WESTCONNECT REGIONAL TRANSMISSION PLANNING

2016-17 PLANNING CYCLE

DRAFT REGIONAL STUDY PLAN

HIGHLIGHT INDICATES THAT WESTCONNECT WILL UPDATE CONTENT BEFORE FINALIZING

APPROVED BY WESTCONNECT PMC ON MARCH XX, 2016

Contents

1.0 Introduction

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), Subregional Planning Groups[1] (SPGs), and stakeholders as described in greater detail in subsequent sections of this document.

The first step of the WestConnect Regional Transmission Planning Process involves 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 2016-17 planning cycle.

1.1 WestConnect Regional Transmission Planning Process

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).[2] The planning process is performed biennially, beginning in even-numbered years, and consists of seven primary steps as outlined in Figure 1.

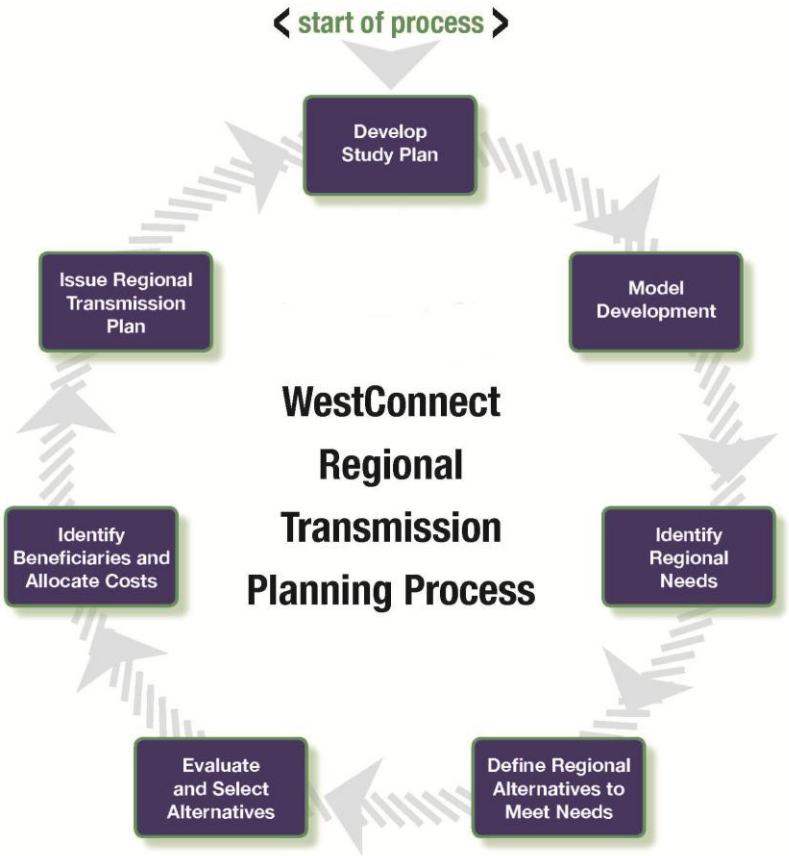
The WestConnect Planning Process is in conformance with Order No. 1000 as supplemented by numerous Compliance Filings and resulting FERC Orders. Readers can access the text of the compliance documentation on the WestConnect website[3], and are encouraged to consult the compliance documentation and the WestConnect Business Practice Manual (BPM) for additional process information.

[1] 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).

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

[3] www.westconnect.com

Figure 1: WestConnect Regional Transmission Planning Process



The WestConnect Regional Transmission Planning Cycle (planning cycle) is biennial. The biennial cycle commences in even numbered years, resulting in the development of a Regional Transmission Plan every other year. During the biennial planning cycle, WestConnect will perform system assessments and 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.

Additional details of the WestConnect Regional Transmission Planning Process can be reviewed in the BPM, which is posted to the WestConnect website[4].

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

1.2 2015 Regional Planning Cycle

In 2015 WestConnect conducted an abbreviated one-year regional planning cycle, which concluded with the first Regional Plan approved by the PMC on December 16, 2015. Given the shortened timeframe of the 2015 cycle, the 2015 Study Plan had a limited technical scope. During the model development phase of the 2015 cycle, WestConnect constructed a single regional power flow model representative of a 2024 heavy summer condition. Once the PMC approved the aforementioned 2024 summer regional power flow model, the WestConnect Planning Subcommittee conducted the regional needs assessment using that model. This regional reliability transmission needs assessment, which was conducted in an open and transparent manner with input from PMC members and stakeholders, did not identify any performance issues that either (a) resulted in potential regional issues in more than one member TO system, or (b) caused a regional issue on a member TO system that was different than the contingency/outage owner. Based on this assessment, there were no regional transmission needs identified in the 2015 assessment.

The 2015 cycle did not include a comprehensive analysis for *economic* driven transmission needs because of the abbreviated timeline. However, WestConnect did review results from the WECC 2024 Common Case, spent time updating the model with more up-to-date assumptions, and explored metrics to identify economic need (congestion) in future planning cycles.

In the 2015 cycle, the regional power flow model was also used to evaluate public policy needs by determining if adequate transmission facilities were available to access renewable resources required to achieve enacted public policy (RPS).

The 2015 Regional Plan[5] documents the process and analysis described above.

2.0 Overview of 2016-17 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 2016-17 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 2016-17 Regional Planning Cycle

Due Date	*Quarter of Cycle*	*2016-2017 Activity*
November 19, 2015	Q8 (prior)	WestConnect Stakeholder Meeting to discuss the draft Study Plan and scenario process with Stakeholders
November 20, 2015	Q8 (prior)	TPPL data entry window opens
December 1, 2015	Q8 (prior)	Draft Regional Study Plan posted to WestConnect website (v1)

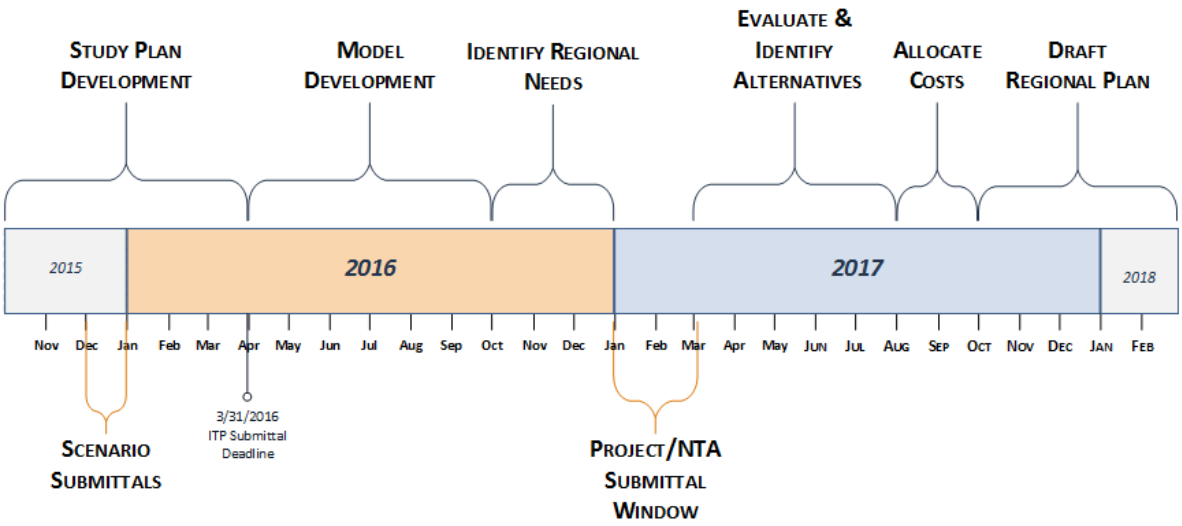
[5] http://www.westconnect.com/filestorage/12_16_15_wc_2015_regional_transmission_plan.pdf

Due Date	*Quarter of Cycle*	*2016-2017 Activity*
December 1, 2015	Q8 (prior)	Scenario submittal window opens
December 11, 2015	Q8 (prior)	Stakeholder comments on draft Study Plan due to WestConnect
December 18, 2015	Q8 (prior)	TPPL data entry window closes
December 31, 2015	Q8 (prior)	Scenario submittal window closes
February 1, 2016	Q1	Draft Regional Study Plan posted to WestConnect website (v2)
February 24, 2016	Q1	WestConnect Stakeholder Meeting to present draft Regional Study Plan
February 25, 2016	Q1	Interregional Coordination Meeting
March 31, 2016	Q1	Final Regional Study Plan posted to WestConnect website
March 31, 2016	Q1	Interregional Transmission Project (ITP) submittal deadline[6]
September, 2016	Q3	Regional models finalized
December, 2016	Q4	Final regional transmission needs posted to WestConnect website
December, 2016	Q4	Stakeholder meeting to discuss identified regional needs
January, 2017	Q5	Submittal window opens for projects to meet the posted regional needs. Submittal window lasts for no less than 30 days
September, 2017	Q7	WestConnect posts listing of projects meeting an identified regional need selected for the purposes of cost allocation
October, 2017	Q8	Initiate Study Plan development for 2018-2019 planning cycle
November, 2017	Q8	Draft Regional Plan posted to WestConnect website
November, 2017	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 2017	Q8	Final 2016-17 Regional Plan posted to WestConnect website

The 2016-17 regional planning cycle timeline is shown in Figure 2.

[6] The timing of this ITP submittal deadline early in 2016, 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 2016.

Figure 2: 2016-17 Planning Cycle Timeline



2.2 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 have opportunities to participate in and provide input to local transmission plans as provided for in each Member TO's OATT. Further, stakeholders have opportunities to participate in and provide input into subregional planning efforts within the Sierra Subregional Planning Group (SSPG), Colorado Coordinated Planning Group (CCPG), and Southwest Area Transmission (SWAT).

All WestConnect planning meetings are open to stakeholders (with the exception of PMC closed sessions which will be identified in agendas distributed prior to meetings and posted on the website). Stakeholders' opportunities for timely input and meaningful participation are available throughout the WestConnect planning process. More specifically, WestConnect will be accepting formal stakeholder comments on the following reports planned to be created during the 2016-17 planning cycle:

- Study Plan, including scenario submittals
- Model Development
- Regional Needs Assessment
- Alternative Evaluation (if applicable)
- Cost Allocation (if applicable)
- Regional Transmission Plan.

