Annual Interregional Coordination Meeting (AICM) - 2025

March 24, 2025

California ISO Offices
250 Outcropping Way, Folsom, California

Housekeeping reminders

- Stakeholder calls and meetings related to Transmission Planning are not recorded.
- This collaborative meeting is intended to stimulate open dialogue and engage different perspectives.
- Please keep comments professional and respectful.
- Please try and be brief and refrain from repeating what has already been said so that we can manage the time efficiently.
- If you need technical assistance during the meeting, please send a chat to the event producer

Instructions for raising your hand to ask a question

- Open the Participant and Chat panels from the bottom right.
- If you are connected to audio through your computer or used the “call me” option, select the raise hand icon  located on the bottom of your screen.
  - **Note**: *3 only works if you dialed into the meeting.
  - Please remember to state your name and affiliation before making your comment.
- You may also send your question via chat to all panelists.

Agenda for the 2025 AICM

Topic	Presenter	Time	Duration (minutes)
Introductions	All	1:00 pm	20
WECC Activities	WECC	1:20 pm	40
FERC 1920/1920A Discussions	All	2:00 pm	50
Break		2:50 pm	20
Updates – Roundtable			
	NorthernGrid	3:10 pm	30
	WestConnect	3:40 pm	30
	CAISO	4:10 pm	30
Wrap-up	CAISO	4:40 pm	20

Introductions

Annual Interregional Coordination Meeting (AICM)
Folsom, California ISO

March 24, 2025

California ISO

WECC Activities

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WECC

WECC Activities Interregional Coordination Meeting

March 24, 2025

Enoch Davies

Manager, Reliability Modeling

Topics

- Long-term dataset development (Year 20)
- ADS status
- Base case development observations
- WECC Risk Register activity

Long-term Dataset Development (Year 20)

- Task force established July 2023 in response to pending FERC Order on regional and interregional long-term (20-year) transmission planning and other 20-year planning efforts in the West
- Recommendation document for approval by the RAC describes developing long-term datasets, modeling assumptions, and planning methodologies
- WECC will produce Year 20 models for both power flow and production cost modeling in addition to the models produced today

Assumptions for Year 20 Modeling

- Load
  - 1-in-2, 1-in-5, 1-in-10 load forecasts for power flow base case
  - 8,760 hourly profiles for production cost modeling
  - Include disaggregation of different categories of load (behind-the-meter generation, energy efficiency, electrification, etc.)
- Generation
  - Data submitters to provide balanced load and resource portfolios
  - Data submitters responsible for resource placement in models

Assumptions for Year 20 Modeling

- Topology
  - LTPTF recommends developing a standard of project inclusion
  - Potential inclusion criteria includes:
    - DOE project list
    - Path rating process progress
    - Inclusion in regional and/or local transmission plans
  - Provide a submittal window for transmission developers to submit projects for consideration at 200 kV+
  - Improved documentation on 200 kV + projects included in the models

Proposed Timeline for 20-year Models

		2025 Year 0 Q3/Q4	2026 Year 1A, FERC 1000 Year 1, FERC 1920	2027 Year 2A, FERC 1000 Year 2, FERC 1920	2028 Year 1B, FERC 1000 Year 3, FERC 1920	2029 Year 2B, FERC 1000 Year 4, FERC 1920
Data submittal to WECC	Power flow data	Year 1A 10-year PF Year 1 20-year PF	Q3: Year 2A 10-year submittal	Q3: Year 1B 10-year submittal	Q3: Year 2B 10-year submittal	Q3: Next cycle 10-year data submittal
	Production cost L&R data	Year 1A 10-year PCM Year 1 20-year PCM	Q1: Year 1A L&R data submittal, includes 20-yr forecast			
10-year model	Power flow	Year 1A 10-year PF available	Q3: Year 2A 10-yr PF available	Q3: Year 1B 10-year PF available	Q3: Year 2B 10-year PF available	Q3: Next cycle 10-year PF available
	Production cost model		Q3: Year 1A 10-year PCM available	Q1: Year 2A update to Year 1A 10-year PCM	Q3: Year 1B 10-year PCM available	Q1: Year 2B update to Year1B 10-year PCM
20-year model	Power flow		Q1: 10-year Year 1A case available to start building 20-year Q4: 20-year FERC 1920 case available			
	Production cost model			Q4: 20-year PCM available		

Full timeline version available at LTPTF team site

Next Steps

- REQUEST: WECC RAC approval of the LTPTF recommendation document
- Remaining tasks for LTPTF:
  - Review WECC Data Preparation Manual to determine whether any modifications are needed
  - Review annual WECC Loads and Resources request to determine whether any modifications are needed
  - Coordinate with SRS and PCDS on the Year 20 data request

Anchor Data Set (ADS)

- Version 1 released in early 2024 based on 2023 L&R data submission
- Version 2 released end of July 2024 based on 2024 L&R data
- Concerns about generation placements were raised

Next ADS Version Changes

- 2034 ADS PCM V3 - Planning to publish this spring
  - More correct placement of new units from the 2024L&R that did not include locations
  - Better resource alignment with the 2034HS1 power flow
  - Tier3 (future conceptual) will be in the case, but status set to false (not dispatchable)
  - Fuel assignment cleanup and other general cleanup
  - DG-BTM by area distributed to area
  - North Songs Project in case
- Ancillary service settings corrected
- Hybrid units modeled at same bus
- Updated Demand Response shapes
- Station service model updated to act as net from generator on bus
- Update titles of interfaces to include direction. EX. (W-E)
- Path 14, 15, 26, 66 corrections
- Correct fuels assignments and Pmin Pmax, CO2 groups
- Apply - fix for combined-cycle units, gas units modeled separately from steam, fix to a/b configuration
- SunZia Project in case (under construction)

ADS Status and Discussion

- Was there value in releasing a version based on the 2023 L&R data?
  - Should we develop a version based on 2025 L&R again in 2026?
- Long-standing issue of timing.
  - The L&R data is not available until April.
  - NERC is talking about adjusting the timing of the LTRA; may affect when the NERC data request is available.
- How will this group be using the version we plan to release in April?

Base Cases

- Build 11 cases annually
  - Five "operating" cases, representing year 2026
    - Heavy and light winter and summer
    - Heavy spring
  - Four "planning" cases
  - Two specialized cases

Data and Model Quality

- Steady-state and Dynamics Dashboard (SADD)
  - Available in the zip file posted for each case
- WECC Scorecard item
  - % reduction of the priority power flow model shortcomings identified in the previous year's operating cases
- NERC Case Quality Metrics

Risk Register

- Planning Case Accuracy
  - Condition: As two types of organizations originate transmission projects (current transmission owners and operators, and independent transmission developers), information about transmission projects originated by independent developers may not be submitted to WECC to be included in future studies.
  - Consequence: If the transmission planners are not informed about transmission projects in an appropriate timeframe, they are not able to determine and coordinate any impacts these projects have on their transmission planning assessments and any impacts outside of the interconnecting entity.
  - Cause: As the typical process works within the MOD-032 standard where information is submitted by the PCs and TPs, a project initiated by an independent developer often lacks a designated TP or PC to provide this information until the facility is close to commercial operation. The process is also unclear about submitting this information or designating a PC and TP in an appropriate timeframe to allow for the planners to do their assessments.

Project Inclusion

- What projects belong in the base model?
- When should a project be added to the base model?
- Could include:
  - Transmission Projects.
  - Generation Projects.
  - Loads.

WECC

Electric Reliability and Security for the West

www.wecc.org

FERC 1920/1920-A Discussions

Annual Interregional Coordination Meeting (AICM)
Folsom, California ISO

March 24, 2025

Orders 1920/1920-A: FERC addresses the need to meet long-term transmission needs

- The Commission issued Order 1920 on May 13, 2024 to address long-term transmission planning and associated cost allocation processes
  - Builds on previous orders including Order 1000
  - Ensures consistent approach to developing long-term transmission plans resulting in efficient and cost-effective transmission solutions
- Order 1920-A was issued on November 21, 2024
  - Largely sustains Order 1920 requirements
  - Further enhances the role of Relevant State Entities

Summary of FERC Orders 1920 / 1920-A

- Requires transmission providers to conduct long-term planning for regional transmission facilities over a 20-year time horizon to anticipate future needs and to determine how to pay for those transmission facilities
  - Order identifies factors for consideration for development of scenarios and benefits criteria for determining long-term transmission solutions
  - 3 plausible scenarios must be studied with each scenario stress tested to account for extreme weather as a sensitivity
  - Transmission providers to develop 20-year plans at least every 5 years
  - Update interregional coordination processes for sharing of information and the identification and joint evaluation of long-term interregional transmission facilities

Summary of FERC Orders 1920 / 1920-A

- Enhances the role of state regulators in the long-term regional transmission planning process, especially in shaping scenario development and cost allocation
- The engagement period for cost allocation discussions can be extended for up to six additional months at the request of state regulators
- Requires local transmission planning inputs in the regional transmission planning process to enhance transparency and right-size facilities
- Requires addressing generation-interconnection-related needs that have arisen multiple times but have not yet been resolved
- Requires the consideration of the use of grid-enhancing technologies (GETs)

FERC Order No. 1920 requires six-month engagement period with relevant state entities

- Engagement period: November 1, 2024 to May 1, 2025
- Scope of formal engagement period
  - Long-Term Regional Transmission Cost Allocation Method and/or State Agreement Process
  - Regional transmission cost allocation
    - Costs of projects 200 kV and greater are combined for the ISO area and collected by the ISO via uniform system-wide rates
- Given the relative simplicity of the ISO Balancing Area footprint, the ISO is not anticipating changes to the current regional cost allocation method for transmission projects approved in the Long-Term Regional Transmission Planning Process

Order No. 1920 requires resequencing of the ISO's transmission planning process

- Creates opportunities to align with the other planning regions (WestConnect and Northern Grid) in WECC
- Provides relief from the overlapping 15-month planning cycles
- Establishes longer-term (20-year) planning as a requirement

		California ISO proposed Order No. 1920 transmission planning schedule									
		YEAR									
		1	2	3	4	5	6	7	8	9	10
Comprehensive Plan (every two years)			**X**		**X**		**X**		**X**		**X**
20 Year Plan (every four years)					**X**				**X**		
Minimal Reliability Analysis (Alternates with comprehensive plan)		**X**		**X**		**X**		**X**		**X**	
		Reliability Analysis: TPL-001-5 compliance, Deliverability Studies, and RA studies	Reliability (detailed), Policy, Economic, 10-year	Reliability Analysis: TPL-001-5 compliance, Deliverability Studies, and RA studies	Reliability (detailed), Policy, Economic, 10-year, **20-year**	Reliability Analysis: TPL-001-5 compliance, Deliverability Studies, and RA studies	Reliability (detailed), Policy, Economic, 10-year	Reliability Analysis: TPL-001-5 compliance, Deliverability Studies, and RA studies	Reliability (detailed), Policy, Economic, 10-year, **20-year**	Reliability Analysis: TPL-001-5 compliance, Deliverability Studies, and RA studies	Reliability (detailed), Policy, Economic, 10-year

The CAISO filed for extension on compliance filing to align with the other WECC regional planning entities

- FERC 1920/1920-A updates the existing interregional coordination processes to include coordination on long-term transmission plans
- CREPC's (Committee on Regional Electric Power Cooperation) 1920 Ad Hoc Committee requested a 6-month extension for compliance filing on February 11, 2025
- To ensure alignment with the planning regions, CAISO filed a 6-month extension request on its compliance filing on March 12, 2025
  - If the Commission grants the extension request, CAISO will need to file its compliance filing by December 12, 2025

Thank you!

Please submit FERC 1920/1920-A comments to regionaltransmission@caiso.com

NorthernGrid

FERC Order 1920 Discussion
March 24, 2025 AICM

Overview of Order No. 1920

- Establish a new Long-Term Regional Transmission Planning process that includes:
  - 20-year planning horizon
  - Development of three plausible and diverse Long-Term Scenarios using best available data
  - Consideration of certain required Factor Categories
  - Consideration of certain required Benefits
  - Sensitivity analyses for uncertain operational outcomes during multiple concurrent and sustained generation and/or transmission outages due to an extreme weather event across a wide area
- Ensure that there is a cost allocation method that applies to Long-Term Regional Transmission Facilities and complies with requirements of Order No. 1920
- Engage Relevant State Entities through Six-Month Engagement Period
- Compliance Timeline: June 12, 2025

Factors and Benefits

Categories of Factors for Creating Scenarios:

1. Federal, federally-recognized Tribal, state, and local laws and regulations affecting the resource mix and demand
2. Federal, federally-recognized Tribal, state, and local laws and regulations on decarbonization and electrification
3. State-approved integrated resource plans and expected supply obligations for load-serving entities
4. Trends in fuel costs and in the cost, performance, and availability of generation, electric storage resources, and building and transportation electrification technologies
5. Resource retirements
6. Generator interconnection requests and withdrawals
7. Utility and corporate commitments and federal, federally-recognized Tribal, state, and local policy goals that affect Long-Term Transmission Needs

Transmission providers must measure a set of seven required benefits for each scenario to evaluate Long-Term Regional Transmission Facilities:

1. Avoided or deferred reliability transmission facilities and aging infrastructure replacement
2. A benefit that can be characterized and measured as either reduced loss of load probability or reduced planning reserve margin
3. Production cost savings
4. Reduced transmission energy losses
5. Reduced congestion due to transmission outages
6. Mitigation of extreme weather events and unexpected system conditions
7. Capacity cost benefits from reduced peak energy losses

