MVA Transformer	Planned	115 kV	**Y**	2019
El Paso Electric Company	MOONGATE - Jornada Transmission Line	Planned	115 kV	**N**	2020
El Paso Electric Company	MOONGATE Substation	Planned	115 kV	**N**	2020
El Paso Electric Company	Move Sparks 115/69 kV autotransformer to Felipe substation	Planned	115 kV	**Y**	2021
El Paso Electric Company	New Afton_N to VADO 115 kV transmission line.	Planned	115 kV	**N**	2022

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
El Paso Electric Company	New Anthony to VADO 115 kV transmission line ckt 2	Planned	115 kV	**N**	2024
El Paso Electric Company	New transmission line from VADO 115 kV to Salopek 115 kV ckt 2	Planned	115 kV	**N**	2023
El Paso Electric Company	New VADO 115 kV switching station.	Planned	115 kV	**N**	2022
El Paso Electric Company	NW2 (Verde) Substation 30 MVA Transformer	Planned	115 kV	**Y**	2019
El Paso Electric Company	Patriot Substation Transformer (T2)	Planned	115 kV	**Y**	2018
El Paso Electric Company	Pipeline Substation 33.6 MVA Transformer	Planned	115 kV	**Y**	2022
El Paso Electric Company	Sol – Vista Transmission Line Upgrade	Planned	115 kV	**Y**	2017
El Paso Electric Company	Sparks to Felipe 69 kV to 115 kV line upgrade	Planned	115 kV	**Y**	2021
El Paso Electric Company	Uvas Substation 12 MVA Transformer	Planned	115 kV	**Y**	2024
El Paso Electric Company	VADO 115 kV to Arroyo 115 kV transmission line ckt 1. Created from existing Anthony to Arroyo 115 kV transmission line being tapped in and out of new VADO 115 kV substation.	Planned	115 kV	**N**	2023
Imperial Irrigation District	CI-line reconductoring	Planned	Below 115 kV	**N**	Q4 2018
Los Angeles Department of Water and Power	Add voltage support in the LA Basin	Planned	138 kV	**N**	2021
Los Angeles Department of Water and Power	Apex-Crystal Transmission Line	Planned	500 kV AC	**N**	2022
Los Angeles Department of Water and Power	Castaic-Haskell Canyon 230 kV Line 3	Planned	230 kV	**Y**	2022
Los Angeles Department of Water and Power	Convert PP1&PP2-Olive 115kV Lines to 230kV Lines	Planned	230 kV	**N**	2022
Los Angeles Department of Water and Power	Lugo-Victorville Upgrades	Planned	500 kV AC	**N**	2021
Los Angeles Department of Water and Power	New Haskell Canyon-Sylmar 230 kV Line 2	Planned	230 kV	**N**	2022

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Los Angeles Department of Water and Power	New Rosamond Station	Planned	230 kV	**N**	2022
Los Angeles Department of Water and Power	New Scattergood-Olympic 230 kV Cable A	Planned	230 kV	**Y**	2018
Los Angeles Department of Water and Power	Re-conductor Rinaldi-Tarzana 230kV Line 1 & 2	Planned	230 kV	**N**	2022
Los Angeles Department of Water and Power	Re-conductor Valley-Rinaldi 230 kV Lines 1&2	Planned	230 kV	**Y**	2018
Los Angeles Department of Water and Power	Re-conductor Valley-Toluca 230 kV Lines 1&2	Planned	230 kV	**Y**	2020
Los Angeles Department of Water and Power	Scattergood-Olympic Cable B	Planned	230 kV	**N**	2020
Los Angeles Department of Water and Power	Springbok Solar III	Planned	230 kV	**N**	2019
Los Angeles Department of Water and Power	Upgrade Haskell Canyon-Olive 230 kV Line	Planned	230 kV	**Y**	2018
Los Angeles Department of Water and Power	Upgrade Olive-North Ridge 230 kV Line	Planned	230 kV	**Y**	2018
Los Angeles Department of Water and Power	Upgrade Rinaldi 230 kV CBs	Planned	230 kV	**Y**	2022
Los Angeles Department of Water and Power	Upgrade Toluca 500/230 kV Bank H	Planned	500 kV DC	**Y**	2021
Los Angeles Department of Water and Power	Upgrade Transformer Bank E and F	Planned	230 kV	**N**	2021
Los Angeles Department of Water and Power	Victorville 500/287 kV auto-transformer installation	Planned	500 kV AC	**Y**	2020
NV Energy	Arden - McDonald 230 kV Line upgrade	Planned	230 kV	**N**	2019
NV Energy	Avera - Tomsik 138 kV Reconductor	Planned	138 kV	**N**	2027
NV Energy	Burnham - Fold 138 kV fold into Pebble	Planned	138 kV	**N**	2018
NV Energy	Craig - LV Cogen 138 kV line upgrade	Planned	138 kV	**N**	2018