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.

2.3 Interregional Coordination

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

- Participating in annual interregional coordination meetings;
- Distributing regional planning data or information such as:
  - Draft Regional Study Plan
  - Final Regional Study Plan
  - Files and data used to compile regional models
  - Regional Transmission Needs Assessment Report
  - List of Interregional Transmission Projects (ITPs) submitted to WestConnect
  - Assessments and selection of ITPs into Regional Plan
  - Draft Regional Transmission Plan
  - Final Regional Transmission Plan
- Sharing planning data and models if and when requested; 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[7].

ITP 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 included in the WestConnect base transmission plan, they must submit their project per the process described under Section 3.1 Regional Base Transmission Plan. If an ITP proponent seeks cost allocation and/or 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, 2016 in order to allow WestConnect to coordinate the ITP evaluation process with all other Relevant Planning Regions. At this time, the ITP proponent need not identify which regional transmission need the project proposes to address and they do not need to submit the $25,000 study deposit for project submittals. Following the needs identification phase of the regional planning process, and once the project submittal window opens, if the ITP proponent wishes for WestConnect to evaluate their project as an alternative to an identified regional need, the ITP proponent must submit any updated project information, must identify the regional transmission need the project proposes to address, and must submit the $25,000 study deposit consistent with the process described under

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

Section 5.0 to be considered a valid project submittal. Any ITP properly submitted to WestConnect as an alternative to an identified regional need will be evaluated together with any regional alternatives properly submitted during the project submittal window described in Section 5.0.

3.0 The Planning Process

3.1 Development of Regional Models

During Quarters 2 and 3 of the 2016-17 planning cycle, the models needed to perform the regional transmission assessments will be developed as described in this section. Three types of assessments will be performed during the planning process: Reliability (steady state or transient), Economic (production cost), and Public Policy. However, the Public Policy assessment is performed using the Reliability and Economic planning tools and models. The Western Electricity Coordinating Council (WECC) prepares both reliability and economic models, which include the systems of all WECC TOs. These models will be 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[8]. 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.

The PMC will conduct an assessment of the region's transmission needs in the 10-year timeframe, using models developed around the 2026 timeframe. The study horizon guides which WECC Base Cases and Common Case are used as the foundations for the regional models since the study year(s) of the WECC models should correspond most closely with the study horizon in the regional planning effort.

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 Transmission Owner (TO) Member Sector[9]. TO Members participating in the WestConnect 2016-17 planning process and the systems consider in the regional transmission needs assessment include:

- Arizona Public Service Company
- Basin Electric
- Black Hills Power, Inc.
- Southwest Transmission Cooperative
- Tucson Electric Power Company
- Tri-State Generation and Transmission Association

[8] 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 with WestConnect. The agreement is available here.

[9] For the purposes of this document, "TO" is defined as a "TOLSO", which is a Transmission Owner with Load Serving Obligation

- Colorado Springs Utilities
- Imperial Irrigation District
- El Paso Electric Company
- NV Energy
- Public Service Company of New Mexico
- Sacramento Municipal Utility District
- Xcel Energy – Public Service Company of Colorado
- Western Area Power Administration
- Salt River Project
- Platte River Power Authority
- Transmission Agency of Northern California

WECC models are updated and reviewed by the WestConnect TO Members in order to create accurate regional models. WestConnect encourages participation in the model construction process by non-FERC jurisdictional TOs and other data owners within or bordering the WestConnect footprint. TOs that are not official WestConnect members but actively participate in the regional planning process are listed below:

- Los Angeles Department of Water and Power (LADWP)[10]

WestConnect does not conduct FERC Order 1000 regional transmission needs assessments for TOs that are not WestConnect members. The approximate footprint of both member and participating TOs is shown in

Figure 3.

[10] *As of January 2016, LADWP received approval from their Board of Commissioners and may become a member in February.*

Figure 3: Approximate Footprint of WestConnect Member TO's and Participating TO's

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

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

Regional 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 to be reflected in each of the regional planning models. The base transmission plan primarily consists of the "planned" incremental transmission facilities included by TOs in local transmission plans[11] as well as the regional transmission facilities identified in previous regional transmission plans that are not subject to reevaluation. 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 projects under development independent transmission companies (ITCs) transmission developers in the WestConnect planning region, to the extent there is sufficient likelihood associated with these projects to warrant their inclusion in the base transmission

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

plan. A description of the criteria used to identify projects for inclusion in the base transmission plan is in the WestConnect BPM.

The base transmission plan is based on 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 collection window for the 2016-17 planning cycle opened on November 20, 2015, and closed on December 11, 2015. This project repository was used to establish the base transmission plan for the 2016-17 process.

The list of projects and details about the process used to identify the 2016-17 Base Transmission Plan are summarized in Appendix D. This list will be used to develop the 2026 regional models.

3.2 Scenarios in the Planning Process

WestConnect regional assessments are centered on Base Cases and Scenarios, which when taken together provide a robust platform that is used to identify the potential for regional transmission needs and emerging regional opportunities. Base Cases are intended to represent "business as usual", "current trends", or the "expected future". They are based on TO-supplied forecasts for load, generation, public policy resources, and transmission plans. Scenarios are intended to complement Base Cases by looking 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 Q8 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 draft 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 assessment of scenarios. They will determine whether an issue identified in a scenario, whether it be reliability, economic, or public-policy based, constitutes a regional transmission *opportunity*. Since the assessment of a scenario is different than an "expected future" base case, when WestConnect decides to undertake evaluation of a scenario, the PMC recognizes that 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 helpful to stakeholders in the region, because it might help stakeholders see emerging opportunities in the region, including emerging opportunities for infrastructure (generation, transmission, or otherwise). Any such regional *opportunities* 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.[12] The PMC can assess the scenario study results and decide if the identified issues warrant additional consideration by WestConnect.

WestConnect received the following scenario submittals during the window:

Requestor	Description/Name
Arizona Utilities Group	Utilities' CPP Compliance
LS Power	High Wyoming Wind
NRDC	Western Wind & Solar CPP Compliance
Sonoran Institute	BLM Large-Scale Solar PV Build-out
SunZia Transmission, LLC	High NM Wind
Western Grid Group	CPP Compliance

These scenarios are being reviewed and considered by the PS. Results of those conversations will be drafted into the study plan at a later date.

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, which come later in the planning process (see Section 5.0). 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 and if so, determine if it is a more efficient or cost effective regional plan.

3.3 Regional Power Flow Models (PFMs)

The regional power flow models will be developed by the Planning Subcommittee in coordination with the WestConnect SPGs and WestConnect TO Members during Quarter 2 and 3 of 2016.

Power Flow Model Development Process

WestConnect will review and modify the starting WECC power flow models[13] identified in this study plan through coordination with SPGs and member/participating TOs. The roles that each SPG will play are outlined as follows:

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[12] *For example, regional opportunities that come to light as a result of scenario study work do not trigger the opening of a PMC project submittal window for the solicitation for projects, and they do not give rise to cost allocation obligations.*

- SWAT – Individual TOs will submit EPC change files to WestConnect for compilation;
- CCPG – Will coordinate changes with the sub-region and provide the changes to WestConnect.
- SSPG – Anticipated that individual TOs will submit EPC change files to WestConnect for compilation;

Following the process specific to each SPG, 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, shunts, caps, inductors, 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. Verify enacted public policy representation (and adapt resources as necessary), as described more thoroughly in Section 4.4;
4. Provide RAS and contingency definitions based on modeled topology[14].

The process utilized by the SPGs for model development, including coordinating with the WestConnect TO Members, independent transmission developers, and other stakeholders in the development of these cases, will be defined and managed by the individual SPG.

The draft regional power flow model will be provided back to the TOs or SPGs for review and validation of the compiled regional power flow models with the TO members, independent transmission developers, and other stakeholders per the review timeline provided by the PMC.

The participants will also provide the contingency definitions to be used for the regional assessment (see Section 5 below) in the WECC RAS and Contingency Format (available in GE PSLF and PowerWorld Simulator). For all of the models listed above, the TOs will review and include applicable:

- **Operating Procedures** – Any special operating procedures required for compliance with NERC reliability standards will be considered and included in the reference cases.
- **Protection Systems** – The impact of protection systems including remedial action schemes (RAS) required for compliance with NERC reliability standards will be included in the reference cases.
- **Control Devices** – Any special control devices required will be included in the reference cases.

Power Flow Case Overview

The final regional power flow models and contingency definitions will be completed by the end of Quarter 3 of the 2016-17 planning cycle. The PMC will approve the regional power flow models and contingency definitions before they are used to assess regional reliability transmission needs.

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

[14] 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.

Table 2: Power Flow Case Summary

Case Name	Case ID	Case Description and Scope
2026 Heavy Summer Base Case	WC26-HS	Summer peak load conditions during 1500 to 1700 MDT, with typical flows throughout the Western Interconnection.
2026 Light Spring Base Case	WC26-LS	Light load conditions with high wind generation
2026 ___ Scenario Case	WC26-S1	TBD
2026 ___ Scenario Case	WC26-S2	TBD

3.4 Regional Production Cost Model (PCM)

The 2026 TEPPC-approved interconnection-wide 10-year production cost model (PCM) "Common Case" will be reviewed and updated by WestConnect during Quarter 2 and 3 of the 2016-17 planning cycle consistent with the process described below.

Production Cost Model Development Process

The PS will initiate and coordinate a review of the data and assumptions contained within the TEPPC 2026 Common Case dataset by the WestConnect members, participants and stakeholders. 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 the PCM data and assumptions consistent with the Regional PFMs describe earlier in the Study Plan
- Peak and energy demand forecasts for the planning horizon (including EE and 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 PF model topology)
- Branch switching throughout the year
- Fuel price assumptions including carbon
- Unit operating characteristics
- Load, resource, and transmission bus assignments to balancing authorities

Once the data and assumptions contained within the TEPPC 2024 Common Case have been reviewed by the TO Members, the Planning Subcommittee will compile any changes submitted by the TO Members to create the base regional 2026 WestConnect production cost model, which will be called the WestConnect 2026 Base Case. Once compiled, the Planning Subcommittee will perform a series of initial, benchmarking studies with the goal of validating the output of the WestConnect 2026 Base Case.