Additional Requirements

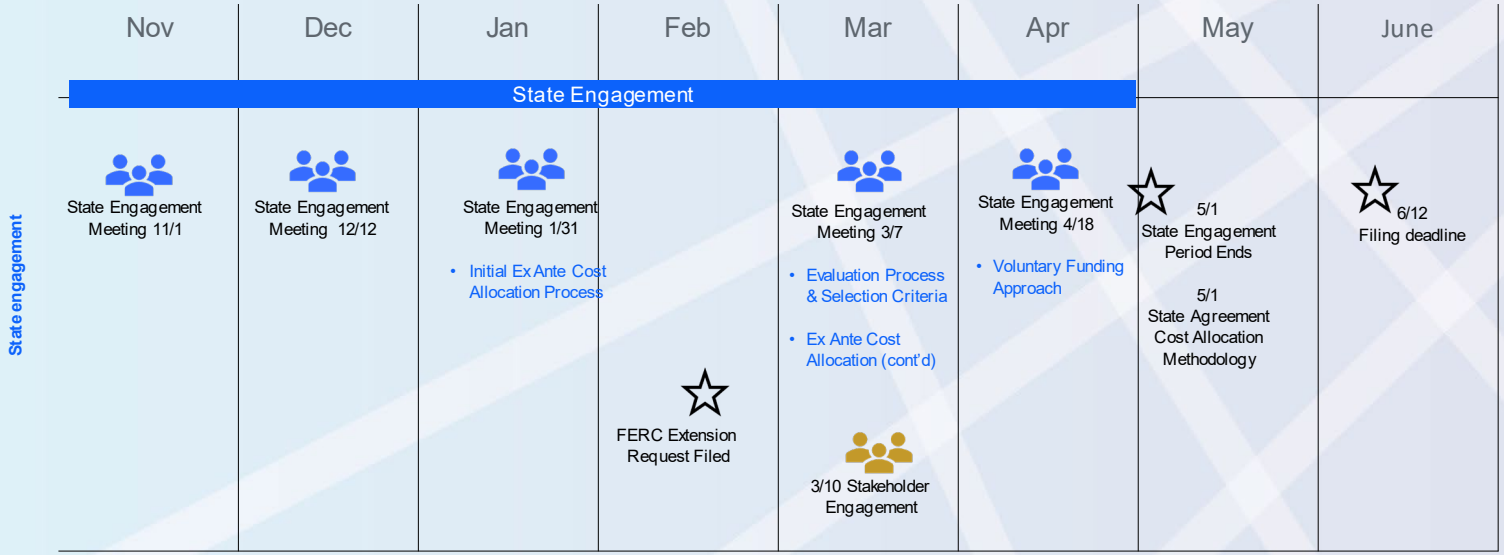
- Consideration of certain generator interconnection facilities in the existing Order 1000 process
- Evaluation of Grid-Enhancing Technologies
- Re-evaluation of Long-Term Regional Transmission Facilities
- Local transmission planning process transparency
- Right-Sizing Transmission Facilities
- Improved interregional transmission planning coordination & transparency

NorthernGrid Implementation Concept

- 20-year planning horizon
- 4-year study cycle
- Designed to start concurrent with 10-year planning horizon

FERC 1920 High-Level Timeline & Key Meetings

Key Points for State & Stakeholder Engagement



Slide will be revised to reflect six-month extension request once granted

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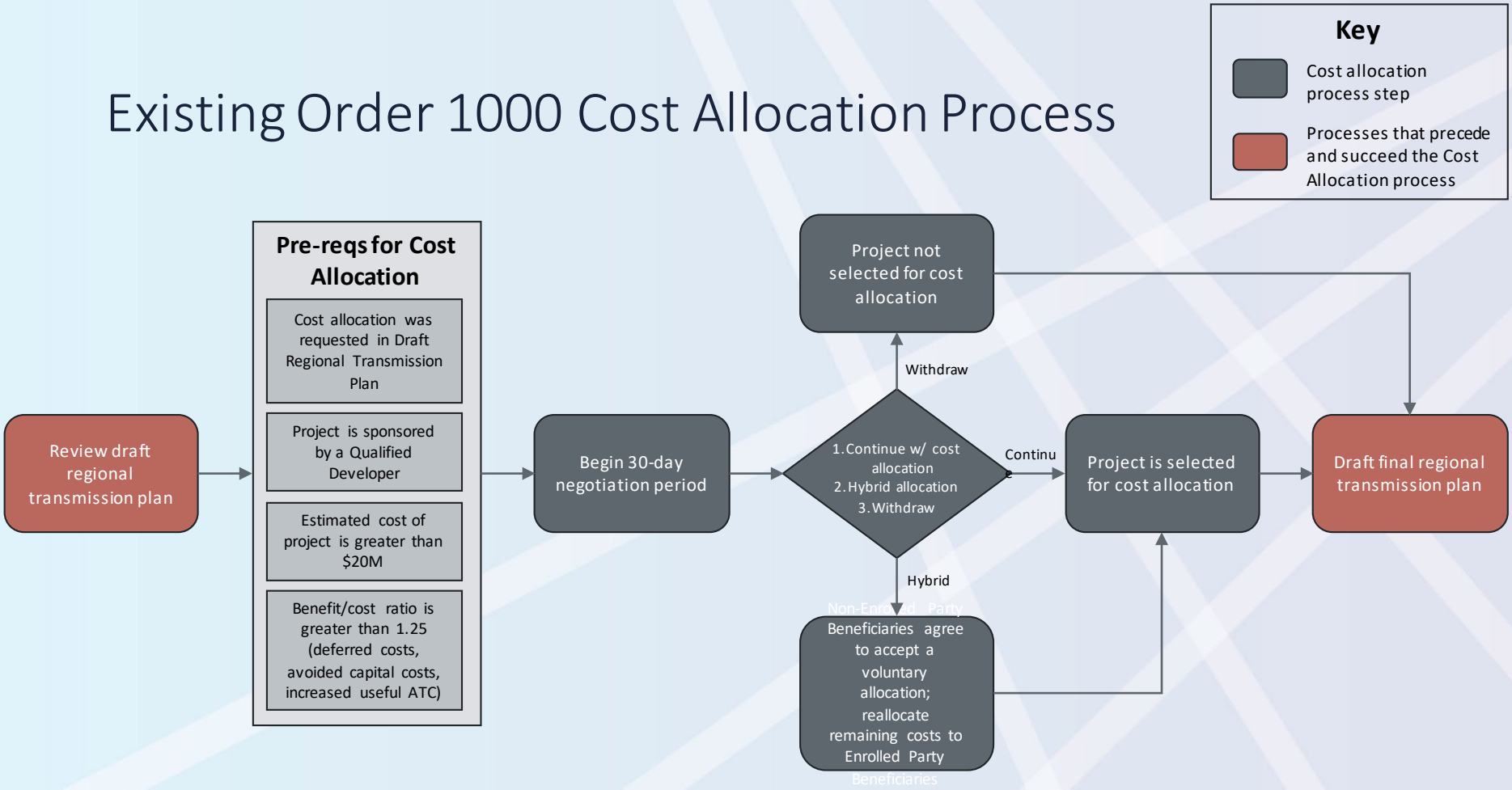
Existing Order 1000 Cost Allocation Process



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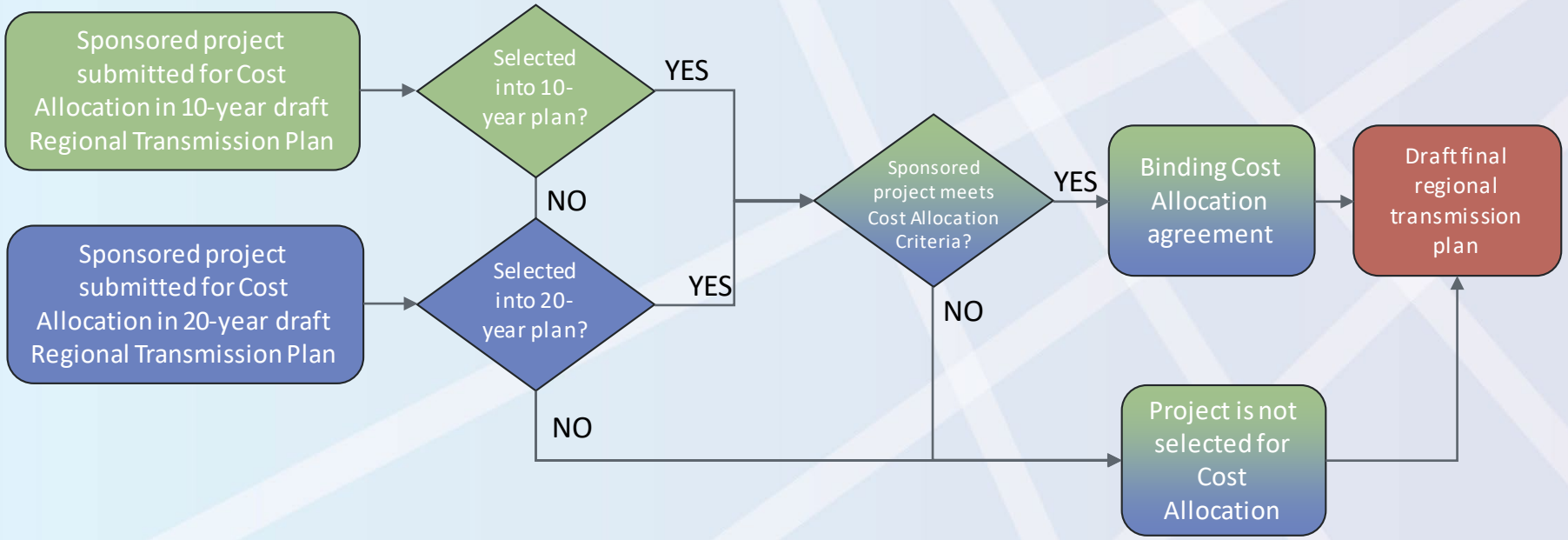
Proposed 1920 & 1000 Combined Cost Allocation Process



*must be sponsored by a Qualified Developer

NorthernGrid

Thank You

Please submit comments & questions to:

nwpp_northerngrid_staff@westernpowerpool.org

or

https://www.northerngrid.net/comments/

NorthernGrid

Overview of WestConnect Order No. 1920 Process to Date

March 24, 2025

WestConnect ETO Members

- Arizona Public Service Company
- Basin Electric Power Cooperative
- Black Hills Colorado Electric, LLC
- Black Hills Power, Inc.
- Cheyenne Light, Fuel & Power Company
- Deseret Power Electric Cooperative
- El Paso Electric Company
- Public Service Company of Colorado
- Public Service Company of New Mexico
- Tri-State Generation and Transmission Association, Inc.
- Tucson Electric Power Company
- UNS Electric, Inc.

Order No. 1920 RSE Meetings and Outreach

- On October 25, 2024, the WestConnect Enrolled Transmission Owners (ETOs) published a State Engagement Process for the WestConnect Planning Region announcement, specifying the Engagement Period commencement and end dates, information on this virtual meeting, and contact information for the Relevant State Entities to communicate with the ETOs.
- The Engagement Period commencement and end dates are:
  - Engagement Period Commencement Date: October 28, 2024
  - Engagement Period End Date: April 28, 2025

Order No. 1920 RSE Meetings and Outreach

- On November 14, 2024, the WestConnect ETOs hosted the first state engagement forum.
- On December 31, 2024, the WestConnect ETOs emailed the Relevant State Entities contacts providing additional resources available to them for Order 1920 efforts:
  - WIEB has agreed to be a resource for the Relevant State Entities throughout the Order No. 1920 state engagement process and has existing materials on many of these topics.
  - DOE Assistance: The US Department of Energy Grid Deployment Office announced technical assistance available to state agencies to assist those agencies in participating in transmission planning activities, including Order No. 1920 processes.

Order No. 1920 RSE Meetings and Outreach

- Based on feedback received during the November 14 state engagement forum, the WestConnect ETOs conducted outreach to the Relevant State Entities during December 2024 and January 2025 seeking feedback on a process for the remainder of the state engagement forums.
- Second Relevant State Entity forum was held on February 13, 2025
- Third Relevant State Entity forum to be held on March 25, 2025 with the following agenda:
  - Overview of Order No. 1920 Process to Date
    - State Engagement Process
    - Stakeholder Engagement Process
  - Overview of Order No. 1920 State Engagement Forum Purpose
  - Overview of key aspects of the WestConnect's Order No. 1920 Compliance Proposal
  - Break-Out Session for Relevant State Entities Focused on State Engagement Process Issues
  - Question and Comment period from Relevant State Entities to the WestConnect ETOs
  - Question and Comment period from Stakeholders to Relevant State Entities
- All agendas, meeting registration information details, and meeting materials are posted at westconnect.com

Stakeholder Engagement Process

- On January 14, 2025, the WestConnect ETOs posted on the WestConnect website and emailed to their pre-existing stakeholder email distribution list an announcement of Stakeholder Outreach Process for WestConnect Planning Region.
- The stakeholder outreach process will provide opportunities for interested parties to provide feedback on the compliance proposal prior to its filing with the Federal Energy Regulatory Commission.
- On March 12, the WestConnect ETOs provided notice that the First Stakeholder Meeting will be on March 26 from 12-1pm MT. This meeting will include a presentation by the Enrolled Transmission Owners on their anticipated approach to Order No. 1920 compliance; similar to this presentation.
  - The Enrolled Transmission Owners do not anticipate providing draft tariff language for this meeting.

Stakeholder Engagement Process

- Anticipated Remainder of Process:
  - Stakeholders will be invited to provide written feedback on the material presented during this initial meeting within 21 days.
  - The Enrolled Transmission Owners will post their proposed tariff language for Order 1920 compliance to the WestConnect website (date TBD).
  - Stakeholders will be invited to provide written feedback on the proposed tariff changes within 21 days.
- This process is subject to change, particularly to accommodate any compliance extensions.

Schedule for Order 1920 Compliance Filing

Extension Request Pending

- On February 11, 2025, the CREPC 1920 Ad Hoc Committee filed a 6-month extension request on behalf of the identified Relevant State Entities identified in the WestConnect Planning region.
- As of March 18, 2025, FERC had not acted on this request.