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
NV Energy	East Tracy 345/120kV XFMR #2	Planned	345 kV	**N**	2020
NV Energy	Faulkner - Wilson 138 kV Reconductor	Planned	138 kV	**N**	2027
NV Energy	McDonald 230/138 kV Transformer Addition	Planned	230 kV	**N**	2019
NV Energy	Replace Wave-Traps on Humboldt-Midpoint 345kV	Planned	345 kV	**N**	2018
NV Energy	Wild Horse 120kV	Planned	115 kV	**N**	2020
Public Service Company of New Mexico	Alamogordo Voltage Support Phase II	Planned	115 kV	**Y**	2019
Public Service Company of New Mexico	Albuquerque-Clines Corners 345 kV Line	Planned	345 kV	**N**	2020
Public Service Company of New Mexico	Blackwater Synchronous Condenser	Planned	345 kV	**N**	2019
Salt River Project	Abel - Pfister - Ball 230kV	Planned	230 kV	**Y**	2021
Salt River Project	Coolidge - Hayden Reroute 115kV	Planned	115 kV	**N**	2020
Salt River Project	Copper Crossing - Abel	Planned	230 kV	**N**	2024
Salt River Project	Price Road Corridor	Planned	230 kV	**N**	2021
Salt River Project	Superior - Silver King 115kV Reroute	Planned	115 kV	**N**	2027
Tri-State Generation and Transmission Association	Hernandez 115/69kV T2 Transformer Replacement	Planned	115 kV	**N**	2021
Tri-State Generation and Transmission Association	NENM Reliability Improvement	Planned	115 kV	**Y**	2023
Tri-State Generation and Transmission Association	Rowe 115/24.9kV Transformer Replacement	Planned	115 kV	**N**	2020
Tucson Electric Power	22nd Capacitor Bank Addition	Planned	138 kV	**N**	2020
Tucson Electric Power	Corona 138/13.8 kV Substation	Planned	138 kV	**Y**	2026
Tucson Electric Power	Craycroft Barril 138/13.8 kV Substation	Planned	138 kV	**Y**	2023
Tucson Electric Power	Del Cerro - Tucson 138 kV Line Re-conductor	Planned	138 kV	**Y**	2020
Tucson Electric Power	DeMoss Petrie (DMP) Capacitor Bank Addition	Planned	138 kV	**N**	2022