Comparisons with historical path flows, typical wind/solar operation, historical generator dispatch, and forward looking resource and transmission projections can be performed at the discretion of the Planning Subcommittee to help vet the model results.

Production Cost Model Case Overview

The WestConnect 2026 Base Case will serve as the foundational case upon which additional scenario-based cases can be constructed. A summary of the production cost model cases slated for compilation and study in the 2016-17 planning cycle are summarized in

Table 3. These cases are described in detail below.

Table 3: Production Cost Model Case Summary

Case Name	Case ID	Case Description and Scope
2026 Base Case	WC26-PCM-REF	Business-as-usual reference case based on WECC 2026 Common Case with additional regional updates from WestConnect members.
Scenario TBD	TBD	TBD
Scenario TBD	TBD	TBD

The production simulation models used to conduct the congestion study will also be made available to PMC members and other planning regions as well as those gaining appropriate access through NDAs.

4.0 Regional Transmission Assessment Methodology

Regional transmission performance will be evaluated through the transmission assessment, which is initiated in Quarter 4 of the first year in the planning cycle. This section describes the studies that will be conducted using the regional models in order to evaluate reliability and economic performance that might result in regional transmission needs.

The transmission assessments will be performed on both the base case models and any scenarios included in the study plan. The base cases are meant to reflect the transmission system, generators, loads, and policies as planned for the ten-year horizon. It represents a "current trend" or "expected future", inclusive of expected load and resource forecasts, planned transmission topology, and enacted public policies. As mentioned in the previous section, the base case economic models also include expected parameters, such as fuel costs, generating unit operating characteristics, and hourly load shapes. Regional performance or congestion issues that result from the base case assessments may constitute a regional reliability, economic, or public policy regional transmission need.

Scenarios, on the other hand, model alternate but plausible futures where resource and load assumptions are different than what is assumed in the base case models. By incorporating scenario

assessments into the regional process, WestConnect stands to benefit by understanding how futures other than the base case could impact the regional transmission system. The impacts that result from scenario assessments might result in a regional reliability, economic, or public policy "opportunity". The PMC may decide if any opportunities resulting from scenario assessments warrant further exploration later in the planning process.

4.1 Local versus Regional Transmission Issues

For the purposes of the regional transmission needs assessment, a single-system "issue" (i.e. potential need) is an issue, both reliability and congestion related, that impacts only the TO-footprint in which it resides. Single TO 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 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.

4.2 Regional Reliability Assessment

Transmission planners primarily rely on three reliability assessment study methods to investigate a system's response to a contingency (i.e., disturbance). The timeframe for investigation, measured after the disturbance, is a common and practical way to distinguish the assessments. The three reliability assessment study methods are:

- Transient stability: first 30 seconds post-disturbance,
- Post-transient: system's condition at three minutes post-disturbance, and
- Steady-state: system's condition at 20 minutes post-disturbance.

The 2016-17 planning cycle may identify regional reliability needs in the 10-year planning horizon. 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 reliability standards and criteria, in particular the steady state requirements of the NERC TPL-001-4 Table 1[15] with the initial condition as system normal (P1, P2, P4, P5, and P7). When evaluating base case models, violations of NERC TPL-001-4 reliability standards creating reliability issues that the PMC determines to be regional in nature will be identified as a regional reliability need. If such regional needs are identified, then potential solutions will be solicited by the PMC for evaluation and potential inclusion into the Regional Transmission Plan. 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.

When scenario-based models are being evaluated, the same violations of reliability standards may be identified as regional reliability issues. However, these issues may result in potential regional

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

opportunities rather than needs. The PMC may determine if the opportunities warrant additional exploration and whether the PS should further evaluate those reliability opportunities later in the planning process.

Power Flow Contingency Analysis Process

The reliability assessment will include power flow contingency analyses based on the NERC reliability standards noted above for all power flow areas modeled within the WestConnect planning. The assessment will evaluate system performance with:

- no contingencies under normal initial system condition (i.e. "P0");
- single contingencies under normal initial system conditions (i.e. "P1, P2");
- if participants provide justification as to how multiple contingencies (i.e. "P4, P5, P7")might result in regional issues, they may provide those contingencies to the PS for consideration.

The assessment will evaluate contingencies of facilities above 200 kV. However, 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. Transmission elements of 100 kV and above will be monitored for performance, unless participants specify lower voltage elements to include in the monitor list. In conducting the assessment, modeled emergency ratings and voltages will be treated as the contingency ratings and voltages. 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.

If a single-system reliability violation (a NERC Transmission Planning (TPL) violation) is identified as part of the reliability assessment, the violation will be referred back to the appropriate TO for resolution. The affected TO will then have an opportunity to identify mitigation for the violation, and new data will be accepted or the violation will stay. Upon approval by the PMC, the modeling for the mitigation will then be incorporated back into the regional power flow model. Single-system reliability violations usually do not cause a regional reliability driven transmission need. In the event a simulated outage produces NERC TPL violations in more than one TO Member's system, that violation may result in the identification of a regional reliability-driven transmission need.

Once the local mitigation has been approved (not always possible) and added to the models, then the base case will be rerun to verify that system performance is acceptable. Any transmission projects or other mitigation to alleviate local reliability concerns will be documented in the Regional Plan. The documentation will identify the local reliability-related projects needed to comply with the reliability performance standards and criteria.

If no project solutions are submitted, WestConnect will seek to develop solutions to reliability 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.

4.3 Regional Economic Assessment

In order to evaluate the potential for regional economic needs in the WestConnect planning footprint, WestConnect conducts a process in which potentially congested elements are identified through forward-looking production cost modeling. Using results from base case model runs and other relevant sensitivities and scenarios, the Planning Subcommittee will review metrics such as congestion frequency (i.e. number of hours) and congestion cost (i.e. cost of redispatch of more expensive generation) for transmission elements greater than 100 kV and WECC transfer paths (or other defined interfaces in the WestConnect footprint).

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

- Transmission elements (or paths/interfaces) between multiple WestConnect member TOs;
- Transmission elements (or paths/interfaces) owned by multiple WestConnect member TOs; and
- Congestion occurring within the footprint of multiple TO's that has potential to be addressed by a regional transmission project or NTA.[16]

If one or more significantly congested elements are identified in the base case after this process is completed, the PMC can approve the list of congested elements as the regional economic need. The list of elements along with congestion results will be posted to the WestConnect website

With the posting of the economic transmission needs, a 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. At a minimum, benefits will include production cost savings and the value of decreased reserve sharing requirements. WestConnect will be further developing the framework for economic project evaluations during the 2016-17 planning cycle.

If no project solutions are submitted, WestConnect will seek to develop solutions to regional economic needs, prioritizing those elements that present severe congestion and/or are most proximate in time so as to identify those warranting evaluation in the current planning cycle. 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.

For scenarios (versus base cases), the PS will perform similar economic assessments, but regional congestion issues may be classified as regional economic opportunities rather than regional needs. The PMC may determine if the opportunities warrant further exploration and whether PS should further evaluate those economic opportunities later in the planning process.

Sensitivities

WestConnect also intends to conduct sensitivity studies on the base case economic model (2026 Reference Case) to better understand whether regional transmission congestion may be impacted by

[16] *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.*

adjusting certain parameters within the base models. Sensitivity analysis is different from scenario evaluation in that the sensitivities are meant 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:

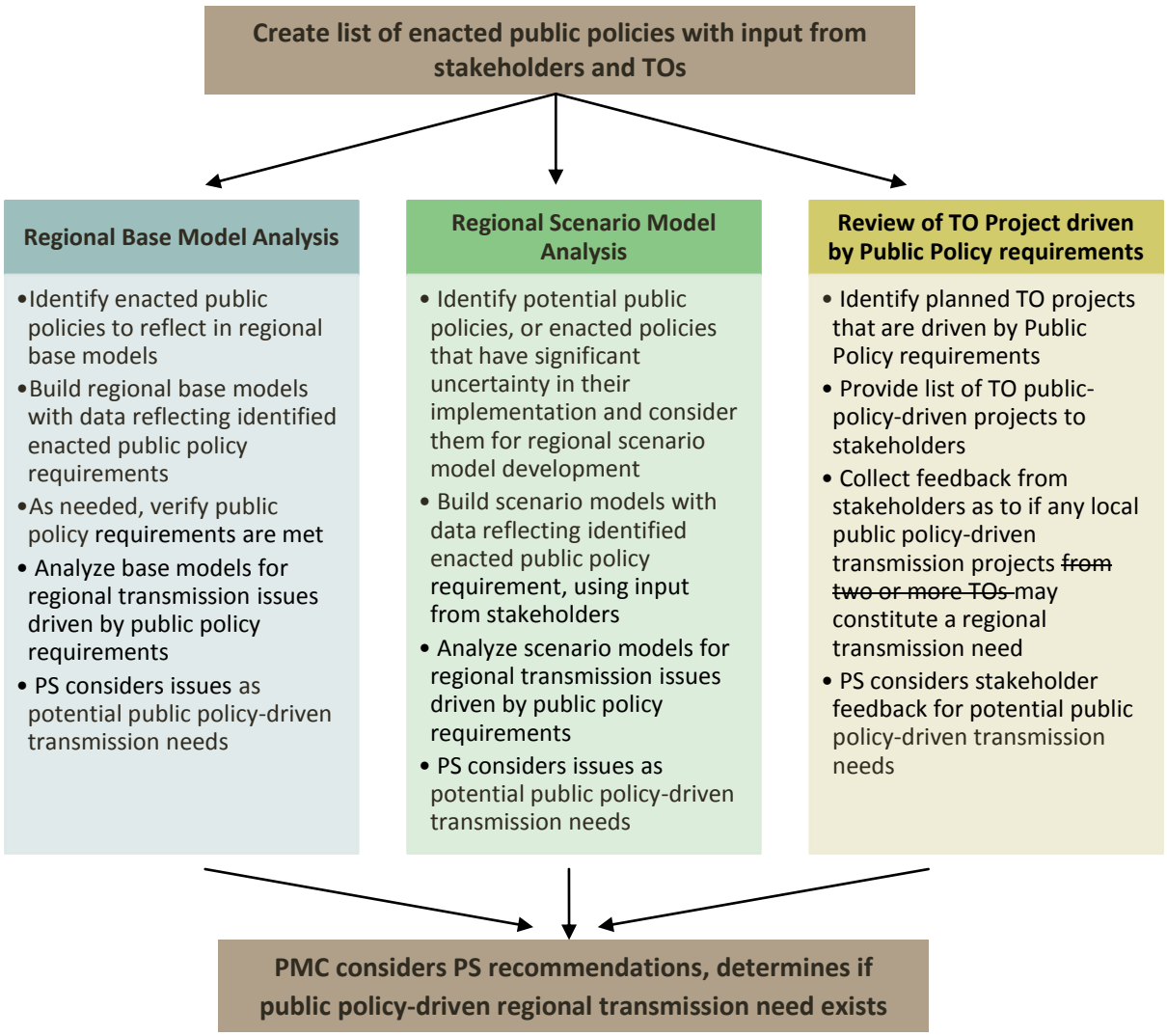
- Load forecast;
- Location of new generation and/or retirement;
- Hydro conditions (e.g. wet vs. dry);
- Natural gas price;
- Emissions cost (e.g. CO_2); and
- Other modeling parameters.