Schedule for Order 1920 Compliance Filing (Subject to Pending Extension Request)

- Public utility transmission providers must (for now) submit compliance filings regarding Order 1920 by June 12, 2025.
  - Multiple entities filed requests for rehearing and appeals to circuit courts.
    - On January 23, 2025, FERC issued a Notice of Denial of Rehearing by Operation of Law and Providing for Further Consideration. (190 FERC ¶ 62,048) The notice provides that the requests for rehearing of Order 1920-A will be addressed in a future order.
    - The appeals (consolidated in the 4th Circuit) remain pending. During January 2025, multiple parties amended petitions to include Order No. 1920-A.

Contact Information

- Stakeholders and Relevant State Entities may communicate with the Enrolled Transmission Owners in the WestConnect planning region by sending questions or comments to:

Order1920@westconnect.com.

Updates – Roundtable Discussions

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NorthernGrid

Annual Interregional Coordination Meeting

Chelsea Loomis, Western Power Pool

03/24/ 2025

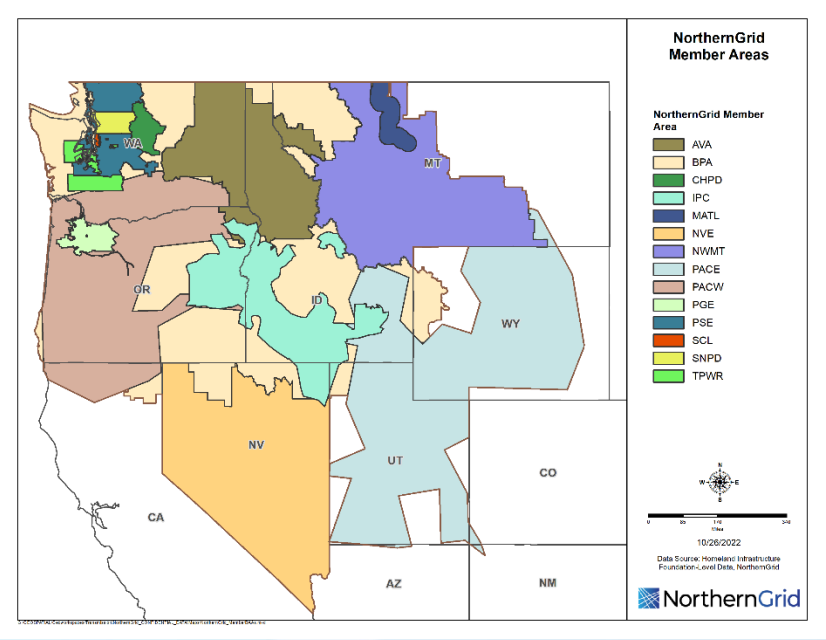
Annual Interregional Coordination Meeting

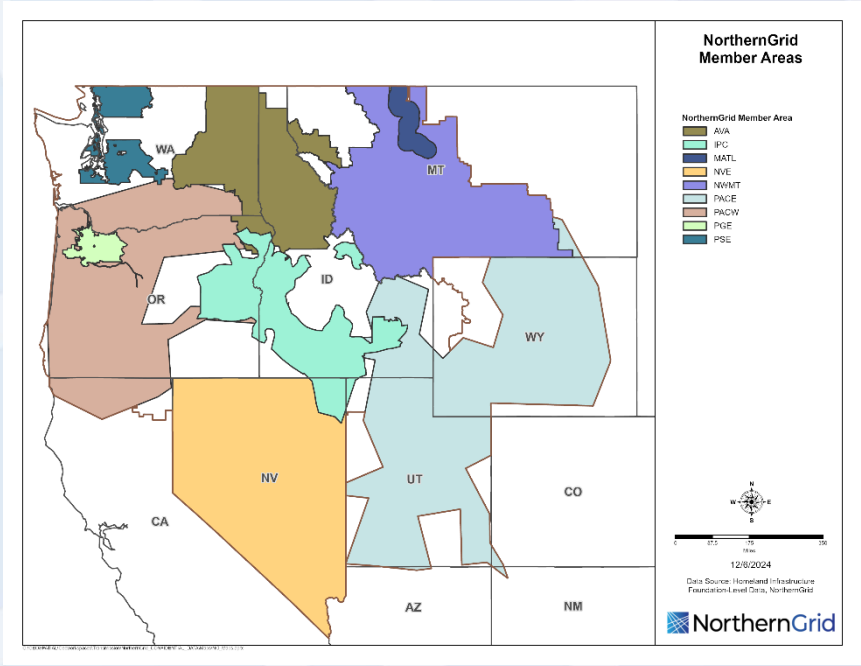
Most Recent Annual Interregional Information

Identification and preliminary discussion of interregional solutions

Updates of the status of any ITP being evaluated or previously included in Regional Transmission Plan

NorthernGrid footprint map





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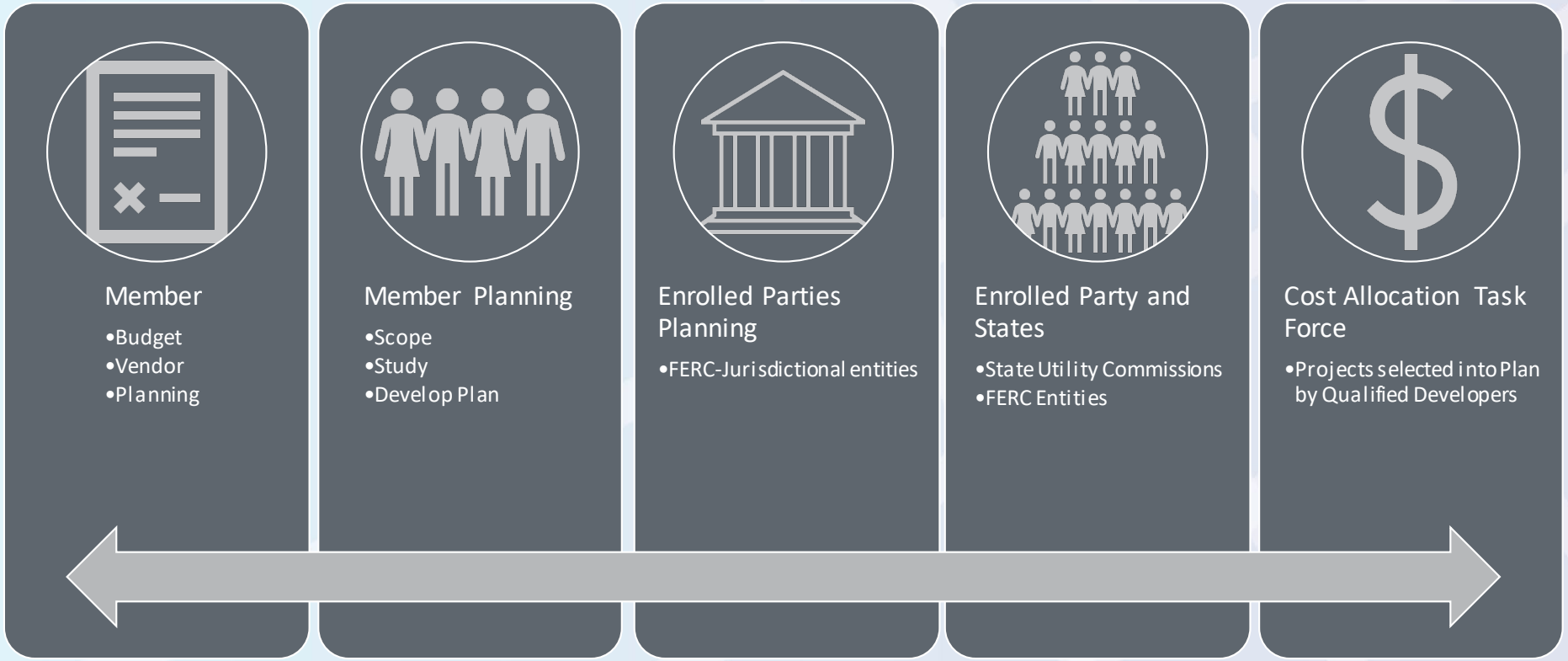
NorthernGrid Committees



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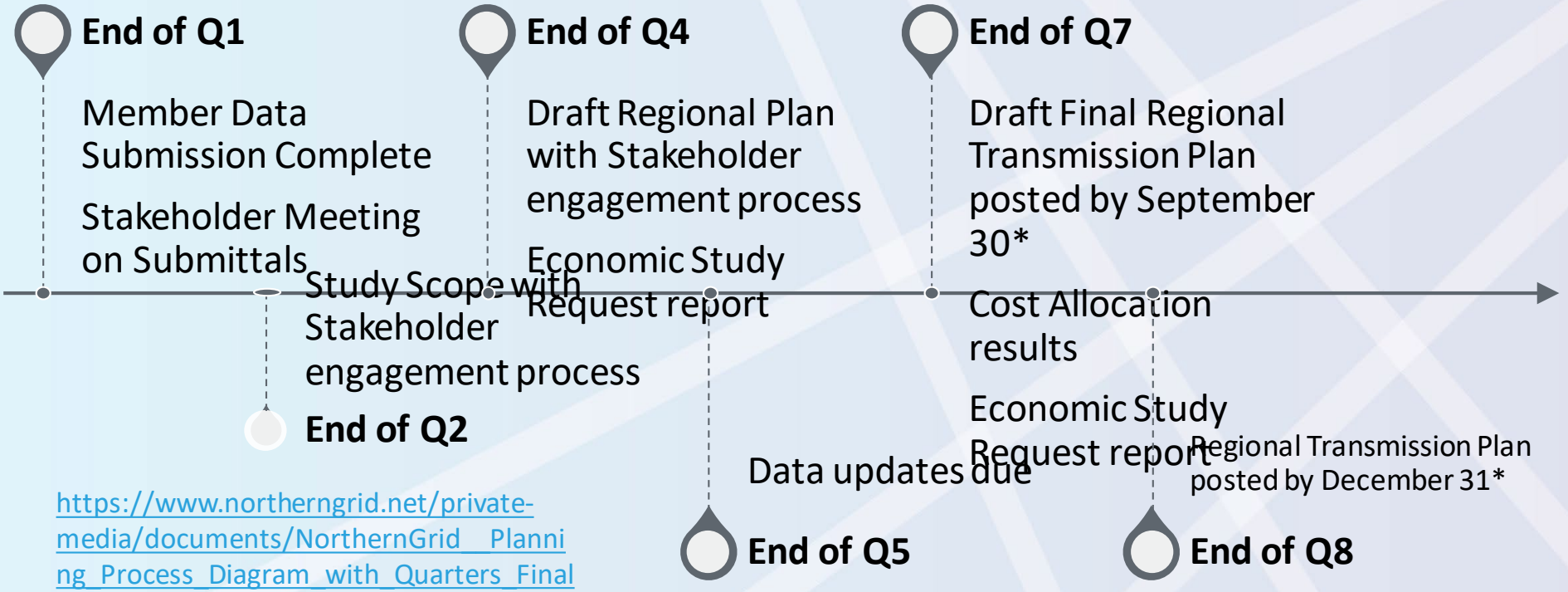
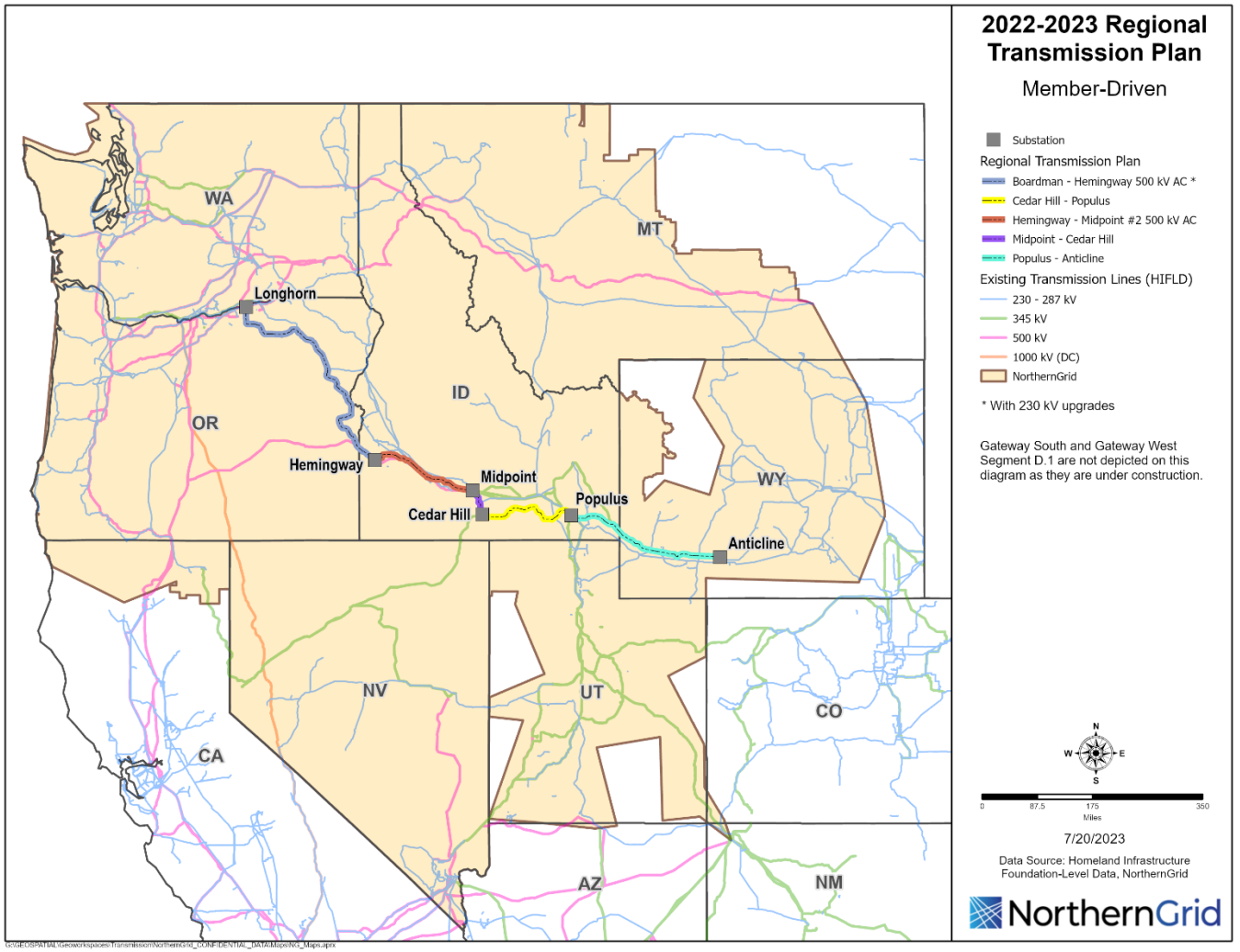
NorthernGrid Schedule of Deliverables



https://www.northerngrid.net/private-media/documents/NorthernGrid__Planning_Process_Diagram_with_Quarters_Final_1_28_2020.pdf