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Tucson Electric Power	Drexel Capacitor Bank Addition	Planned	138 kV	**N**	2021
Tucson Electric Power	Gateway 138-kV Transmission Line	Planned	138 kV	**N**	2019
Tucson Electric Power	Gateway 138-kV Transmission Line (phase 2)	Planned	138 kV	**N**	2022
Tucson Electric Power	Gateway 230/138 kV Substation	Planned	230 kV	**N**	2019
Tucson Electric Power	Gateway to US/Mexico Border 230-kV Transmission Line	Planned	230 kV	**N**	2019
Tucson Electric Power	Greenlee 345 kV, Conversion to breaker-and-a-half substation	Planned	345 kV	**Y**	2019
Tucson Electric Power	Harrison 138/13.8 kV Substation	Planned	138 kV	**Y**	2020
Tucson Electric Power	Harrison Capacitor Bank Addition	Planned	138 kV	**N**	2028
Tucson Electric Power	Hartt 138/13.8 kV Substation	Planned	138 kV	**Y**	2022
Tucson Electric Power	Irvington - Kino 138kV Transmission Line	Planned	138 kV	**N**	2021
Tucson Electric Power	Irvington 138 kV breaker-and-a-half substation	Planned	138 kV	**Y**	2019
Tucson Electric Power	Irvington Capacitor Bank Addition	Planned	138 kV	**N**	2020
Tucson Electric Power	Irvington to 22nd Street 138-kV Line Re-Conductor	Planned	138 kV	**N**	2019
Tucson Electric Power	Irvington to South 138-kV Line Re-Conductor	Planned	138 kV	**N**	2020
Tucson Electric Power	Irvington to Vail 138-kV Line Re-Conductor	Planned	138 kV	**N**	2020
Tucson Electric Power	Kantor Capacitor Bank Addition	Planned	138 kV	**N**	2019
Tucson Electric Power	Kino 138kV Substation	Planned	138 kV	**Y**	2021
Tucson Electric Power	La Canada to Orange Grove 138-kV Line Re-Conductor	Planned	138 kV	**N**	2020
Tucson Electric Power	La-Canada Line Switch	Planned	138 kV	**Y**	2020
Tucson Electric Power	Line 125 Re-conductor & Conversion to Double Circuit	Planned	138 kV	**N**	2022
Tucson Electric Power	Loop-in of Hassayampa to Pinal West 500-kV Line with with existing Jojoba Substation	Planned	500 kV AC	**N**	2019

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Tucson Electric Power	Loop-in of Irvington to Robert Bills 138-kV line with new Sonoran substation	Planned	138 kV	**N**	2021
Tucson Electric Power	Loop-in of Irvington to Sount 138-kV Line to Sonoran Substation	Planned	138 kV	**N**	2020
Tucson Electric Power	Loop-in of Irvington to Vail 138-kV Line to Sonoran Substation	Planned	138 kV	**N**	2021
Tucson Electric Power	Loop-in of North Loop to Rancho Vistoso 138-kV Line to Naranja Substation	Planned	138 kV	**Y**	2025
Tucson Electric Power	Marana 138/13.8 kV Substation	Planned	138 kV	**Y**	2024
Tucson Electric Power	Marana 138-kV Transmission Line	Planned	138 kV	**Y**	2024
Tucson Electric Power	Naranja 138/13.8 kV Substation	Planned	138 kV	**Y**	2025
Tucson Electric Power	Naranja Capacitor Bank Addition	Planned	138 kV	**N**	2025
Tucson Electric Power	North Loop Capacitor Bank Addition (#3)	Planned	138 kV	**N**	2022
Tucson Electric Power	North Loop Capacitor Bank Addition (#4)	Planned	138 kV	**N**	2024
Tucson Electric Power	Orange Grove Capacitor Bank Addition	Planned	138 kV	**N**	2019
Tucson Electric Power	Orange Grove to Rilito 138-kV Line Re-Conductor	Planned	138 kV	**N**	2020
Tucson Electric Power	Pantano Capacitor Bank Addition	Planned	138 kV	**N**	2020
Tucson Electric Power	Point of Interconnection 138kV Switchyard (Rosemont)	Planned	138 kV	**Y**	2019
Tucson Electric Power	Q59 138/13.8 kV Substation	Planned	138 kV	**N**	2022
Tucson Electric Power	Rancho Vistoso to La Canada 138-kV Line Re-Conductor	Planned	138 kV	**N**	2020
Tucson Electric Power	Re-Conductor Nogales to Kantor 138-kV Transmission Line	Planned	138 kV	**N**	2019
Tucson Electric Power	Sonoran 138/46/13.8 kV Substation	Planned	138 kV	**N**	2020
Tucson Electric Power	Sonoran to NextEra 138-kV Line	Planned	138 kV	**N**	2022
Tucson Electric Power	South Loop 345 kV, Conversion to breaker-and-a-half substation	Planned	345 kV	**Y**	2020