By adjusting individual parameters, this assessment will help WestConnect understand how sensitive the Base Transmission Plan is to variables, while also rounding out the 2026 Base Case congestion assessment. The PS will make recommendations to the PMC regarding how sensitivity analysis will be incorporated into the study process.

4.4 Regional 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. 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 rollup of local TO plans and their associated load, resource, and transmission assumptions. The PS has discretion to identify what enacted policies, if any, should be verified through the regional process to ensure they are properly represented in the regional base models. 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 or opportunities. 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 above. The regional public policy-driven transmission need identification process is outlined below in Figure 4.

Figure 4: Regional Public Policy Process



WestConnect will begin 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. This list will be developed by the Planning Subcommittee in public meetings, and will be made available on the WestConnect website. Once the list is developed, the Planning Subcommittee, with input from stakeholders, will divide the list into three categories to consider which enacted public policies (1) will be reflected in the regional base model analysis; (2) are subject to regional scenario model analysis given significant uncertainty in their implementation; or (3) are an enacted public policy but due to uncertainty, or modeling or data constraints does not lend itself to technical modeling assessments in the current planning cycle.

For polices that fall into category (1), the regional base models, including both power flow and production cost, will reflect the enacted public policies identified through the process described above. The data to reflect the public policies will be provided by TOs as it is assumed that enacted public policies are already reflected in TO's transmission plans. In some instances, the Planning Subcommittee may choose to verify (through various 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) using the regional base models to determine if there are any regional transmission issues that might constitute a public-policy driven transmission need. The details of this analytical process are described in Section 4.2 for the reliability assessment and in Section 4.3 for the economic assessment.

Public policies that fall under category (2) are *enacted* yet have uncertain implementations. These will be addressed through scenario analysis in the WestConnect process. The regional base case models are intended to represent the "expected" future, which naturally should include all enacted public policies. However, in the event an enacted public policy may result in a wide-range of alternative implementation plans (and correspondingly a wide-range of transmission impacts) scenario analysis allows WestConnect to plan for and understand these various alternative futures, recognizing that at some point the enacted public policy may gain enough certainty in its implementation such that a single set of assumptions can be included in the base regional models. The scenario models that reflect enacted but uncertain public policies will be evaluated using regional scenario models. These may be suggested by stakeholders or developed by the Planning Subcommittee. Regional base case models may be used as a starting point to develop the scenario models. Depending on the public policy being considered, WestConnect may have to perform analyses in order to determine what changes should be made to the base load, resource, and potentially transmission assumptions to properly reflect the uncertainty in the enacted public policy. The models that are to be built during the 2016-17 cycle for regional public policy scenario analysis are described in Section 3.3 and Section 3.4. Notably, the PMC is not obligated to identify a public-policy driven regional transmission need based on results from the regional scenario model analysis. For example, the Clean Power Plan is an enacted public policy that has significant uncertainty associated with its implementation. If modeling of the policy identifies an economic or reliability issue, the PMC can consider how likely the modeled future is. If it is a future that models Clean Power Plan implementation in a manner that is consistent with the expectations of states, utilities and stakeholders, then that scenario may be more likely to result in a public-policy driven regional transmission need as compared to a scenario that is representative of a single party's outlook on how the Clean Power Plan might unfold.

Another component of WestConnect's regional public policy planning process allows for the PS in consultation with stakeholders to review local (TO) public-policy driven transmission projects and make suggestions as to if the TOs 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 if it should be identified as a regional public policy-driven transmission need.

4.5 Identifying Regional Transmission Needs

After the PS completes the regional transmission assessments (as described in 4.2, 4.3, 4.4) 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 or opportunities. The process for identifying those regional transmission needs for which a regional transmission solution(s)

are sought and evaluated shall utilize various communication channels with stakeholders, including open PMC and PS meetings, stakeholder meetings, and the regional transmission needs assessment report (which will also 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. Regional opportunities will be handled in a similar matter, but note that mandatory project submittal windows and the potential for cost allocation are not considered for opportunities driven by scenario analysis.

In the event that no regional transmission needs are identified, the PMC will not collect transmission or non-transmission alternatives for evaluation against a regional need (on account of not having any regional transmission needs to evaluate the alternatives against). The scenario study work, and any regional opportunities it might bring to light, may warrant further exploration and evaluation at a later point in the planning process.

5.0 Alternatives to Meet Regional Needs

There will be an open submission period for project proposals to address identified regional transmission needs. The submission period will be noticed on the WestConnect website, and will also be distributed via email to WestConnect stakeholders. The submission period will last for no less than thirty (30) days and will end by the fifth (5th) quarter of the WestConnect planning cycle. Proposals submitted outside of that window will not be considered. Any active member[17] in good standing within one of the five PMC membership sectors may submit projects to meet an identified regional need to be considered for selection in the Regional Plan. Further, only those projects that meet the qualification criteria outlined in the WestConnect Regional Planning Process BPM for valid project submittals will be evaluated in the regional planning process.

More details on the specifics of that submittal window will be made available upon the identification or regional needs. During the window, project developers may submit regional transmission project solutions (and NTAs). These submittals will be accompanied by a $25,000 study deposit.

The categories of projects that may be submitted to WestConnect include:

- Transmission projects not seeking cost allocation
- Transmission projects seeking cost allocation
- Non-transmission alternatives[18]

Entities submitting projects must use the WestConnect Project Submittal Form and provide as much information as possible in order to allow WestConnect to model the project accurately. The Project Submittal Form for alternatives to meet regional needs is included as Appendix A.

In the event no project is submitted for an identified regional need during the project submittal window, the PMC must seek to develop a transmission or NTA to resolve the identified regional need. The PMC

[17] "Active member" is defined in Section 6.2 of the WestConnect Planning Participation Agreement

[18] Remedial Action Schemes can be submitted to be evaluated as an alternative to the construction of additional transmission facilities.

may not be able to identify any feasible solutions in any given transmission planning cycle, but it will undertake this obligation to seek a resolution.

6.0 Evaluation and Selection of Regional Alternatives

During Quarter 5, 6 and 7 of the 2016-17 planning cycle, the models and studies used to identify regional transmission needs will be used to determine whether the proposed projects (transmission projects and NTAs) resolve the identified needs. In the case of regional projects submitted as more efficient or cost effective solutions to identified regional transmission needs, the models and studies used to identify the regional transmission needs will be used to ensure that the reliability of the system is maintained and the proposed project does not create any new regional reliability, economic, or public policy needs. Projects that resolve a reliability criteria violation (a NERC TPL violation) identified as a regional reliability need will be deemed to have met that regional reliability need. Similarly, projects that are shown to reduce congestion and variable production cost within the WestConnect planning region will be deemed to have met that regional economic need. Projects that enable enacted public policy requirements to be satisfied will be deemed to have met that regional transmission need driven by a public policy requirement. Projects that meet an identified regional transmission need and are seeking cost allocation will be reviewed to determine their eligibility to seek cost allocation as more fully described in Section 4.5.1. In the event no projects have been proposed to meet an identified regional transmission need, the PMC will seek to develop an appropriate proposal and describe that project in the Regional Plan and it will not be subject to cost allocation.

More Efficient or Cost-Effective Regional Solutions

Regional projects determined to be capable of meeting an identified regional need will be evaluated and selected from among competing solutions to determine the preferred solution or combination of solutions to satisfy the regional transmission needs. The solution alternatives will be evaluated on a comparable basis according to the following criteria as outlined in the WestConnect Jurisdictional TOs' Tariffs: (1) ability to fulfill the identified need practically; (2) ability to meet applicable reliability criteria or NERC Transmission Planning Standards issues; (3) technical, operational and financial feasibility; (4) operational benefits/constraints or issues[19]; (5) cost-effectiveness over the time frame of the study or the life of the facilities, as appropriate (including adjustments, as necessary, for operational benefits/constraints or issues, including dependability); (6) where applicable, consistency with Public Policy Requirements or regulatory requirements., including cost recovery through regulated rates.

More Efficient or Cost-Effective Projects Seeking Cost Allocation

Projects submitted to WestConnect seeking regional cost allocation must first be determined by the PMC to be a more efficient or cost-effective solution to one or more regional transmission needs as outlined in Section 4.5.1. Those projects seeking regional cost allocation that are determined to be a more efficient or cost-effective solution will then be further reviewed by the PMC to determine if they are

[19] *In evaluating benefits and costs, the PMC may assess operational impacts through the use of tools other than the transient stability, post-transient and/or steady-state studies performed by the PMC during the needs identification phase, as necessary and appropriate under the circumstances.*

eligible for regional cost allocation based on an evaluation of their reliability, economic and/or public policy requirement benefits, as more completely described in Section 4.6 below.

7.0 Regional Cost Allocation

Projects submitted to the PMC seeking regional cost allocation that have been selected as the more efficient or cost effective alternatives to the identified regional needs will be reviewed to determine their eligibility to obtain cost allocation. All projects deemed eligible to seek cost allocation will subsequently go through the cost allocation process. All categories of benefits shall be considered when benefits are calculated. If a project cannot pass one cost allocation threshold alone (reliability, economic, or public policy), the sum of the benefits from each benefit category may be considered.