*Indicates FERC requirement, all others typically agreed upon by members

NorthernGrid 2022-2023 Regional Transmission Plan



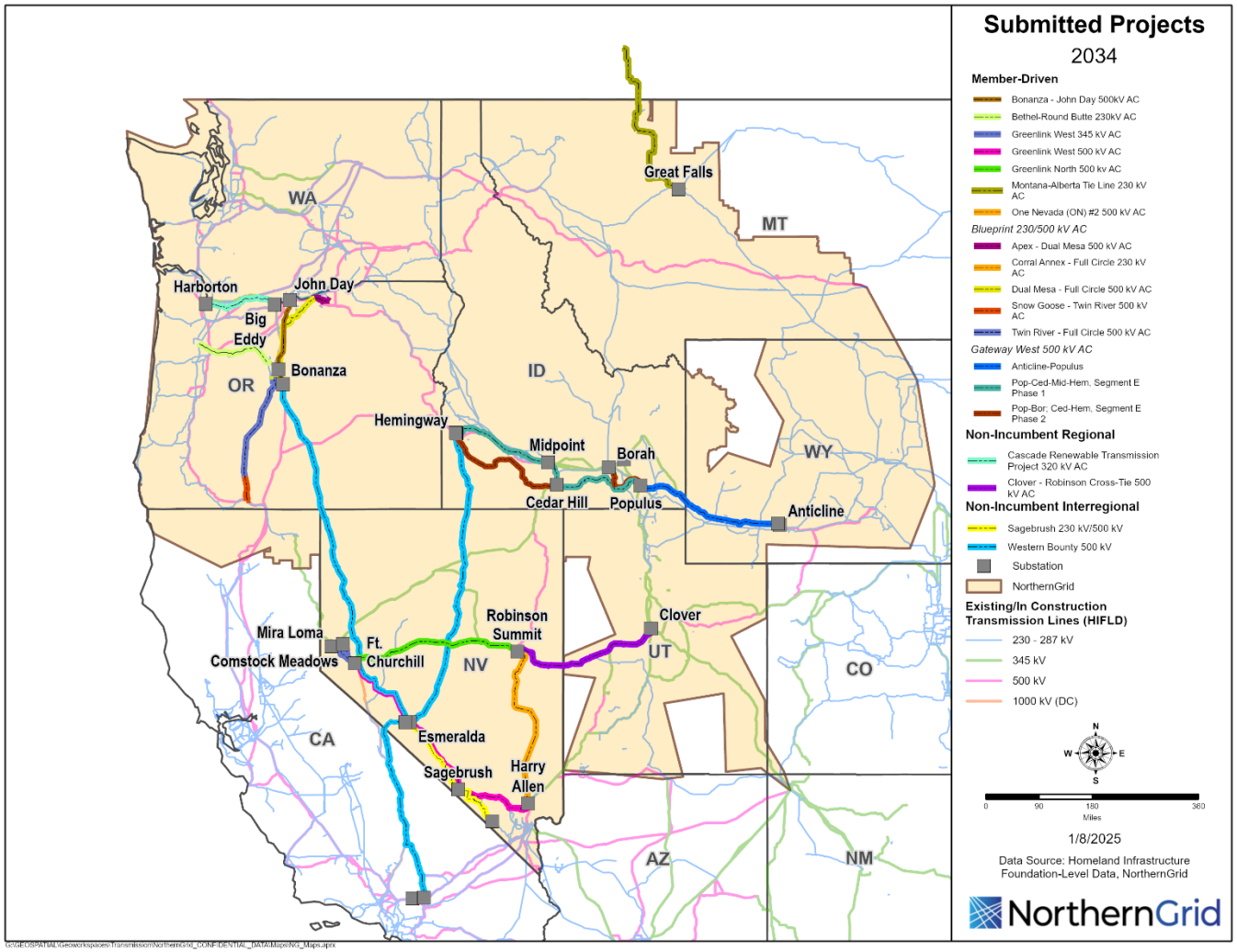
NorthernGrid

NorthernGrid System Load for 2034-2035

	NG Study Cycle 2022-2023 (MW)	NG Study Cycle 2024-2025 (MW)	%Increase
Jan	49,264	55,235	12%
Feb	47,454	53,645	13%
Mar	44,994	49,991	11%
Apr	42,608	48,057	13%
May	44,277	48,463	9%
Jun	51,652	59,093	14%
Jul	54,887	61,867	13%
Aug	53,900	61,244	14%
Sep	47,818	54,490	14%
Oct	43,769	49,474	13%
Nov	45,409	52,558	16%
Dec	49,564	55,787	13%

NorthernGrid Generation Changes for 2034-2035

	Fuel Type	ID	MT	NV	OR	UT	WA	WY	Grand Total
Addition	Battery Storage	4,012	303	3,208	3,438	3,710	2,921	3,041	20,632
	Biodiesel						711		711
	Blast Furnace Gas			118					118
	Coal							99	99
	Geothermal	30		93					123
	Natural Gas		293	705		858		2,227	4,083
	Non-Emitting							1,214	1,214
	Nuclear	462				690		845	1,997
	Pumped Storage		653		200				853
	Solar	4,225	425	3,243	2,763	7,980	2,349	1,274	22,259
	Solid Waste			5					5
	Water			1,000	6				1,006
	Wind	1,115	2,491		3,687		2,770	8,935	18,999
Retirement	Coal		370	712				1,034	2,116
	Geothermal			70					70
	Landfill Gas			15					15
	Natural Gas			118					118
	Solar			126					126
	Water			13					13
	Wind			149					149



NorthernGrid Submitted Projects:

Member-Driven
Non-Incumbent, Regional
Non-Incumbent, Interregional

Conditions of Interest for NorthernGrid footprint

- Heavy system loading, lower renewable generation output
- North to South/East to West
- Low Hydro/End of Summer
- East to West
- West to East
- South to North
- Summer Peak
- Winter Peak
- West of Cascades, North

NorthernGrid

Combinations of transmission projects

Point of Interest!!

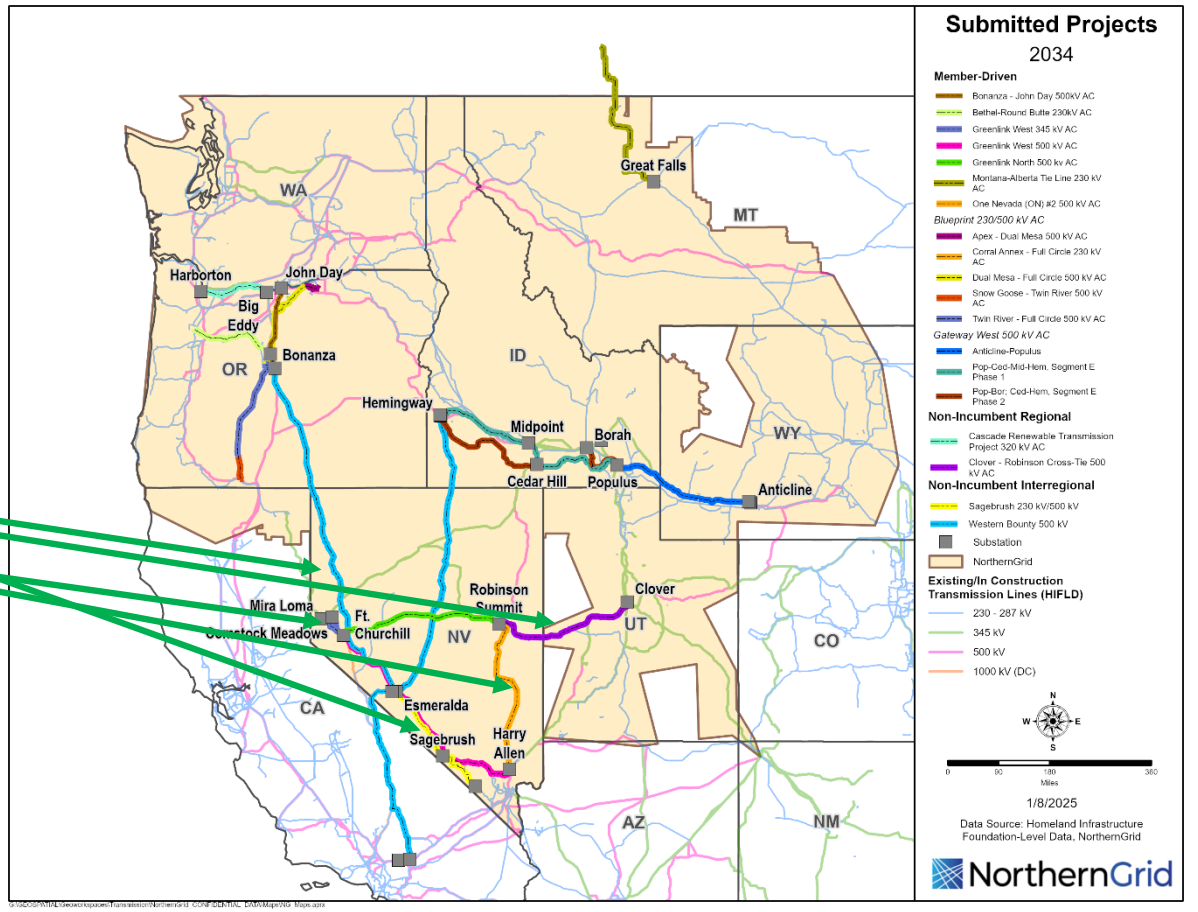
9 conditions for the NG footprint * 22 Regional Combinations yields a total of ***198*** Base Cases

Regional Combination	All Greenlink Projects	MATL	One Nevada #2	Gateway West, Anticline-Populus	Gateway West, Populus-Cedar Hill-Midpoint-Hemingway	Gateway West, Populus-Borah-Midpoint, Cedar Hill-Hemingway	Cascade Renewable Transmission System	Clover-Robinson (Cross-Tie)	Sagebrush (Interregional)	Western Bounty (Interregional)	Blueprint	Bonanza/John Day to Bonanza	Bethel Round Butte (Lambert Mountain View)
1													
2	x	x	x	x	x	x					x	x	x
3	x	x	x	x	x	x	x	x			x	x	x
4	x	x	x	x	x	x	x	x	x	x	x	x	x
5							x						
6								x					
7	x		x					x					
8	x		x					x	x	x			
9	x		x										
10	x												
11	x							x					
12				x	x								
13				x	x	x							
14				x									
15				x	x	x				x			
16	x		x	x	x	x							
17	x	x	x	x	x	x		x					
18	x	x	x	x	x	x	x						x
19								x					
20	x	x	x	x	x	x					x		
21	x	x	x	x	x	x						x	
22	x	x	x	x	x	x							x

NorthernGrid

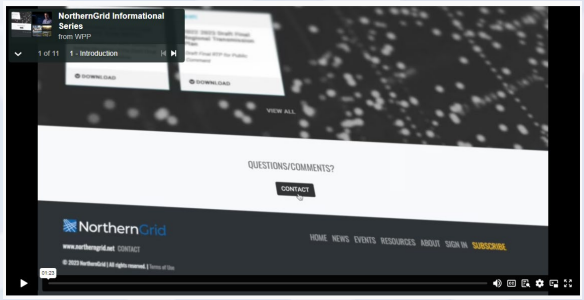
Example: RC 8

Regional Combination	All Greenlink Projects	MATL	One Nevada #2	Gateway West, Anticline-Populus	Gateway West, Populus-Cedar Hill-Midpoint-Hemingway	Gateway West, Populus-Borah-Midpoint, Cedar Hill-Hemingway	Cascade Renewable Transmission System	Clover-Robinson (Cross-Tie)	Sagebrush (Interregional)	Western Bounty (Interregional)	Blueprint	Bonanza/John Day to Bonanza	Bethel Round Butte (Lambert Mountain View)
1													
2	x	x	x	x	x	x					x	x	x
3	x	x	x	x	x	x	x	x			x	x	x
4	x	x	x	x	x	x	x	x	x	x	x	x	x
5							x						
6								x					
8	x	x						x	x	x			
10	x												
11	x							x					
12				x	x								
13				x	x	x							
14				x									
15				x	x	x				x			
16	x		x	x	x	x							
17	x	x	x	x	x	x		x					
18	x	x	x	x	x	x	x						x
19								x					
20	x	x	x	x	x	x					x		
21	x	x	x	x	x	x						x	
22	x	x	x	x	x	x							x



NorthernGrid Informational Series

- Intro
- FERC Orders
- Resource Planning vs Transmission Planning
- Participants in the NorthernGrid Planning Process
- Walk-Through of the Planning Cycle
- What is the Regional Transmission Plan
- Technical Studies
- Economic Studies
- Cost Allocation
- Cost Allocation Benefits & Payments
- Role of the State



NorthernGrid

Thank you!