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Tucson Electric Power	South to NextEra 138-kV Line	Planned	138 kV	**N**	2022
Tucson Electric Power	Toro - Rosemont 138kV Line	Planned	138 kV	**Y**	2019
Tucson Electric Power	Tortolita Capacitor Bank Addition (#2)	Planned	138 kV	**N**	2019
Tucson Electric Power	Tortolita Capacitor Bank Addition (#3)	Planned	138 kV	**N**	2021
Tucson Electric Power	Tortolita Capacitor Bank Addition (#4)	Planned	138 kV	**N**	2022
Tucson Electric Power	Tucson to El Camino del Cerro 138-kV Line Re-Conductor	Planned	138 kV	**N**	2020
Tucson Electric Power	West Ina Capacitor Bank Addition	Planned	138 kV	**N**	2021
Western Area Power Administration - DSW	Coolidge - Valley Farms	Planned	115 kV	**N**	2020
Western Area Power Administration - DSW	Dome Tap-Gila	Planned	161 kV	**N**	2020
Western Area Power Administration - DSW	Gila 161 kV substation rebuild	Planned	161 kV	**Y**	2020
Western Area Power Administration - DSW	Kofa – Dome Tap	Planned	161 kV	**N**	2020
Western Area Power Administration - DSW	Liberty - Rudd 230 kV Facility Uprate	Planned	230 kV	**N**	2019

CCPG Base Transmission Plan Projects for 2018-19 Regional Planning Cycle

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Black Hills Energy	Boone-La Junta 115 kV Rebuild	Planned	115 kV	**N**	2020
Black Hills Energy	LaJunta 115kV Substation	Planned	115 kV	**Y**	2019
Black Hills Energy	Portland 115/69kV Transformer Replacement	Planned	115 kV	**Y**	2019
Black Hills Energy	West Station - West Cañon 115kV	Planned	115 kV	**N**	2021
Black Hills Power	Sagebrush 230/69 kV Substation	Planned	230 kV	**N**	2019

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Black Hills Power	Second 230/69kV Yellow Creek Transformer	Planned	230 kV	**Y**	2021
Black Hills Power	South Rapid City - Westhill 230kV Rebuild	Planned	230 kV	**Y**	2018
Black Hills Power	Westhill-Stegall 230 kV Line Rebuild	Planned	230 kV	**N**	2019
Cheyenne Light Fuel and Power	Archer - Cheyenne Prairie 115kV Reconductor	Planned	115 kV	**Y**	2019
Cheyenne Light Fuel and Power	East Business Park - Cheyenne Prairie 115kV Line Reconductor	Planned	115 kV	**Y**	2020
Cheyenne Light Fuel and Power	Happy Jack-North Range 115 kV Rebuild	Planned	115 kV	**N**	2018
Cheyenne Light Fuel and Power	Swan Ranch 115 kV Substation	Planned	115 kV	**Y**	2021
Colorado Springs Utility	Series Reactor - 115kV system	Planned	115 kV	**N**	2019
Colorado Springs Utility	Cottonwood 230/115kV Autotransformer Replacement.	Planned	230 kV	**N**	2019
Platte River Power Authority	Timberline 230/115kV Transformer T3 Replacement	Planned	230 kV	**Y**	2021
Public Service Company of Colorado/ Xcel Energy	Ault-Cloverly 115 kV Transmission Project	Planned	115 kV	**Y**	2020
Public Service Company of Colorado/ Xcel Energy	Gilman-Avon 115 kV Transmission Line and Cap Bank	Planned	115 kV	**Y**	2022
Public Service Company of Colorado/ Xcel Energy	Monument 115 kV Phase Shifter	Planned	115 kV	**N**	2020
Public Service Company of Colorado/ Xcel Energy	Thornton Substation	Planned	115 kV	**Y**	2019
Public Service Company of Colorado/ Xcel Energy	Avery Substation	Planned	230 kV	**Y**	2019
Public Service Company of Colorado/ Xcel Energy	Badgers Hills 345 kV Substation	Planned	345 kV	**N**	2020
Tri-State Generation and Transmission Association	Burlington - Burlington (KCEA) 115kV Line Rebuild	Planned	115 kV	**N**	2020