Those projects seeking cost allocation that are selected into the regional plan as a more efficient or cost effective alternative that also pass the applicable B/C thresholds will be selected into the regional plan for the purposes of cost allocation, and cost allocation will be performed pursuant to the cost allocation methodologies described in the WestConnect Regional Planning Process BPM.

Cost allocation for economic projects will be based on the calculation of economic benefits that each Transmission Owner will receive. Cost allocation for economic projects shall include sensitivity[20] analyses to ensure that benefits will actually be received by beneficiaries with relative certainty. Projects for which benefits and beneficiaries are highly uncertain and vary beyond reasonable parameters based on assumptions about future conditions will not be selected for cost allocation.

8.0 Issuance of a Regional Study Plan

By the end of Quarter 8 of the 2016-17 planning cycle, after stakeholder review and input, the PMC will vote to approve the 20156-17 WestConnect Regional Transmission Plan (Regional Plan). The Regional Plan will document why projects were either included or not included in the Regional Plan. Projects that are identified in the WestConnect Regional Plan will include:

- The base transmission plan,
- Transmission facilities and NTAs selected as the more efficient or cost effective regional solutions to the identified regional reliability, economic, and public policy needs, and
- Transmission facilities selected as the more efficient or cost effective regional solutions to the identified regional needs and that have been selected for the purposes of cost allocation[21]..

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[20] Some tariff refers to this "sensitivity" analysis a "scenario" analysis. However, FERC orders in the WestConnect dockets make it clear that FERC is talking about the likely and expected futures for the region. Therefore, for the Study Plan that concept is captured by the term "sensitivity".

[21] For any project selected in the Regional Plan for purposes of cost allocation, the PMC will select a transmission developer from among all Eligible Developers as the one who may use the regional cost allocation, as determined from the Transmission Developer Qualification Process. This developer selection process will occur following the identification of projects selected in the Regional Plan for purposes of cost allocation.

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Appendix A – Draft WestConnect Stakeholder Project Submittal Form

To be added

Appendix B – Draft WestConnect Scenario Submittal Form

To be added

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 2016-17 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 describe 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

Appendix D – Base Transmission Plan Process

To identify TO projects for inclusion in the 2026 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. In the course of this review, it was determined by the sponsoring TOs that some projects originally identified in the TPPL as "planned" were removed from the base plan list if the TO member and/or participant indicated that the project was on hold or currently in a conceptual status.

The Planning Subcommittee also met to review 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 the non-incumbent project sponsors were invited to attend. 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

The California Independent System Operator (CAISO) and WestConnect transmission planning footprints have strong electrical and operational ties, requiring close coordination of planning assumptions and information. Based on member and participant feedback, the WestConnect Planning Subcommittee considered two CAISO transmission projects for inclusion in the regional models that were recently approved by the CAISO Board of Directors and currently going through the CAISO competitive solicitation process. 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[22].

Interregional Transmission Projects

[Add considerations for interregional transmission projects (coming in by March 31st)]

[22] *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 E – Base Transmission Plan (2016-2026 Projects)

The tables below have the planned and conceptual projects which were submitted into the WestConnect TPPL. As of this draft, the Base Transmission Plan is under development and the TPPL projects are still under review. The planned projects are slated for inclusion in the Base Transmission Plan whereas the conceptual projects are slated for exclusion.

CCPG - Planned

Sponsor	Project Name	Development Status	Voltage
Black Hills Energy	Overton 115 kV Substation	Planned	115 kV
Black Hills Energy	LaJunta 115kV Substation	Planned	115 kV
Black Hills Energy	Baculite Mesa-Overton 115 kV line rebuild	Planned	115 kV
Black Hills Energy	Portland 115/69kV Transformer Replacement	Planned	115 kV
Black Hills Power	Second 230/69kV Yellow Creek Transformer	Planned	230 kV
Black Hills Power	South Rapid City - Westhill 230kV Rebuild	Planned	230 kV
Cheyenne Light Fuel and Power	Swan Ranch 115 kV Substation	Planned	115 kV
Cheyenne Light Fuel and Power	King Ranch 115kV Substation	Planned	115 kV
Cheyenne Light Fuel and Power	East Business Park - Cheyenne Prairie 115kV Line Reconductor	Planned	115 kV
Cheyenne Light Fuel and Power	Archer - Cheyenne Prairie 115kV Reconductor	Planned	115 kV
Cheyenne Light Fuel and Power	North Range - Swan Ranch 115kV Reconductor	Planned	115 kV
Platte River Power Authority	Boyd 230/115kV Substation Expansion	Planned	230 kV
Platte River Power Authority	Fort Collins Northeast 115/13.8kV Substation	Planned	115 kV
Platte River Power Authority	Timberline 230/115kV Transformer T3 Replacement	Planned	230 kV
Platte River Power Authority	Laporte 230kV Expansion	Planned	230 kV
Public Service Company of Colorado/ Xcel Energy	Pawnee - Daniels Park 345 kV Transmission Project	Planned	345 kV
Public Service Company of Colorado/ Xcel Energy	Rifle - Parachute 230 kV Line #2	Planned	230 kV

Sponsor	Project Name	Development Status	Voltage
Public Service Company of Colorado/ Xcel Energy	Happy Canyon Substation	Planned	115 kV
Public Service Company of Colorado/ Xcel Energy	Thornton Substation	Planned	115 kV
Public Service Company of Colorado/ Xcel Energy	Avery Substation	Planned	230 kV
Public Service Company of Colorado/ Xcel Energy	Moon Gulch 230/13.8 kV, 50 MVA Distribution Substation	Planned	230 kV
Public Service Company of Colorado/ Xcel Energy	Gilman-Avon 115 kV Transmission Line and Cap Bank	Planned	115 kV
Public Service Company of Colorado/ Xcel Energy	Weld to Rosedale 230 kV Line	Planned	230 kV
Public Service Company of Colorado/ Xcel Energy	Ault-Cloverly 115 kV Transmission Project	Planned	115 kV
Public Service Company of Colorado/ Xcel Energy	Milton-Rosedale 230 kV Transmission Line	Planned	230 kV
Tri-State Generation and Transmission Association	Big Sandy - Calhan 230 kV Project	Planned	230 kV
Tri-State Generation and Transmission Association	Falcon-Midway 115 kV Line Uprate Project	Planned	115 kV
Tri-State Generation and Transmission Association	La Junta (TS) 2nd 115/69kV, 42 MVA XFMR	Planned	115 kV
Tri-State Generation and Transmission Association	Badwater-Sawmill Creek 230 kV Line (Badwater-DJ 230 kV Line)	Planned	230 kV
Tri-State Generation and Transmission Association	Lost Canyon - Main Switch 115 kV Line	Planned	115 kV
Tri-State Generation and Transmission Association	San Luis Valley-Poncha 230 kV Line #2	Planned	230 kV
Tri-State Generation and Transmission Association	Wind River 115kV Reliability Upgrade	Planned	115 kV
Western Area Power Administration - RMR	Granby - Windy Gap	Planned	138 kV

Sponsor	Project Name	Development Status	Voltage
Western Area Power Administration - RMR	Estes-Flatiron 115-kV rebuild	Planned	115 kV
Western Area Power Administration - RMR	Badwater Reactor	Planned	Below 115 kV
Western Area Power Administration - RMR	Ault 345/230 kV XFMR Replacement	Planned	345 kV
Western Area Power Administration - RMR	Alliance - Dunlap 115 kV rebuild	Planned	115 kV

CCPG - Conceptual (Submitted to TPPL and slated for exclusion)

Sponsor	Project Name	Development Status	Voltage
Black Hills Energy	West Station - West Cañon 115kV	Conceptual	115 kV
Black Hills Energy	Desert Cove-Fountain Valley-MidwayBR 115kV line rebuild	Conceptual	115 kV
Cheyenne Light Fuel and Power	Cheyenne Prairie - South Cheyenne 115kV Double Circuit	Conceptual	115 kV
Public Service Company of Colorado/ Xcel Energy	Lamar-Vilas 230kV Transmission Project	Conceptual	230 kV
Public Service Company of Colorado/ Xcel Energy	Bluestone Substation	Conceptual	230 kV
Public Service Company of Colorado/ Xcel Energy	Parachute - Cameo 230 kV Transmission Line	Conceptual	230 kV
Public Service Company of Colorado/ Xcel Energy	Weld County Expansion Project	Conceptual	230 kV
Public Service Company of Colorado/ Xcel Energy	Wilson Substation	Conceptual	115 kV
Public Service Company of Colorado/ Xcel Energy	Glenwood-Rifle 115 kV Upgrade	Conceptual	115 kV
Public Service Company of Colorado/ Xcel Energy	Wheeler - Wolf Ranch 230 kV Transmission Project	Conceptual	230 kV
Tri-State Generation and Transmission Association	Lamar-Front Range Project	Conceptual	345 kV

Sponsor	Project Name	Development Status	Voltage
Tri-State Generation and Transmission Association	Boone-Walsenburg 230 kV Line	Conceptual	230 kV
Tri-State Generation and Transmission Association	Boone - Lamar 230 kV Line	Conceptual	230 kV
Western Area Power Administration - RMR	Basin Cap Bank	Conceptual	115 kV
Western Area Power Administration - RMR	Powell Cap Bank	Conceptual	115 kV

SSPG - Planned

Sponsor	Project Name	Development Status	Voltage
NV Energy	California – Bordertown 120kV Line	Planned	115 kV
NV Energy	Carlin Trend 120 kV Separation Scheme (RAS) to mitigate thermal overloading	Planned	345 kV
NV Energy	MYS (My Switch)	Planned	138 kV
Western Area Power Administration - SNR	Reconductor Keswick-Airport-Cottonwood 230 kV Lines	Planned	230 kV
Western Area Power Administration - SNR	Reconductor Olinda-Cottonwood #1 & #2 230 kV Lines	Planned	230 kV
Western Area Power Administration - SNR	Install 230 kV Reactive Voltage Support	Planned	230 kV
Western Area Power Administration - SNR	Elverta Line Swap	Planned	230 kV