Nwpp_northerngrid_staff@westernpowerpool.org

NorthernGrid

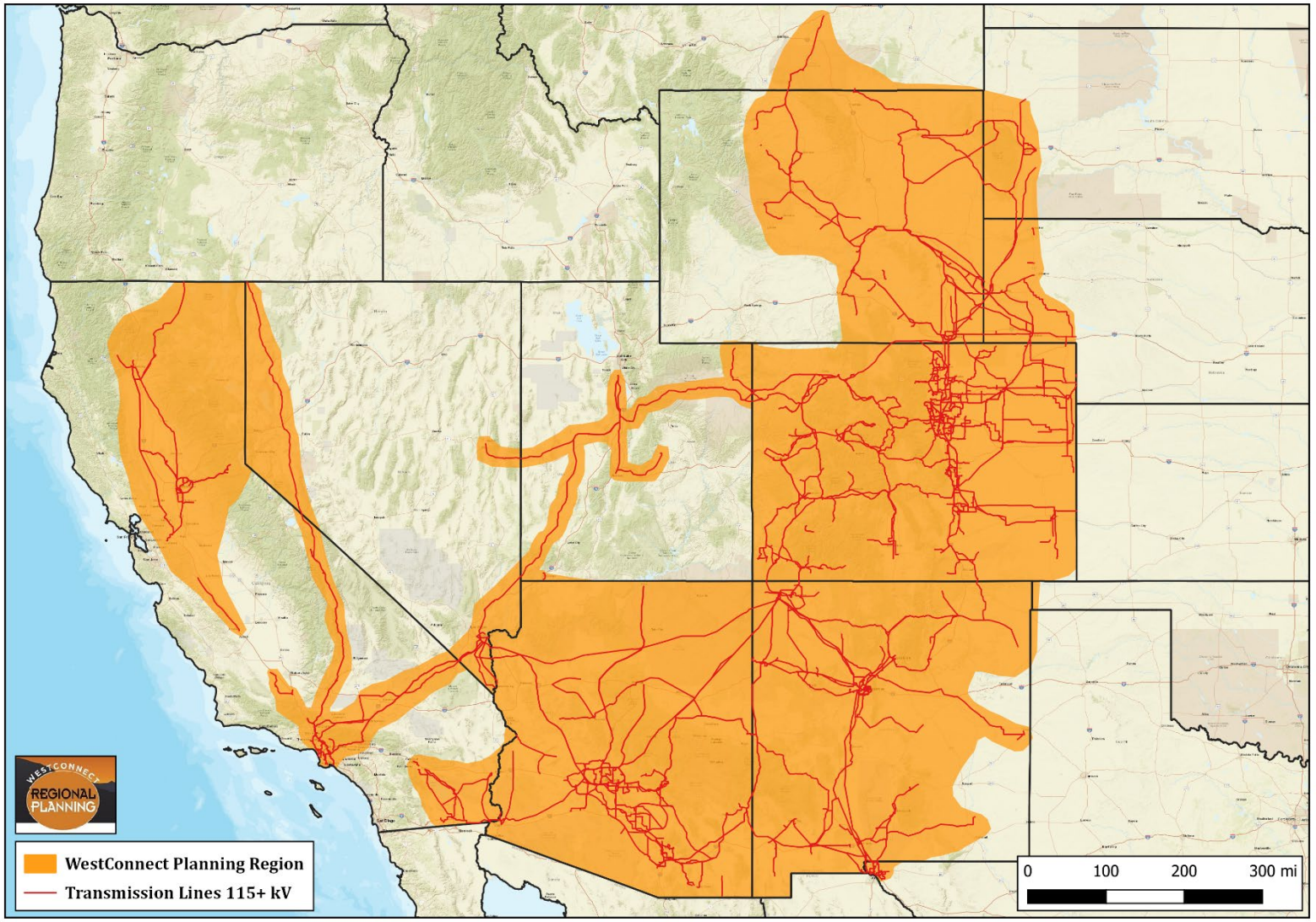
WestConnect
Regional Transmission Planning

Annual Interregional Coordination Meeting
March 24, 2025
CAISO Offices
Folsom, CA

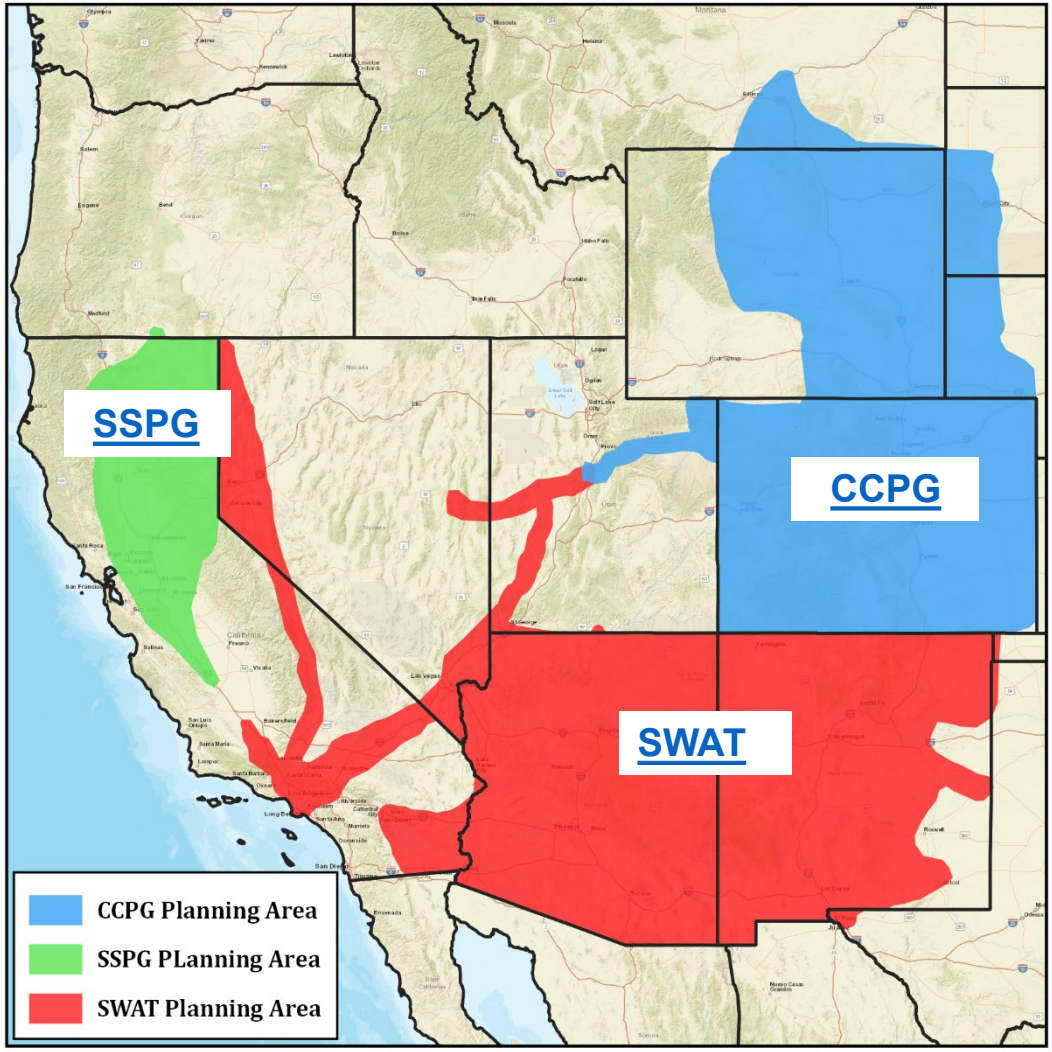
WestConnect Regional Planning Overview

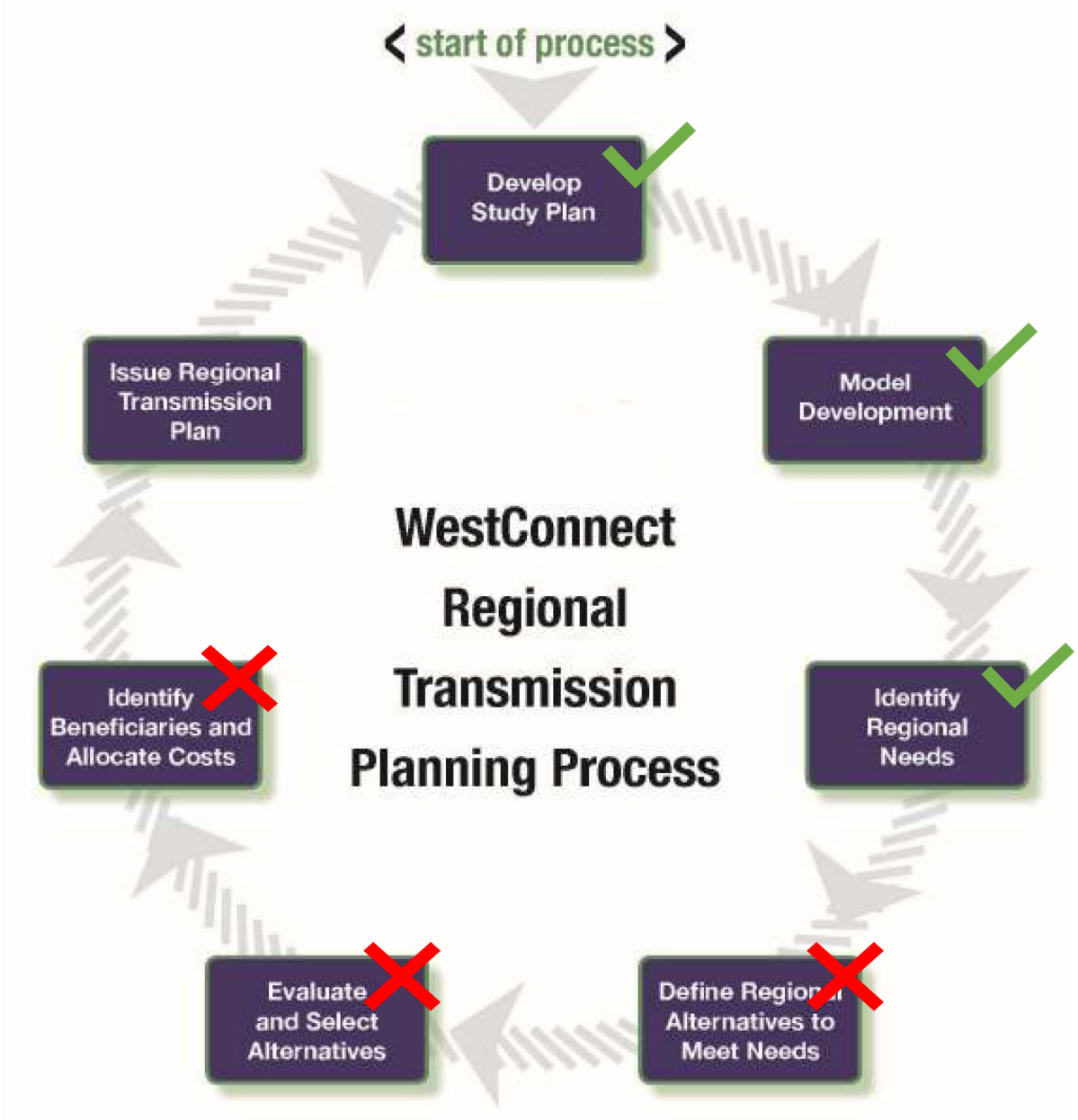
Heidi Pacini, WestConnect Project Manager

WestConnect Planning Region

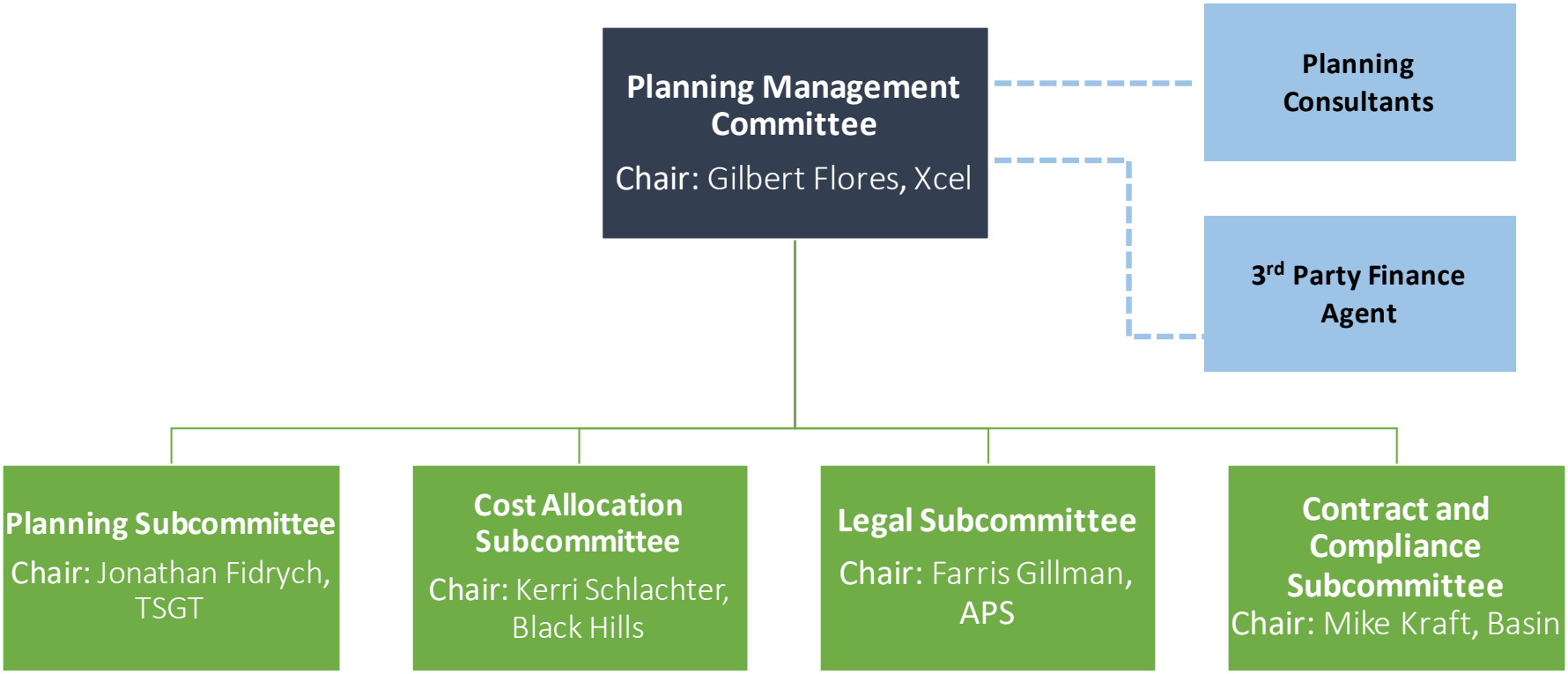


Subregional Planning Groups




start of process
Develop Study Plan
Model Development
Identify Regional Needs
Define Regional Alternatives to Meet Needs
Evaluate and Select Alternatives
Identify Beneficiaries and Allocate Costs
Issue Regional Transmission Plan
WestConnect Regional Transmission Planning Process