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Tri-State Generation and Transmission Association	Falcon - Paddock - Calhan 115kV Line	Planned	115 kV	**N**	2022
Tri-State Generation and Transmission Association	Falcon-Midway 115 kV Line Uprate Project	Planned	115 kV	**Y**	2021
Tri-State Generation and Transmission Association	La Junta (TS) 2nd 115/69kV, 42 MVA XFMR	Planned	115 kV	**Y**	2020
Tri-State Generation and Transmission Association	Lost Canyon - Main Switch 115 kV Line	Planned	115 kV	**Y**	2022
Tri-State Generation and Transmission Association	Rolling Hills Substation	Planned	115 kV	**N**	2024
Tri-State Generation and Transmission Association	Santa Fe Springs Substation	Planned	115 kV	**N**	2022
Tri-State Generation and Transmission Association	Shaw Ranch Substation	Planned	115 kV	**N**	2024
Tri-State Generation and Transmission Association	White Rock 115/34.5kV Transformer #2	Planned	115 kV	**N**	2021
Tri-State Generation and Transmission Association	Wind River 115kV Reliability Upgrade	Planned	115 kV	**Y**	2022
Tri-State Generation and Transmission Association	Fuller 230/115kV Transformer #2	Planned	230 kV	**N**	2020
Tri-State Generation and Transmission Association	San Luis Valley-Poncha 230 kV Line #2	Planned	230 kV	**Y**	2022
Tri-State Generation and Transmission Association	Wayne Child Phase II - (Formerly Arrow Transmission Project)	Planned	345 kV	**N**	2021
Western Area Power Administration - RMR	Big Horn Transmission Improvement	Planned	115 kV	**N**	2023
Western Area Power Administration - RMR	Blue Mesa	Planned	115 kV	**N**	2025
Western Area Power Administration - RMR	Estes-Flatiron 115-kV rebuild	Planned	115 kV	**Y**	2021

Sponsor	Project Name	Development Status	Voltage	2016-2017 Plan?	In-Service Date
Western Area Power Administration - RMR	Kimball Substation	Planned	115 kV	**N**	2023
Western Area Power Administration - RMR	Sand Creek Tap	Planned	115 kV	**N**	2022
Western Area Power Administration - RMR	Granby - Windy Gap	Planned	138 kV	**Y**	2018
Western Area Power Administration - RMR	Midway KV1A Replacement	Planned	230 kV	**N**	2020
Western Area Power Administration - RMR	Pole Creek Tap	Planned	230 kV	**N**	2020
Western Area Power Administration - RMR	Stegall Bus Sectionalization	Planned	230 kV	**N**	2024
Western Area Power Administration - RMR	Ault 345/230 kV XFMR Replacement	Planned	345 kV	**Y**	2020
Western Area Power Administration - RMR	Badwater Reactor	Planned	Below 115 kV	**Y**	2019

SSPG Base Transmission Plan Projects for 2018-19 Regional Planning Cycle

Sponsor	Project Name	2018 Status	Voltage	2016-2017 Study?	In-Service Date
NV Energy	Brunswick Rebuild	Planned	115 kV	**N**	2018
NV Energy	California – Bordertown 120kV Line	Planned	115 kV	**Y**	2019
NV Energy	California Substation upgrade	Planned	115 kV	**N**	2018
NV Energy	Carson - Emerson Line Rebuild	Planned	115 kV	**N**	2019
NV Energy	Cortez South Pipeline Capcitor Bank	Planned	115 kV	**N**	2018
NV Energy	Dove - East Tracy 120 kV Line Reconductor	Planned	115 kV	**N**	2019
NV Energy	Dove Capacitor Bank	Planned	115 kV	**N**	2019