SWAT - Planned

Sponsor	Project Name	Development Status	Voltage
Arizona Public Service	North Gila - Orchard 230kV Line	Planned	230 kV
Arizona Public Service	Morgan - Sun Valley 230kV Line	Planned	230 kV
Arizona Public Service	Morgan - Sun Valley 500kV Line	Planned	500 kV AC
Arizona Public Service	Ocotillo 230kV Generation Interconnections	Planned	230 kV

Sponsor	Project Name	Development Status	Voltage
El Paso Electric Company	Wrangler - Sparks Transmission Line Reconductor	Planned	115 kV
El Paso Electric Company	Leo Substation Upgrade from 69 kV to 115 kV	Planned	115 kV
El Paso Electric Company	LE1 (Organ) Substation	Planned	115 kV
El Paso Electric Company	LE1 (Organ) - Jornada Transmission Line	Planned	115 kV
El Paso Electric Company	Leo - Dyer (6500) Transmission Line Upgrade to 115 kV	Planned	115 kV
El Paso Electric Company	Leo - Milagro (7800) Transmission Line Upgrade to 115 kV	Planned	115 kV
El Paso Electric Company	NW2 (Verde) Substation 30 MVA Transformer	Planned	115 kV
El Paso Electric Company	Global Reach Substation Transformer (T2)	Planned	115 kV
El Paso Electric Company	Rio Bosque Substation Transformer (T2)	Planned	Below 115 kV
El Paso Electric Company	Patriot Substation Transformer (T2)	Planned	115 kV
El Paso Electric Company	Felipe 69 kV Substation Capacitor Bank	Planned	Below 115 kV
El Paso Electric Company	Afton North Autotransformer	Planned	345 kV
El Paso Electric Company	NW3 (Transmountain) Substation Transformer	Planned	115 kV
El Paso Electric Company	Afton North - Airport Transmission Line	Planned	115 kV
El Paso Electric Company	Airport – Jornada Transmission Line	Planned	115 kV
El Paso Electric Company	Global Reach Substation Capacitor Bank	Planned	115 kV
El Paso Electric Company	Picante Substation Capacitor Bank	Planned	115 kV
El Paso Electric Company	Uvas Substation 12 MVA Transformer	Planned	115 kV
El Paso Electric Company	Pipeline Substation 33.6 MVA Transformer	Planned	115 kV
El Paso Electric Company	Leasburg Substation 33.6 MVA Transformer	Planned	115 kV
El Paso Electric Company	Sol – Vista Transmission Line Upgrade	Planned	115 kV
El Paso Electric Company	Lane-Pendale-Copper (16900) 69 kV Line Rebuild & Reconductor	Planned	Below 115 kV
El Paso Electric Company	Rio Grande-Sunset (5600) 69 kV line Reconductor	Planned	Below 115 kV

Sponsor	Project Name	Development Status	Voltage
El Paso Electric Company	Rio Grande – Asarco Tap (5500) 69 kV Line Reconductor	Planned	Below 115 kV
El Paso Electric Company	Eastside Loop Expansion Phase I	Planned	115 kV
El Paso Electric Company	East side loop expansion Phase I	Planned	115 kV
El Paso Electric Company	East side loop expansion Phase 2	Planned	115 kV
El Paso Electric Company	Move Sparks 115/69 kV autotransformer to Felipe substation	Planned	115 kV
El Paso Electric Company	Sparks to Felipe 69 kV to 115 kV line upgrade	Planned	115 kV
Imperial Irrigation District	Niland Substation Transformer Replacement	Planned	161 kV
Los Angeles Department of Water and Power	Re-conductor Haskell Canyon-Rinaldi 230 kV Rinaldi Line 1	Planned	230 kV
Los Angeles Department of Water and Power	New Scattergood-Olympic 230 kV Cable A	Planned	230 kV
Los Angeles Department of Water and Power	Re-conductor Barren Ridge-Haskell Canyon 230 kV Line 1	Planned	230 kV
Los Angeles Department of Water and Power	Castaic-Haskell Canyon 230 kV Line 3	Planned	230 kV
Los Angeles Department of Water and Power	Upgrade Haskell Canyon-Sylmar 230 kV Line1	Planned	230 kV
Los Angeles Department of Water and Power	Upgrade Haskell Canyon-Olive 230 kV Line	Planned	230 kV
Los Angeles Department of Water and Power	Upgrade Olive-North Ridge 230 kV Line	Planned	230 kV
Los Angeles Department of Water and Power	Re-conductor Valley-Rinaldi 230 kV Lines 1&2	Planned	230 kV
Los Angeles Department of Water and Power	Re-conductor Valley-Toluca 230 kV Lines 1&2	Planned	230 kV
Los Angeles Department of Water and Power	Victorville 500/287 kV auto-transformer installation	Planned	500 kV AC
Los Angeles Department of Water and Power	Upgrade Toluca 500/230 kV Bank H	Planned	500 kV DC
Los Angeles Department of Water and Power	Upgrade Rinaldi 230 kV CBs	Planned	230 kV
Los Angeles Department of Water and Power	New Haskell Canyon-Sylmar 230 kV Line	Planned	230 kV
Los Angeles Department of Water and Power	Intermountain Replacement at 1200 MW	Planned	Below 115 kV
Public Service Company of New Mexico	Alamogordo Voltage Support Phase II	Planned	115 kV
Public Service Company of New Mexico	Second Yah-Ta-Hey 345/115 kV Transformer	Planned	345 kV

Sponsor	Project Name	Development Status	Voltage
Public Service Company of New Mexico	Guadalupe SVC	Planned	345 kV
Public Service Company of New Mexico	Cabezon Switching Station	Planned	345 kV
Salt River Project	Abel-Pfister-Ball 230kV (formerly RS12-RS-24-Abel and Abel-Moody)	Planned	230 kV
Salt River Project	Rogers – Santan 230kV	Planned	230 kV
Salt River Project	Schrader - RS28 230kV Transmission Line	Planned	230 kV
Salt River Project	RS28 Substation	Planned	230 kV
Salt River Project	Hassayampa - Pinal West #1 Jojoba line loop	Planned	500 kV AC
Salt River Project	Browning - Corbell 230kV Line Reconfiguration	Planned	230 kV
Southwest Transmission Cooperative	Butterfield Substation Capacitor Bank	Planned	230 kV
Southwest Transmission Cooperative	San Rafael Substation Capacitor Bank	Planned	230 kV
Southwest Transmission Cooperative	Bicknell Substation Capacitor Bank	Planned	115 kV
Tri-State Generation and Transmission Association	NENM Reliability Improvement	Planned	115 kV
Tucson Electric Power	Kino 138/13.8 kV Substation	Planned	138 kV
Tucson Electric Power	Marana 138/13.8 kV Substation	Planned	138 kV
Tucson Electric Power	Corona 138/13.8 kV Substation	Planned	138 kV
Tucson Electric Power	Craycroft Barril 138/13.8 kV Substation	Planned	138 kV
Tucson Electric Power	Irvington - Tucson 138 kV Transmission Line Circuit 2	Planned	138 kV
Tucson Electric Power	Harrison 138/13.8 kV Substation	Planned	138 kV
Tucson Electric Power	Hartt 138/13.8 kV Substation	Planned	138 kV
Tucson Electric Power	Marana 138kV Transmission Line	Planned	138 kV
Tucson Electric Power	Orange Grove 138/13.8 kV Substation	Planned	138 kV
Tucson Electric Power	Rosemont 138kV Line	Planned	138 kV
Tucson Electric Power	Point of Interconnection 138kV Switchyard (Rosemont)	Planned	138 kV
Tucson Electric Power	Tortolita 500 kV Switchyard	Planned	500 kV AC

Sponsor	Project Name	Development Status	Voltage
Tucson Electric Power	Naranja 138/13.8 kV Substation	Planned	138 kV
Tucson Electric Power	Rancho Vistoso to La Canada 138kV Line Uprate	Planned	138 kV
Tucson Electric Power	Irvington – Drexel 138 kV Line Uprate	Planned	138 kV
Tucson Electric Power	NL - NARANJA 138 kV Project	Planned	138 kV
Tucson Electric Power	Tortolita - Rancho Vistoso 138kV Line Re-configuration: Tortolita - NL EXP / NL EXP - Rancho Vistoso	Planned	138 kV
Tucson Electric Power	NL EXP - Rancho Vistoso 138kV Line Uprate	Planned	138 kV
Tucson Electric Power	NL Expansion 138kV Capacitor Bank upgrades, banks 1&2	Planned	138 kV
Tucson Electric Power	Del Cerro - Tucson 138 kV Line Uprate/Re-conductor	Planned	138 kV
Tucson Electric Power	Irvington 138 kV breaker-and-a-half substation	Planned	138 kV
Tucson Electric Power	South Loop 345 kV, Conversion to breaker-and-a-half substation	Planned	345 kV
Tucson Electric Power	Greenlee 345 kV, Conversion to breaker-and-a-half substation	Planned	345 kV
Tucson Electric Power	East Loop Bus Tie Breaker	Planned	138 kV
Tucson Electric Power	La-Canada Line Switch	Planned	138 kV
Tucson Electric Power	NorthEast Bus Tie Breaker	Planned	138 kV
Tucson Electric Power	North Loop - Naranja Line Uprate	Planned	138 kV
Tucson Electric Power	Naranja - Rancho Vistoso Line Uprate	Planned	138 kV
Tucson Electric Power	Roberts Capacitor Bank Addition	Planned	138 kV
Western Area Power Administration - DSW	Parker – Headgate Rock	Planned	161 kV
Western Area Power Administration - DSW	Tucson Substation	Planned	230 kV
Western Area Power Administration - DSW	Gila 161 kV substation rebuild	Planned	161 kV
Western Area Power Administration - DSW	ED-5 - Marana Tap "Saguaro Bypass"	Planned	115 kV

SWAT - Conceptual (Submitted to TPPL and slated for exclusion)