PMC Organization



PMC Membership as of 3/24/2025

Transmission Owner w/Load Serving Obligation (18)

Enrolled TO

- Arizona Public Service*
- Basin Electric*
- Black Hills
- Deseret Power
- El Paso Electric
- Public Service of New Mexico
- Tri-State G&T
- Tucson Electric
- Xcel – PSCo*

Coordinating TO

- Arizona Electric Power Cooperative
- Colorado Springs Utilities
- Imperial Irrigation District
- Los Angeles Department of Water and Power
- Platte River Power Authority
- Sacramento Municipal Utility District
- Salt River Project
- Transmission Agency of Northern California
- Western Area Power Administration

Transmission Customer

- Vacant

Independent Transmission Developer (6)

- Black Forest Partners
- GridLiance Southwest LLC
- Southwestern Power Group
- TransCanyon*
- LS Power Grid West, LLC*
- Xcel – Western Transmission Company*

State Regulatory Commission (1)

- CO Public Utilities Commission

Key Interest Group (0)

- Interwest Energy Alliance

*2024 Eligible Transmission Developer

Updated 1/1/2025

PMC Activities

- Monthly meetings held via webinar or at rotating member facilities
- Meetings are posted to the WestConnect Calendar
- Manages the Regional Transmission Planning Process
- Currently preparing for scenario studies

Stakeholder Input & Opportunities

- WestConnect holds at least two stakeholder meetings each year
- PMC & Subcommittee meetings are open with opportunity for stakeholder input
- Future WestConnect Stakeholder Meetings at key points of planning cycle – for example:
  - Draft Regional Transmission Plan Report
  - All as determined by the PMC
  - Fall 2025 Stakeholder Meeting tentatively scheduled for Wednesday, November 19th in Tucson, AZ

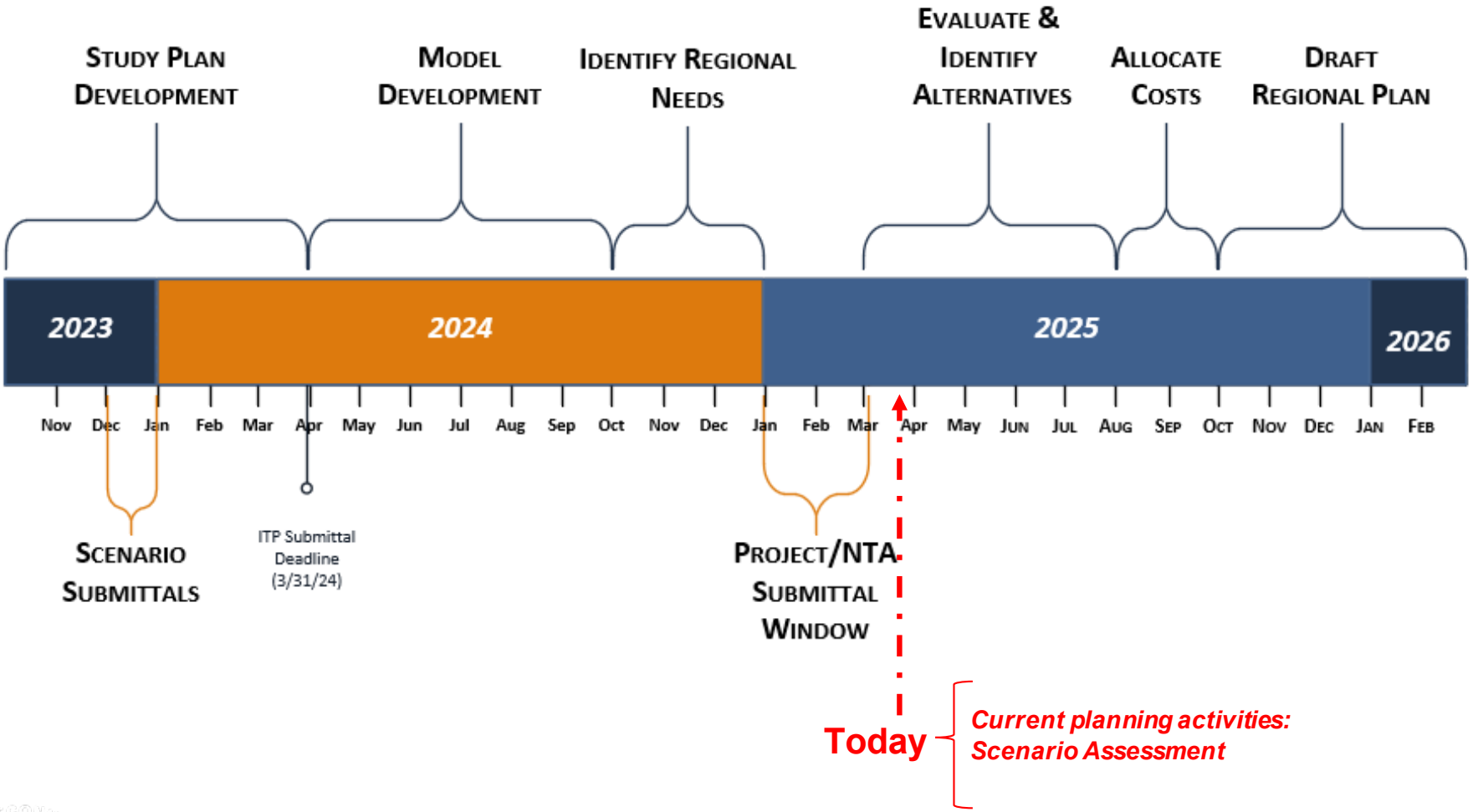
2024-25 Regional Planning Cycle Update

Tom Green, WestConnect Planning Consultant,
Energy Strategies

Overview

- Review of 2024-25 Study Plan
- Regional Needs Assessment Results
- Scenario Study Assumptions

2024-25 Process Timeline



2024-25 REGIONAL STUDY PLAN

2024-25 Study Plan Review

- Study Plan identifies the scope and schedule of the study work to be performed during the planning cycle
- 2024-25 Study Plan was approved by PMC on **March 20, 2024**
  - Numerous drafts made available to stakeholders for comment
  - Final version is available on WestConnect website
- Study Plan identifies the Base Transmission Plan, the Model Development Process, and the scope of the Regional Assessments
  - It also identified three scenario studies that will take place – scenario studies are for information-only and do not result in the identification of regional needs
- The Study Plan also provides guidance on identification of Regional Needs, local vs. regional transmission issues, and explains why regional issues are the focus of the Order 1000 planning process

Base Transmission Plan

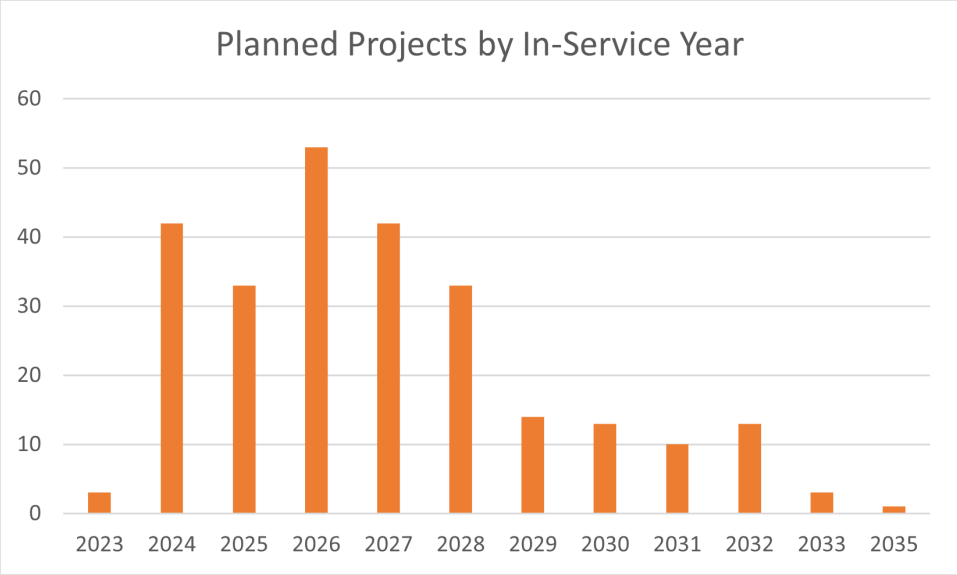
- Base Transmission Plan is the transmission network topology that is reflected in the regional planning models.
  - Base Transmission Plan = ***Planned*** **TO Projects** + ***High probability*** **ITD Projects**
- Inclusion is based on project information gathered in the WestConnect Transmission Plan Project List (TPPL) for the 2024-25 cycle, which was collected in early 2024 and updated during Model Development process.
- The Model Development Report will provide details about what the 2024-25 Base Transmission Plan represents

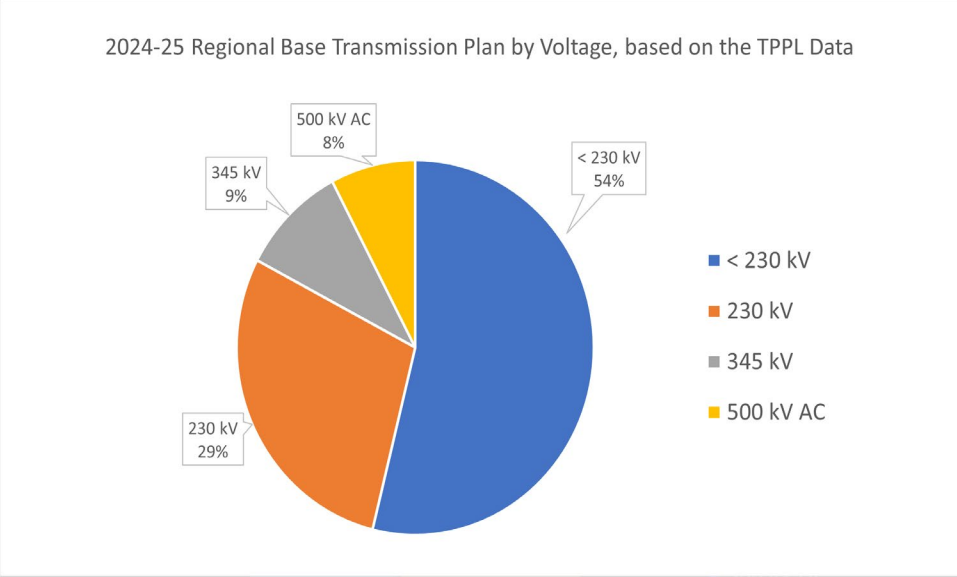
Project Type	Number of Projects
Substation	114
Transmission Line	116
Other	30
Total Projects	**260**

Base Transmission Plan: TO Breakdown

TOLSO	Below 230 kV	230 kV	345 kV	500 kV	Total
Arizona Electric Power Cooperative	1	1	1	-	**3**
Arizona Public Service	-	13	2	5	**20**
Black Hills Energy	5	-	-	-	**5**
Black Hills Power	-	-	-	-	**0**
Cheyenne Light Fuel and Power	10	6	-	-	**16**
Colorado Springs Utility	8	3	-	-	**11**
Deseret Power	-	-	-	-	**0**
El Paso Electric Company	56	-	14	-	**70**
Imperial Irrigation District	2	2	-	-	**4**
Los Angeles Department of Water and Power	3	14	1	5	**23**
Platte River Power Authority	1	2	-	-	**3**
Public Service Company of Colorado/ Xcel Energy	3	4	2	-	**9**
Public Service Company of New Mexico	-	-	2	-	**2**
Sacramento Municipal Utility District	1	4	-	-	**5**
Salt River Project	1	9	-	9	**19**
Transmission Agency of Northern California	-	-	-	-	**0**
Tri-State Generation and Transmission Association	8	4	1	-	**13**
Tucson Electric Power	31	7	2	1	**41**
Western Area Power Administration - DSW	3	2	-	-	**5**
Western Area Power Administration - RMR	7	4	-	-	**11**
Western Area Power Administration - SNR	-	-	-	-	**0**
Total Projects	**140**	**75**	**25**	**20**	**260**