Sponsor	Project Name	2018 Status	Voltage	2016-2017 Study?	In-Service Date
NV Energy	North Valley Road - Penny's Tap 120 kV line Uprate	Planned	115 kV	**N**	2018
NV Energy	Silver Lake 120 kV Capacitor Bank	Planned	115 kV	**N**	2021
NV Energy	Tracy - Patrick 120 kV Line Uprate	Planned	115 kV	**N**	2018
NV Energy	Turquoise Solar	Planned	115 kV	**N**	2018
NV Energy	Dixie Meadows I	Planned	230 kV	**N**	2020
NV Energy	East Tracy - Valmy 3422 Line Wavetrap Removal	Planned	345 kV	**N**	2019
NV Energy	Mira Loma Transformer #1 and #2 Rating Increase	Planned	345 kV	**N**	2018
NV Energy	Replace Wave Traps on Valmy-Coyote-Humboldt 345 kV Line	Planned	345 kV	**N**	2020
Sacramento Municipal Utility District	Carmichael 230 kV Shunt Capacitor	Planned	230 kV	**N**	2019
Sacramento Municipal Utility District	Franklin 230 kV Substation	Planned	230 kV	**N**	2018
Sacramento Municipal Utility District	Hurley - Procter 230 kV Line Re-conductor	Planned	230 kV	**N**	2018
Sacramento Municipal Utility District	Hurley 230 kV bus-tie breaker	Planned	230 kV	**N**	2020
Sacramento Municipal Utility District	Orangevale 230 kV Shunt Capacitor	Planned	230 kV	**N**	May, 2020
Western Area Power Administration - SNR	Install 230 kV Reactive Voltage Support	Planned	230 kV	**Y**	May, 2019
Western Area Power Administration - SNR	Reconductor Keswick-Airport-Cottonwood 230 kV Lines	Planned	230 kV	**Y**	May, 2019
Western Area Power Administration - SNR	Reconductor Olinda-Cottonwood #1 & #2 230 kV Lines	Planned	230 kV	**Y**	2020

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Appendix C – Other Regional Planning Process Activities

The PMC will identify transmission developers eligible to utilize cost allocation developed in the Regional Planning Process using the Transmission Developer Qualification Criteria. Transmission developers seeking eligibility for potential designation as the entity eligible to use the regional cost allocation for a transmission project selected in the Regional Plan for purposes of cost allocation must submit to the PMC information as specified in the tariff of each TO Member. The submittal window for this information as part of the 2018–19 planning cycle will be determined by the PMC.

Once projects have been selected for inclusion in the Regional Plan, WestConnect will select an eligible transmission developer (as determined by the Transmission Developer Qualification Criteria mentioned above) to utilize the cost allocation developed for each project selected for the purposes of cost allocation.

Please follow a link listed below to view the Transmission Developer Qualification Criteria and the developer selection process.

WestConnect TO Member	**OASIS Link to Tariff**
Arizona Public Service Company	http://www.oasis.oati.com/azps/index.html
Black Hills Power, Inc.	http://www.oatioasis.com/BHBE/index.html
Black Hills Colorado Electric Utility Company, LP	http://www.oatioasis.com/bhct/index.html
Cheyenne Light Fuel & Power Company	http://www.oatioasis.com/CLPT/index.html
El Paso Electric Company	http://www.oatioasis.com/epe/index.html
NV Energy	http://www.oatioasis.com/NEVP/index.html
Public Service Company of New Mexico	http://www.oatioasis.com/pnm/index.html
Tucson Electric Power Company	http://www.oatioasis.com/tepc/index.html
UNS Electric, Inc.	http://www.oatioasis.com/UNST/index.html
Xcel Energy – Public Service Company of Colorado	http://www.oasis.oati.com/psco/index.html