Sponsor	Project Name	Development Status	Voltage
Arizona Public Service	Northeastern Arizona - Phoenix 500kV line	Conceptual	500 kV AC
Arizona Public Service	Komatke 230/69kV Substation	Conceptual	230 kV
Arizona Public Service	Buckeye - TS11 - Sun Valley 230kV Line	Conceptual	230 kV
Arizona Public Service	Sun Valley - TS10 - TS11 230kV Line	Conceptual	230 kV
Arizona Public Service	Pinal Central - Sundance 230kV Line	Conceptual	230 kV
Arizona Public Service	Orchard - Yucca 230kV Line	Conceptual	230 kV
Arizona Public Service	El Sol - Westwing 230kV Line	Conceptual	230 kV
Arizona Public Service	Avery 230/69kV Substation	Conceptual	230 kV
Arizona Public Service	Scatter Wash 230/69kV Substation	Conceptual	230 kV
Salt River Project	Hassayampa - Pinal West 500kV #2	Conceptual	500 kV AC
Salt River Project	Silver King to RS29 230kV Transmission Line	Conceptual	230 kV
Salt River Project	RS29 to RS30 115kV Transmission Line	Conceptual	115 kV
Salt River Project	RS28 to RS27 230kV Transmission Line	Conceptual	230 kV
Salt River Project	New Oak Flat - Silver King 230kV	Conceptual	230 kV
Salt River Project	New Superior - New Oak Flat 230kV	Conceptual	230 kV
Tucson Electric Power	East Ina 138/13.8 kV Substation	Conceptual	138 kV
Tucson Electric Power	Sun City 138/13.8 kV Substation	Conceptual	138 kV
Tucson Electric Power	Golden Valley 230kV Transmission Line	Conceptual	230 kV
Tucson Electric Power	Griffith - N. Havasu 69/230kV Transmission Line	Conceptual	230 kV
Tucson Electric Power	Orange Grove - East Ina 138kV Transmission Line	Conceptual	138 kV
Tucson Electric Power	Midvale - Spencer 138 Transmission Line	Conceptual	138 kV
Tucson Electric Power	Winchester - Vail Double Circuit 345kV Line	Conceptual	345 kV
Tucson Electric Power	Vail 345/138kV Transformer T4	Conceptual	345 kV

Sponsor	Project Name	Development Status	Voltage
Tucson Electric Power	Vail - Irvington (New Substation) - South Loop 345kV Line and Irvington Substation	Conceptual	345 kV
Tucson Electric Power	Willow 345kV Substation	Conceptual	345 kV
Tucson Electric Power	University of Arizona Tech Park 138/13.8kV Substation	Conceptual	138 kV
Tucson Electric Power	Spencer 138/13.8kV kV Substation	Conceptual	138 kV
Tucson Electric Power	Rancho Vistoso - Sun City 138kV Line	Conceptual	138 kV
Tucson Electric Power	Irvington – Tech Park / Tech Park – Vail 138 kV Line Reconductor	Conceptual	138 kV
Tucson Electric Power	Anklam 138/13.8kV Substation	Conceptual	138 kV
Tucson Electric Power	Medina 138/13.8 kV Substation	Conceptual	138 kV
Tucson Electric Power	Raytheon 138/13.8 kV Substation	Conceptual	138 kV
Tucson Electric Power	UA Med 138/13.8 kV Substation	Conceptual	138 kV
Western Area Power Administration - DSW	Blythe – Goldmine Tap	Conceptual	161 kV
Western Area Power Administration - DSW	Bouse – Kofa	Conceptual	161 kV
Western Area Power Administration - DSW	Dome Tap-Gila	Conceptual	161 kV
Western Area Power Administration - DSW	Dome Tap – Wellton Mohawk	Conceptual	161 kV
Western Area Power Administration - DSW	Gila-Knob	Conceptual	161 kV
Western Area Power Administration - DSW	Goldmine Tap - Knob	Conceptual	161 kV
Western Area Power Administration - DSW	Headgate Rock – Blythe	Conceptual	161 kV
Western Area Power Administration - DSW	Kofa – Dome Tap	Conceptual	161 kV
Western Area Power Administration - DSW	Parker – Blythe	Conceptual	161 kV
Western Area Power Administration - DSW	Coolidge - Valley Farms	Conceptual	115 kV
Western Area Power Administration - DSW	ED5-Saguaro Northern	Conceptual	115 kV
Western Area Power Administration - DSW	ED5 - Saguaro Southern	Conceptual	115 kV
Western Area Power Administration - DSW	Valley Farms - Oracle	Conceptual	115 kV
Western Area Power Administration - DSW	Tucson - Nogales	Conceptual	115 kV

Sponsor	Project Name	Development Status	Voltage
Western Area Power Administration - DSW	Saguaro - Tucson	Conceptual	115 kV
Western Area Power Administration - DSW	Nogales - Apache	Conceptual	115 kV
Western Area Power Administration - DSW	Saguaro - Oracle 115kV	Conceptual	115 kV
Western Area Power Administration - DSW	Tucson - Oracle	Conceptual	115 kV

Regional (TO Projects in >1 SPG) - Planned

Sponsor	Project Name	Development Status	Voltage
NV Energy	Harry Allen 500/230 kV Transformer	Planned	500 kV AC
NV Energy	Miller - NLV 69kV Upgrade	Planned	Below 115 kV
NV Energy	First Solar - Playa 2 (HA230kV)(100MW)	Planned	230 kV
NV Energy	Sun Power - Boulder (NSO230kV) (100MW)	Planned	230 kV
NV Energy	Silverhawk 700MW CC Generator	Planned	500 kV AC
NV Energy	Reid Gardner 4 Retirement	Planned	230 kV
NV Energy	Clark 4 Generator Retirement	Planned	Below 115 kV
NV Energy	Apple 120kV Load	Planned	115 kV
NV Energy	Wild Horse 120kV	Planned	115 kV
NV Energy	Luning Solar - Table Mountain 50MW PV Generator	Planned	115 kV
NV Energy	Coyote Creek 120kV Ring Bus	Planned	115 kV
NV Energy	Tracy 345/120kV XFMR #2	Planned	345 kV
NV Energy	Painted Rock Distribution Substation	Planned	115 kV

Regional (TO Projects in >1 SPG) - Conceptual (Submitted to TPPL and slated for exclusion)

Sponsor	Project Name	Development Status	Voltage
Tri-State Generation and Transmission Association	San Juan Basin Energy Connect Project	Conceptual	230 kV

Non-Incumbent Developer Projects

The table below has all Independent Transmission Developer (ITD) projects which were submitted into the WestConnect TPPL. Their inclusion in the Base Transmission Plan is pending further review of their project data. The following projects were submitted into the WestConnect TPPL and evaluated for inclusion in the Base Transmission Plan. No projects passed the threshold required by the WestConnect Planning Process for inclusion in the base transmission plan, as indicated by the third column. However, exclusion from the base plan does not mean that a project is ineligible to seek Order No. 1000 regional cost allocation. Eligibility for Order No. 1000 cost allocation is a separate analysis, which follows the identification of regional transmission needs. Project submittals for new transmission projects to satisfy an identified regional transmission need will come later in the WestConnect Regional Planning Process.

Sponsor	Project Name	In Base Plan Transmission Plan?	Voltage
Tres Amigas LLC	Tres Amigas Superstation	No	345 kV
Clean Line Energy Partners	Centennial West Clean Line	No	600 kV DC
Great Basin Transmission, LLC	Southwest Intertie Project or SWIP (SWIP Phase II)	No	500 kV AC
Lucky Corridor, LLC	Lucky Corridor Transmission Project	No	345 kV
San Luis River Colorado Project	SLRC Power Center, Transmission Line	No	230 kV
Southline Transmission, L.L.C.	Southline Transmission Project -- (Afton-Apache)	No	345 kV
Southline Transmission, L.L.C.	Southline Transmission Project -- (Apache-Saguaro)	No	230 kV
SunZia Transmission, LLC	SunZia Southwest Transmission Project	No	500 kV AC
TransWest Express, LLC	TransWest Express Project	No	600 kV DC
Wyoming-Colorado Intertie, LLC	Wyoming-Colorado Intertie	No	345 kV

Sponsor	Project Name	In Base Plan Transmission Plan?	Voltage
Central Arizona Project	Harcuvar Transmission Project (HTP)	No	230 kV
Clean Line Energy Partners	Western Spirit Clean Line	No	345 kV
Duke-American Transmission Company	Zephyr	No	500 kV DC
Great Basin Energy Development, LLC	Great Basin HVDC	No	500 kV DC
Southwest Transmission Partners, LLC	North Gila - Imperial Valley #2	No	500 kV AC
TransCanada	Chinook	No	500 kV DC

Appendix F – Regional Model Case Details

Power Flow Case Detail

These cases will be updated to reflect the specific model assumptions outlined in this study plan according to the power flow model development process described above. Only those data and models associated with a TO Member, or a neighboring planning region to the extent that information is provided to WestConnect, will be updated to create the regional power flow models. The remaining systems within the Western Interconnection will be maintained as originally modeled by WECC.

WestConnect is preparing regional power flow cases for the 2016-17 study cycle. Each of the cases are described below. These cases will be updated to reflect the specific model assumptions outlined in the table according to the power flow model development process described above. Only those data/models associated with a TO Member, or a neighboring planning region to the extent that information is provided to WestConnect, will be updated to create the regional power flow models, and the remaining systems within the Western Interconnection will be maintained as originally modeled by WECC.

Case Name: 2026 Heavy Summer (WC26-HS)	
Starting Case	WECC 2026 Heavy Summer (26HS1)
Purpose	A 10-year heavy summer regional power flow base case model will be developed by WestConnect, starting with the WECC 2026 Heavy Summer (26HS1) case. The WECC case is a general 10-year case with typical flows represented throughout WECC. It is representative of peak load for the months of June through August at 1500 to 1700 MDT. Used to identify issues that may result in regional reliability need??
Generation	Will include forecasted generation to meet load plus reserve requirement, as identified in TO resource and/or transmission plan. Generation modeled should include all existing, under construction, and planned generation that has received regulatory approval.
Transmission	Will include existing transmission system plus transmission facilities identified in 2016-17 base transmission plan (See Section X.X). • *Address path flow targets*
Load	Peak summer load condition. Forecast loads included cases will be based on the 2026 median load forecast for each TO Member including the impact of planned energy efficiency, demand side management programs, and behind-the-meter distributed generation resources. All in-service and planned reactive resources will be included.
Firm Transfers	Scheduled firm transfers will be included.
Public Policy	Renewable resources to achieve enacted public policies including but not limited to RPS will be accounted for in model.