Base Plan: Timing of Projects

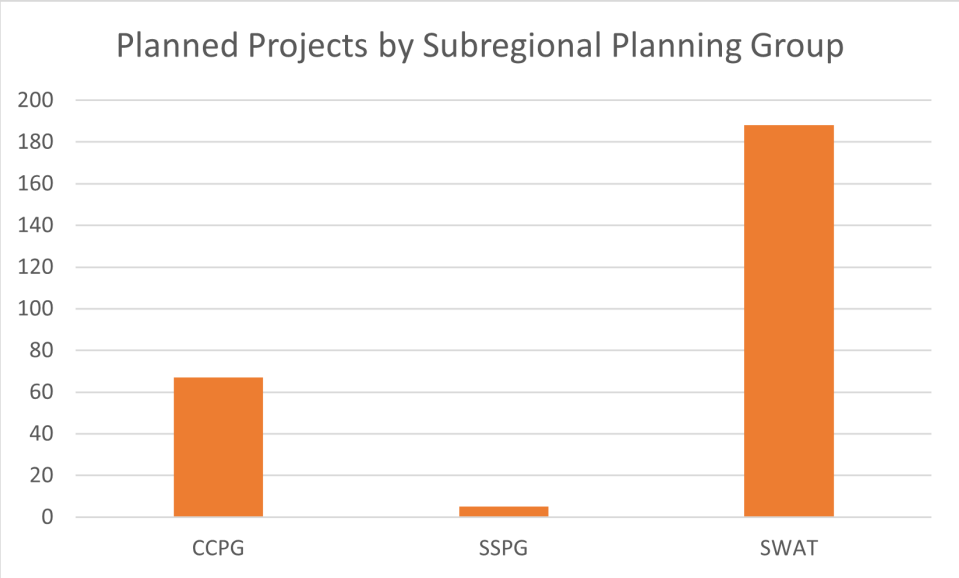




Base Plan: Geography and Drivers

State	Number of Projects
Arizona	87
California	29
Colorado	47
Nebraska	2
Nevada	1
New Mexico	22
South Dakota	-
Texas	47
Wyoming	18
Multiple	7
Total Projects	**260**

Driver	Number of Projects
Reliability	201
Reliability/Public Policy	17
Public Policy	6
Public Policy/Reliability	2
Other	28
Economic	4
Economic/Reliability	1
Reliability/Economic	1
Total Projects	**260**



Public Policy Requirements

- TO members identify public policy requirements
- Public Policy Projects are reported in the Base Models
- Policies and requirements are listed in the Study Plan
- If a Regional Need is identified and is determined to be caused by public policy implementation, then the need is defined as a Public Policy-driven Regional Transmission Need.
- Stakeholders encouraged to review public policy requirements and suggest potential public policy needs.

2024-25 REGIONAL MODEL DEVELOPMENT

Overview of 2024-25 Model Development

- WestConnect develops regional planning models for the 10-year timeframe that are then used to to perform the regional needs assessment,
- On October 15, 2024, the Planning Subcommittee notified the PMC that the Regional Base Models were complete and could be finalized. The PMC approved the recommendation on October 16, 2024, thereby initiating the Regional Needs Assessment phase.
- The Study Plan also identified four economic sensitivity cases:
    1. High Load
    2. Low Hydro
    3. System-wide Carbon Emission Cost
    4. High Gas Price
- The following materials summarize key assumptions made in developing the regional models

Base Models Defined in Study Plan

Reliability Base Cases

WestConnect Base Case Name	Case Description	Seed Case(s)
2034 Heavy Summer Base Case	Summer peak load conditions, with typical flows throughout the Western Interconnection.	WECC 2034 Heavy Summer 1 Planning Base Case (34HS1)
2034 Light Spring Base Case	Light load conditions during spring months of March, April, or May with solar and wind serving a significant but realistic portion of the Western Interconnection total load.	WestConnect Heavy Summer Base Case

Economic Base Cases

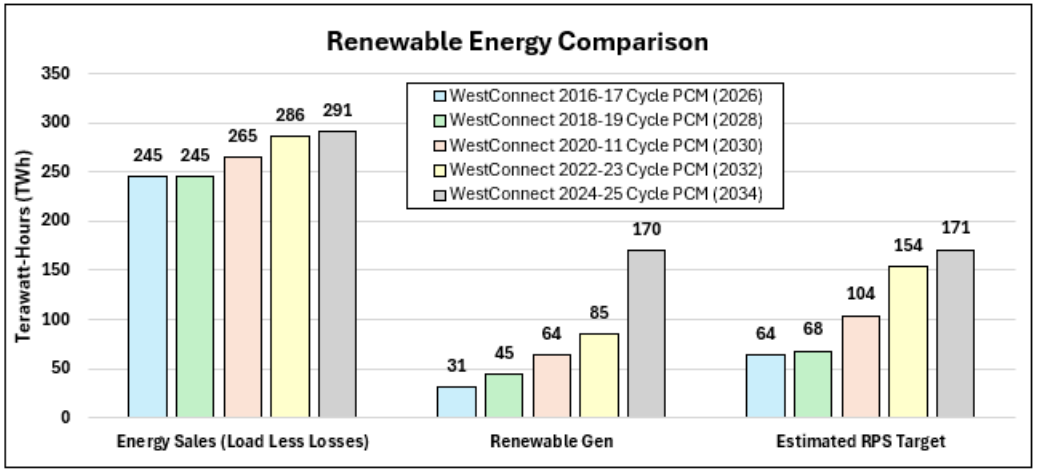
WestConnect Base Case Name	Case Description	Seed Case(s)
2034 Base Case PCM	Business-as-usual, expected-future case with (1) median load, (2) median hydro conditions and (3) representation of resources consistent with TOLSO-approved resource plans as of March 2024.	WECC 2034 Anchor Data Set (ADS)

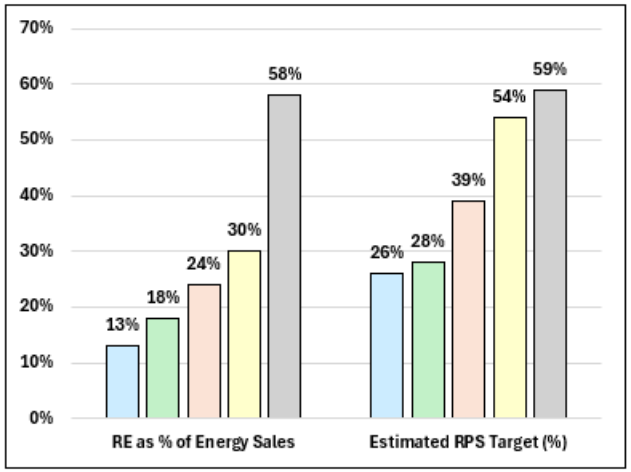
Public Policy Verification

- Public Policy Requirements: state or federal laws or regulations, enacted statutes (i.e., passed by the legislature and signed by the executive) and regulations promulgated by a relevant jurisdiction, whether within a state or at the federal level.
  - Based on language from the final rule on FERC order 1000 published by FERC: "…and allow for consideration of transmission needs driven by public policy requirements established by state or federal laws or regulations (Public Policy Requirements). By "state or federal laws or regulations," we mean enacted statutes (i.e., passed by the legislature and signed by the executive) and regulations promulgated by a relevant jurisdiction, whether within a state or at the federal level."
- TOLSO Confirmation: have received responses from all members
  - As part of Section 6 of WestConnect's 2024-25 Study Plan, each TOLSO must verify they meet all enacted public policies that apply to them.
    - Enacted public policy … is considered in the regional planning process through its inclusion in regional planning models.
    - The regional base models, including both power flow and production cost, will reflect the enacted public policies…

Draft Renewable Energy Check

- Evaluate whether WestConnect economic models indicate a renewable energy penetration trajectory consistent with enacted public policies.
- Perform high-level accounting and comparison of energy sales and renewable energy.
- WestConnect renewable generation in 2034 PCM is a 100% increase from the 2032 PCM
- RPS-related generation in 2034 PCM represents more than half of the estimated 2034 RPS target for the WestConnect footprint





2024-25 REGIONAL NEEDS ASSESSMENTS

Regional Needs Assessment Background

- Needs Assessments uses base models developed for year 2034
  - Reliability (Heavy Summer & Light Spring powerflow models)
  - Economic (Production Cost Model)
- Assessment is only for WestConnect footprint
  - Local vs. regional transmission issues
- Planning Subcommittee (PS) identifies potential regional issues and makes recommendations to the PMC
- The PMC made a final determination on regional needs in December 2024 based on the PS recommendations and stakeholder comments collected following this meeting.
- Regional needs posted to the WestConnect website.
- The Regional Transmission Needs Assessment Report was finalized in early 2025.
  - Contains regional needs assessment results and the PMC determination regarding regional transmission needs for the study cycle.

Reliability Assessment

- Ensure WestConnect region complies with applicable North American Electric Reliability Corporation (NERC) standards and WECC criteria
- Assessment include steady state and transient stability analyses
- Transmission elements of 90 kV and above will be monitored for system performance along with any Member specified lower voltage Bulk Electric System (BES) elements
- Contingency Definitions
  1. Started with 2022-23 planning cycle contingency definitions
  2. Auto-inserted every 230kV and above single branch and GSU's > 200 MW Pgen
  3. Added member-submitted contingencies, and operating procedures
- 1,418 contingency runs
- Flagged branch loadings and bus voltages using member-submitted criteria
  - BES monitored only
  - Default for bus voltage is WECC criteria unless superseded by member submitted criteria

Reliability Results

2034HS Base Case

- No Contingency (P-0)
  - **5** branch flagged above Rating A
    - PNM 4, PSCo 1
  - **10** flagged bus voltage issues
    - PSCo 5, SRP 3, TSGT 2
- Contingencies (**61** flagged issues)
  - **0** failed solutions
  - **32** flagged loadings above Rating B
    - PNM 1, PSCo 21, SRP 2, TSGT 6, WAPA-DSW 2
  - **15** flagged low bus voltages
    - PSCo 11, TSGT 4
  - **0** flagged high bus voltages
  - **14** flagged voltage deviations (8+% Voltage Decrease)
    - APS 2, PSCo 9, TSGT 3
- No transient stability issues

2034LSP Base Case

- No Contingency (P-0)
  - **2** branch flagged above Rating G
    - PNM 1, TSGT 1
  - **3** flagged bus voltage issues
    - PSCO 3
- Contingencies (**14** flagged issues)
  - **0** failed solutions
  - **1** flagged loadings above Rating H
    - WAPA-DSW 1
  - **4** flagged low bus voltages
    - LADWP 3, TSGT 1
  - **5** flagged high bus voltages
    - LADWP 4, PSCO 1
  - **4** flagged voltage deviations (8+% Voltage Decrease)
    - TSGT 4
- No transient stability issues

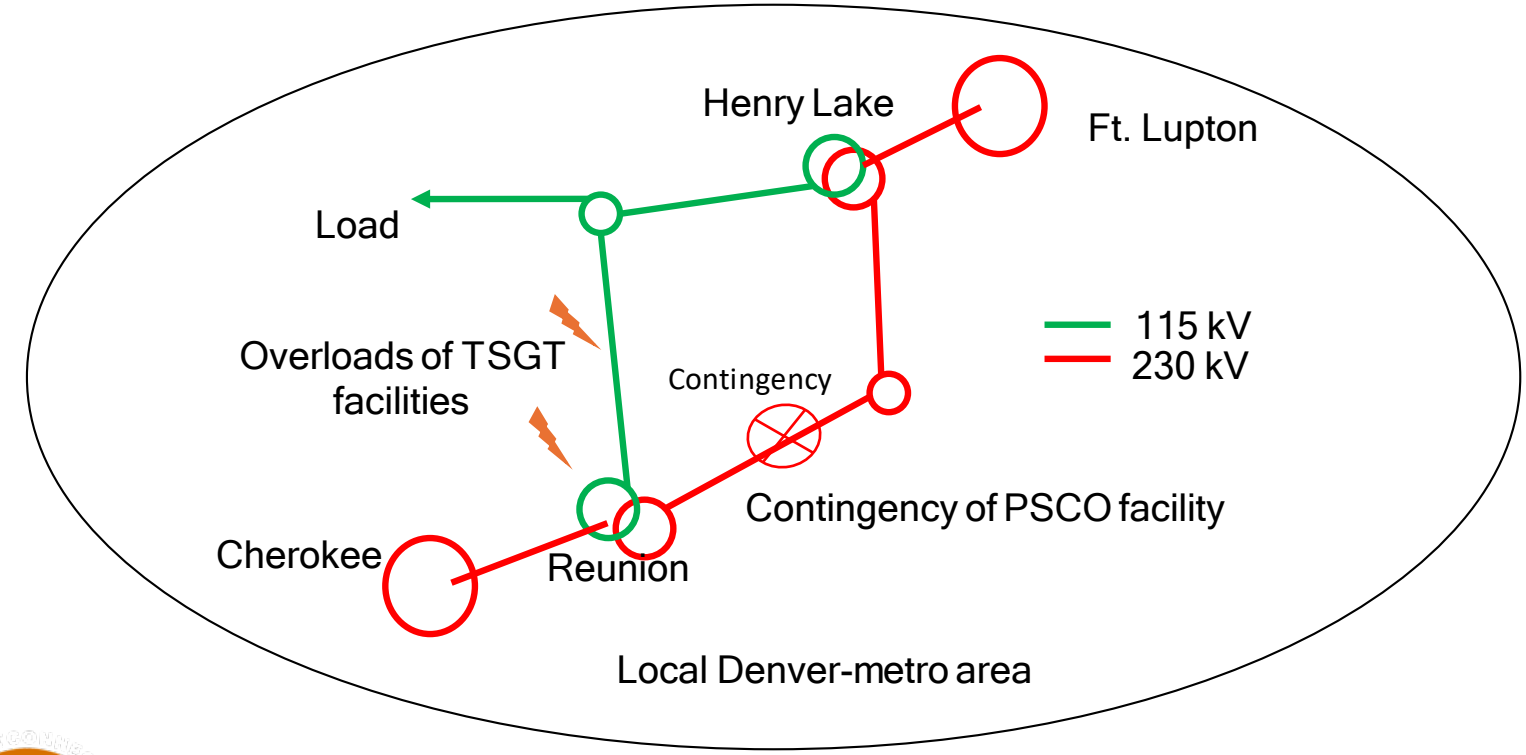
Potential Regional Needs Summary

- Unsolved Contingencies: 0
- Transient Stability Issues: 0
- Potential Regional Issues: 9
  - 4 single outage events caused multiple overloaded lines/transformers owned by different owners.
  - 4 overloads of a single-owner line or transformer with one or both terminal buses having a different single-owner.
  - 1 Multi-owner bus – Bus with voltage issue is owned by multiple owners

- Resolution:
  - Modeling: 8 issues resolved by various modeling updates
  - One remaining issue proposed to be Local vs. Regional
    - Member Response to PS:
      "This is a local issue related to load growth. These overloads are caused not by the contingency, but by local tripping of a transformer. This is a known local issue that will be addressed by the affected entity."