Case Name: 2026 Light Spring (WC26-LS)	
Starting Case	WECC 2026 Light Spring (26LS1)
Purpose	A 10-year light spring regional power flow base case model will be developed by WestConnect, starting with the WECC 2026 Light Spring (26LSP1) case, which is being constructed for the western planning regions and TEPPC. The case is representative of light spring loading conditions (May through March at 0300 – 0500 MST), with high wind generation dispatch. Used to identify issues that may result in regional reliability need?
Generation	
Transmission	
Load	*Lighter load*
Firm Transfers	
Public Policy	

1

Case Name: Scenario Placeholder (WC26-S1)	
Starting Case	
Purpose	
Generation	
Transmission	
Load	
Firm Transfers	
Public Policy	

2

Case Name: Scenario Placeholder (WC26-S2)	
Starting Case	
Purpose	
Generation	
Transmission	
Load	
Firm Transfers	
Public Policy	

3

Case Name: Scenario Placeholder (WC26-S3)	
Starting Case	
Purpose	
Generation	
Transmission	
Load	
Firm Transfers	
Public Policy	

4

Production Cost Model Case Detail

WestConnect is preparing regional production cost model cases for assessment during the 2016-17 study cycle. Each of the cases are described in detail below. These cases will be compiled by the Planning Subcommittee with input and support from TO members, TO participants, and other stakeholders.

Case Name: 2026 Reference Case (WC26-PCM-REF)	
Starting Case	WECC 2026 Common Case
Purpose	The WECC TEPPC 2026 Common Case dataset, in its release version, will be used as a starting point to construct the regional production cost model. All data used to create the 2026 WestConnect regional production cost model[23] will be consistent with the data used to develop the regional power flow models (e.g., with regard to resource additions and retirements, and the transmission network topology).
Generation	
Transmission	
Load	
Public Policy	
Other	Any change made to the WECC-TECC 2026 Common Case dataset to reflect assumptions set forth in this study plan will be documented by WestConnect for inclusion in the final plan. Only those data and models associated with a TO Member, or a neighboring planning region to the extent that information is provided to WestConnect, will be updated to create the 2026 WestConnect regional production cost model, and the remaining systems within the Western Interconnection will be maintained as originally modeled by WECC.

Case Name: Scenario TBD	
Starting Case	
Purpose	
Generation	
Transmission	
Load	
Public Policy	
Other	

[23] The 2024 2026 WestConnect regional production cost models will be developed in GridView format.

Case Name: Scenario TBD	
Starting Case	
Purpose	
Generation	
Transmission	
Load	
Public Policy	
Other	

1

2

Case Name: Scenario TBD	
Starting Case	
Purpose	
Generation	
Transmission	
Load	
Public Policy	
Other	

3

4

Case Name: Scenario TBD	
Starting Case	
Purpose	
Generation	
Transmission	
Load	
Public Policy	
Other	

5

6

Appendix G – Data Exchange Procedures for Model Development

The steps below provide a summary of how the regional planning models will be developed. More details will be provided in a forthcoming Model Development Report.

Step 1 - Review topology and data accuracy of the WECC Reference Cases

Power Flow Models

Participants will identify changes to the WECC 2026 Heavy Summer (26HS1) and WECC 2026 Light Spring (26LS1) reference cases necessary to represent the regional base transmission plan. Data accuracy should be ensured for all elements (buses, branches, shunt devices, loads, resources, etc.) excluding review of individual load and resource magnitudes (L&R modifications will be done at a later step after topology is correct).

Remove open elements that represent planned projects not included in the base transmission plan (potential scenarios with those projects will be created by separate change files to create, remove, and modify elements in the cases).

Changes that include more than one data owner (e.g. tie lines) need to be coordinated with all affected owners. Include comments to indicate coordination was done.

Production Cost Model

Participants will identify electric topology changes to the WECC 2026 Common Case (2026CC) necessary to represent the regional base transmission plan and for consistency with the 26HS1 and 26LS1 power flow cases. 2026CC's topology will initially be based on the 2025 Heavy Summer (25HS1) power flow case, so the review will likely involve comparisons between the 25HS1, 26HS1, and 26LS1 cases.

The study consultant will export the 2026CC topology into a set of spreadsheets for review by all participants, in which the differences between it and the 26HS1 & 26LS1 cases will be highlighted. Participants with the ABB GridView software will be able to review the model directly. At a minimum, the topology will include:

- General Load, Generator, and Branch (Transformers & Lines) data – e.g., name, ID, bus location, ownership, type.
- Interfaces (groups of branches) and Nomograms (groups of operationally-tied elements)
- List of Areas, Regions, and Reserve Sharing Groups

Step 2 - Submit changes

All change submittals will include two pieces of information: (1) software-specific change files for direct application to the power flow cases and (2) written comments which describe the intended revisions.

Power Flow Models

SWAT and SSPG participants (PSLF users) will submit change files in epc append format (*.epc) to the study consultant. PNM has a tool that works like the WECCtools epcl_xtract program for PSLF users - it

produces an epc file instead of an EPCL script (*.p). A separate epc change file should be provided for each set of related updates, and each with comments describing the intended updates.

CCPG participants (primarily PSS/E users) will submit changes to the CCPG coordinator. 100 is the estimated threshold for element deletions above which it's more efficient for the study consultant to develop a script to produce individual epc change files. As a result:

- If the number of element deletions is 100 or less, then the CCPG coordinator will submit PSS/E raw format append files (*.raw) to the study consultant that each include comments describing intended updates, with ***emphasis*** given to elements that must be deleted from the model since raw append files do not explicitly include deletion flagging.
- If the number of element deletions exceeds 100, then the CCPG coordinator will submit a complete case in PSS/E raw format (*.raw) which includes all desired updates, including comments describing the embedded updates, with ***emphasis*** given to elements that must be deleted from the model since raw append files do not explicitly include deletion flagging.

Production Cost Model

Participants will submit changes based on whether or not they have the ABB GridView software:

- All participants will be able to update the information in the spreadsheets provided in Step 1. Participants will submit the revised spreadsheet file(s) & comments describing the intended updates to the study consultant.
- GridView users will be able to update the information directly within the GridView software. These participants will submit change files in MS Access format (*.mdb) that can be made via GridView's "Database Comparison" feature (i.e., compare the updated case with). A separate epc change file should be provided for each set of related updates, and each with a descriptive name and comments describing the intended updates.

Step 3 - First Modification of WECC Reference Cases

Power Flow Models

The study consultant will incorporate submitted topology revisions, check RPS, solve cases, and flag suspicious data. Participant voltage limits and contingency definitions developed during the 2015 abbreviated planning cycle will be used to test the cases. The cases and test contingency analysis output will be posted for participant review. This test contingency analysis output will be discarded after review because testing is the only purpose of the output. Contingency definitions for the 2016-17 planning cycle will be developed in a later step.

Production Cost Model

The study consultant will incorporate submitted topology revisions, check RPS and resource adequacy, run a test simulation, and flag suspicious data. The case (in GridView and spreadsheet formats) and its simulation output (benchmarked against historical data) will be posted for participant review.

Step 4 - Second Modification of WECC Reference Cases & Creation of Scenario Cases

Power Flow Models

Participants will review the first modification cases along with their test contingency analysis output and submit further topology and voltage limit corrections, if any.

The participants, in coordination with the subregional planning groups (SPG's), will review & submit revisions to the loads, resources, and area interchange for corrected base and scenario conditions. The SPG's will submit L&R and area interchange in any of three formats: PSLF epc append files, PSS/E raw append files, and/or spreadsheets.

The study consultant will modify and solve the cases. The test contingency analysis will be repeated. The cases with test contingency analysis output will be posted for participant review (test contingency analysis output will be discarded after review).

Production Cost Models

Participants will review the first modification case along with its outputs compared with historical data and submit further topology corrections, if any.

The participants, in coordination with the subregional planning groups (SPG's), will review & submit revisions to the loads, resources, and associated economic and constraint data that will enable an economic evaluation for all hours in a year (such as winter ratings/capacities that may not be specified in the power flow reference cases). At a minimum, the data to be review & revised will include:

- Generator min & max capacity(ies), operating efficiencies (e.g., heat rates), & costs (e.g., fuel, variable operations & maintenance or VOM)
- Ratings for Interfaces (group of branches)
- Limits of Nomograms (groups of operationally-tied elements)
- Reserve Requirements by Areas, Regions, Reserve Sharing Groups, and Owner

The SPG's will submit updates in any of two formats: revised spreadsheets or change files made with GridView's "Database Comparison" feature.

The study consultant will modify and run the cases. The test contingency analysis will be repeated. The cases (in GridView and spreadsheet formats) and their simulation output (benchmarked against historical data) will be posted for participant review.

Step 5 - Develop Contingency Definitions

Power Flow Models

The guiding objective for developing contingency definitions is to identify regional transmission needs. The objective does not include supplementing TO's TPL standards compliance studies.

After receipt of the final changes from participants, the study consultant will incorporate the changes and solve the cases. An initial list of automatically created single branch outages 230kV and above will be created and contingency analysis performed (note: results from the 2015 abbreviated cycle appeared to show no regional issues for 115kV outages, but participant time was spent reviewing and addressing

many flagged 115kV issues. The intent of limiting the scope of contingencies is to improve efficiency). The cases and contingency analysis results will be posted for participant review.

Participants will review the single branch outage list and (a) identify invalid single branch outages to remove and (b) identify other contingencies (regardless of P level) not included in the list that could potentially flag regional transmission needs. Submit contingency definitions in the WECC Contingency and RAS Format. PSS/E does not support the WECC Contingency and RAS Format. Participants who rely on PSS/E and do not use PSLF or PowerWorld Simulator can submit contingency definitions in the PSS/E ACCC *.con format.

Production Cost Model

Participants will identify which, if any, contingencies warrant inclusion in the production cost simulation.

Step 6 - Finalize Cases and Contingency Definitions (Power Flow Only)

The study consultant will incorporate final submitted case and contingency definition changes. The final cases and contingency analysis output will be posted for a final review before PMC approval of the cases.

Step 7 - Transient Stability Simulations (Power Flow Only)

Transient stability simulations require additional data (switching sequences and times, fault impedance, and dynamic data not included in the WECC Master Dynamics File). If participants identify transient stability simulations that could help identify regional transmission needs, a customized procedure will be developed for those specific simulations.