Reliability Issue

- All elements within Denver-metro area
- Contingency on PSCO system, Loadings only on TSGT facilities
- TSGT Comment: "This is a local issue related to load growth. These overloads are caused not by the contingency, but by the resulting tripping of XX transformer. With enough load growth, the current … mitigation becomes inadequate, this is a known issue."
- Any mitigation would likely only benefit TSGT



Regional Reliability Assessment Summary

- **Process**
  - The regional assessment resulted in a single potential regional reliability need
    - A single outage event on one TOLSO's system caused an overload on a facility owned by different TOLSO
  - Affected entities documented the issue as "local" in nature
  - No dispute on that description in September or October PS meetings
- **Planning Subcommittee Recommendation**
  - *On November 12, 2024, the PS recommended that the single reliability issue from the Heavy Summer Reliability Assessment not be considered a regional reliability need.*
- **PMC Motion:**
  - *On December 18, 2024, the PMC approved the recommendation from the PS that no regional transmission needs were identified in the 2024-25 Regional Planning Process*

Base Economic Model Summary

- 2034 WC PCM D4-1:
  - 2034 ADS V2 Foundation
  - 2034 D1 & D2 WC PF Topology Updates & D1/D2 PCM Feedback Updates
  - WECC-wide battery unit modeling update (ID=3 >> ID =10)
    - Implement Battery Schedule WC-wide
  - WECC Path, Wheeling, Commitment vs Dispatch definitions, costs, and rating updates
  - Implement previous cycle penalty costs (previous cycle per ABB/Hitachi recommendation)
  - Add new PF generation and generic modeling unless specific PCM data was provided
  - Re-establish element monitoring; >230kV system, >90kV WC Areas
  - Implement updated NWPP RSG and AS definitions
  - Identified/turned off duplicate generation (SunZia modeled as 6 units @9,000 MW)
  - Implemented Committed Uses modeling and missing temporal element
  - ADS Hydro schedule corrections; min energy, operating ranges, and ramp rates
  - Anticline PSTs modified to encourage flow NW (+0 to +40 deg bounds)
  - "Status Off" ~25GW PacifiCorp Conceptual (Tier 3) Capacity (~5.6 GW Wyoming Wind)
  - Worked with WECC and Hitachi to address all known ADS Issues
    - All known issues have been corrected, WECC to release updated dataset in October
    - Potential update – WECC-Wide Tier 3 Resources – Test Run revealed major issues

Potential Regional Economic Needs

- The 2024-25 regional economic assessment resulted in four (4) potential regional economic needs
  - 4 occurrences of congestion involving multiple WestConnect entities
  - A response for each issue was provided by affected entities
  - No responses indicated a regional need
- No dispute from members at October or November PS meetings
- November 12, 2024, PS Meeting:
  - The PS recommended that the reliability issue not be considered a regional reliability need
- PS Responses to Action Items & Stakeholder comments:
  - Explain method for determining congestion costs
  - Revise congestion table to show direction
  - Investigate congestion costs in High Load Scenario
  - Compare congestion to prior cycles
  - Explain the thought process for needs determination

2034 Final Congestion Results (flow direction update)

2034 WC PCM Final					
Assumed Grouping	**Entities Involved**	**Branch or Path Name**	**Avg Flow (MW)**	**Flow Direction**	**Cong. Hours (% hrs)/Cost(K$)**
Multiple WC Entities	Tri-State G&T|WAPA L.M.|PSCo|BEPC	P36 TOT 3	919	+ = N > S	138 (2%) / 10,032
	BEPC|TSGT|NorthernGrid	DAVEJOHN - LAR.RIVR 230 kV Line #1	116	+ = N > S	311 (4%) / 7,720
	APS|WAPA-DSW	PPAPS W - PINPK 230 kV Line #1	256	+ = E > W	396 (5%) / 1,760
	PSCO|TSGT	CRAIG_YV - CRAIG 230 kV Line #1	73	+ = W > E	723 (8%) / 1,005
Single WC Entity, Multi-Regional	WAPA-SNR|CAISO	P15 Midway-LosBanos	3155	+ = S > N	1658 (19%) / 80,760
	LADWP|NorthernGrid|IPA	INTERMT - MONA 345 kV Line #1&#2	298	+ = W > E	2006 (23%) / 22,374
	LADWP|N3/N9 NV	P77 Crystal-Allen	689	+ = W > E	1023 (12%) / 11,211
	LADWP|IPA	P27 Intermountain Power Project DC Line	305	+ = N > S	2876 (33%) / 4,757
	LADWP|CAISO	P61 Lugo-Victorville 500 kV Line	722	+ = N > S	639 (7%) / 3,229

Responses to Economic Needs Assessment

Branch or Path Name	Entities Involved	Member Response
P36 TOT 3	BEPC, PSCO, TSGT, WAPA-RMR	TOT3/Path 36 congestion is relatively low and there are many adjacent system changes presently occurring that are predicted to improve congestion. Although the amount has increased from previous cycle results this limited amount does not warrant a regional need at this time.
DAVEJOHN - LAR.RIVR 230 kV Line #1	BEPC, PSCO, TSGT, WAPA-RMR	Dave Johnston – Laramie River 230 kV congestion is relatively low but is attributed to increased neighboring Planning Region wind resources. This seams congestion is managed by inclusion of Phase Shifters at Anticline and buildout of the Gateway transmission project by PacifiCorp.
CRAIG_YV - CRAIG 230 kV Line #1	BEPC, PSCO, TSGT, WAPA-RMR	The observed congestion on this line does not warrant establishing this as a regional need as it is limited in duration, cost, and impact. The congestion is a direct result of serving local load and forecasted BTM generation. Additionally, the line and Craig YV terminal equipment are owned by PSCo. While the Craig substation equipment has mixed ownership, PSCo has full ownership of the terminal equipment for this line. This makes the congestion on this facility more similar to a single TO facility in nature.
PPAPS W - PINPK 230 kV Line #1	APS, WAPA-DSW	The observed congestion on this line does not justify designating it as a regional need. Both the congestion hours and cost of the congestion are minimal and do not warrant a capital investment. Historically, the line's flows have remained well below the capacity. Additionally, reliance on a single data point for one West Connect cycle results raises concerns about the analysis's reliability. WAPA recommends using multiple scenarios and years to provide a more robust reliable evaluation.
Path 15 Midway – Los Banos	WAPA-SNR|CAISO	Not a regional issue – Path 15 and related facilities are part of the CAISO Planning Region. Possible driver being a topology issue in the PCM which originated from the WECC ADS. Energy Strategies discovered the topology isn't 1:1, were unable to get a recommended correction from WECC/CAISO prior to finalizing our models. Topology appears fixed in 2035HS

2028-2034 PCM Congestion Results

		2034	2032	2030	2028
Branch Owners	Branch or Path Name	Hours (% hrs)/Cost(K$)	Hours (% hrs)/Cost(K$)	Hours (% hrs)/Cost(K$)	Hours (% hrs)/Cost(K$)
Tri-State G&T|WAPA L.M.|PSCo|BEPC	P36 TOT 3	138 (2%) / 10,032	1 (0.01%) / 16	4 (0.05%) / 232	9 (0.10%) / 828
BEPC|TSGT|NorthernGrid	DAVEJOHN - LAR.RIVR 230 kV Line #1	311 (4%) / 7,720	2 (0.02%) / 0.57	33 (0.38%) / 939	
APS|WAPA-DSW	PPAPS W - PINPK 230 kV Line #1	396 (5%) / 1,760	0		
PSCO|TSGT	CRAIG_YV - CRAIG 230 kV Line #1	723 (8%) / 1,005	0		
Tri-State G&T|PSColorado	STORY - PAWNEE 230kV Line #1			398 (5%) / 5,561	
SRP|APS	GILARIVR - PANDA500/230kV #1			151 (2%) / 5,113	
IPP|Sierra Pacific Power Co.	P29 Intermountain-Gonder 230 kV Interface			137 (2%) / 753	
TSGT New Mexico|PN2 New Mexico	BERNARDO - BELEN_PG 115kV Line #1			142 (2%) / 1,597	
DG&T|Tri-State G&T|WAPA L.M.	P30 TOT 1A Interface			24 (0.27%) / 426	9 (0.10%) / 828
IPP|Sierra Pacific Power Co.	P32 Pavant-Gonder InterMtn-Gonder 230 kV			11 (0.13%) / 109	96 (1%) / 725
Tri-State G&T|CSU	MONUMENT - FLYHORSE N 115kV Line #1			23 (0.26%) / 65	
EPE |TSGT New Mexico	UVAS - ALTLUNTP 115kV Line #1			11 (0.13%) / 62	
PSCO|WAPA L.M.	MIDWAYPS - MIDWAYBR 230kV Line #1			1 (0.01%) / 3	
BANC|SMUD|WAPA-SNR	WHISKEYT-WHISKEYF 230/4.16kV # 1				8,784 (100%) / 241,664
BANC|SMUD|WAPA-SNR	FOLSOM-FOLSOM2 230/13.8kV # 1				821 (9%) / 54,668
TEP|WAPA-DSW	WINCHSTR-VAIL 345kV Line Ckt 1				370 (4%) / 7,892
BANC|SMUD|WAPA-SNR	SPRINGCR-SPRINGCR 230/13.8kV # 1				21 (0.24%) / 3,895
CG|NTTG|TANC	P66 COI				56 (0.64%) / 3,083
LADWP|CAISO	P61 Lugo-Victorville 500 kV Line				163 (2%) / 1,861
NVE|LADWP	P32 Pavant-Gonder InterMtn-Gonder 230 kV				96 (1%) / 725
CAISO|APS|SRP|TEP|WAPA-DSW	MESSOLAR-MESQCOL1 230/34.5kV#1				146 (2%) / 568
TSGT|EPE	P47 Southern New Mexico (NM1)				38 (0.43%) / 460
PSCO|Other	COMAN_S2-COMAN_SOLAR 230/34.5kV #T1				87 (0.99%) / 435
CAISO|TANC|SMUD|WAPA-SNR	P15 Midway-LosBanos				16 (0.18%) / 411
BANC|SMUD|WAPA-SNR	CAMINO S-CAMINO 2 230/13.8kV #T2				3 (0.03%) / 225

Regional Economic Assessment Summary

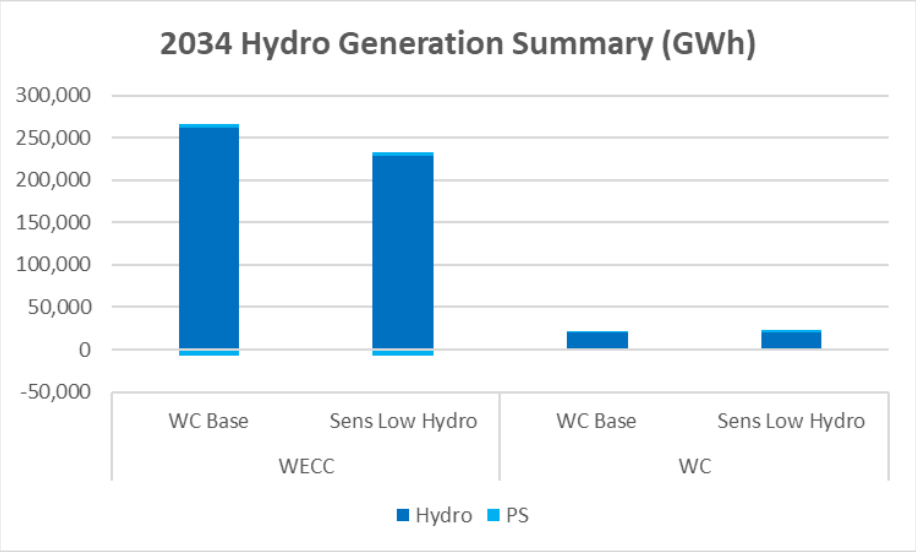
- **Regional Assessment Results**
  - The regional assessment resulted in a single potential regional reliability need
  - The regional economic assessment resulted in 4 occurrences of congestion involving multiple WestConnect entities
- **PS Recommendation to PMC**
  - On November 13, 2024, the PS recommended that the issues from the Regional Assessment not be considered a regional needs.
  - On December 17, 2024, additional information was presented and discussed, the PS addressed stakeholder comments, and determined that they had *no changes to their November 13, 2024, recommendation:*
- **PMC Motion**
  - On December 18, 2024, the PMC approved the recommendation from the PS that no regional transmission needs were identified in the 2024-25 Regional Planning Process

PCM Sensitivities

- Plan
  - Conduct sensitivity studies on the 2034 Base Case Economic model to better understand whether regional transmission congestion may be impacted by specific input uncertainty
  - Evaluate the four sensitivities that were performed in the previous cycle
- Sensitivities
  - Hydro Conditions
  - Natural Gas Prices
  - Load Forecast
  - Emissions Cost

Low Hydro

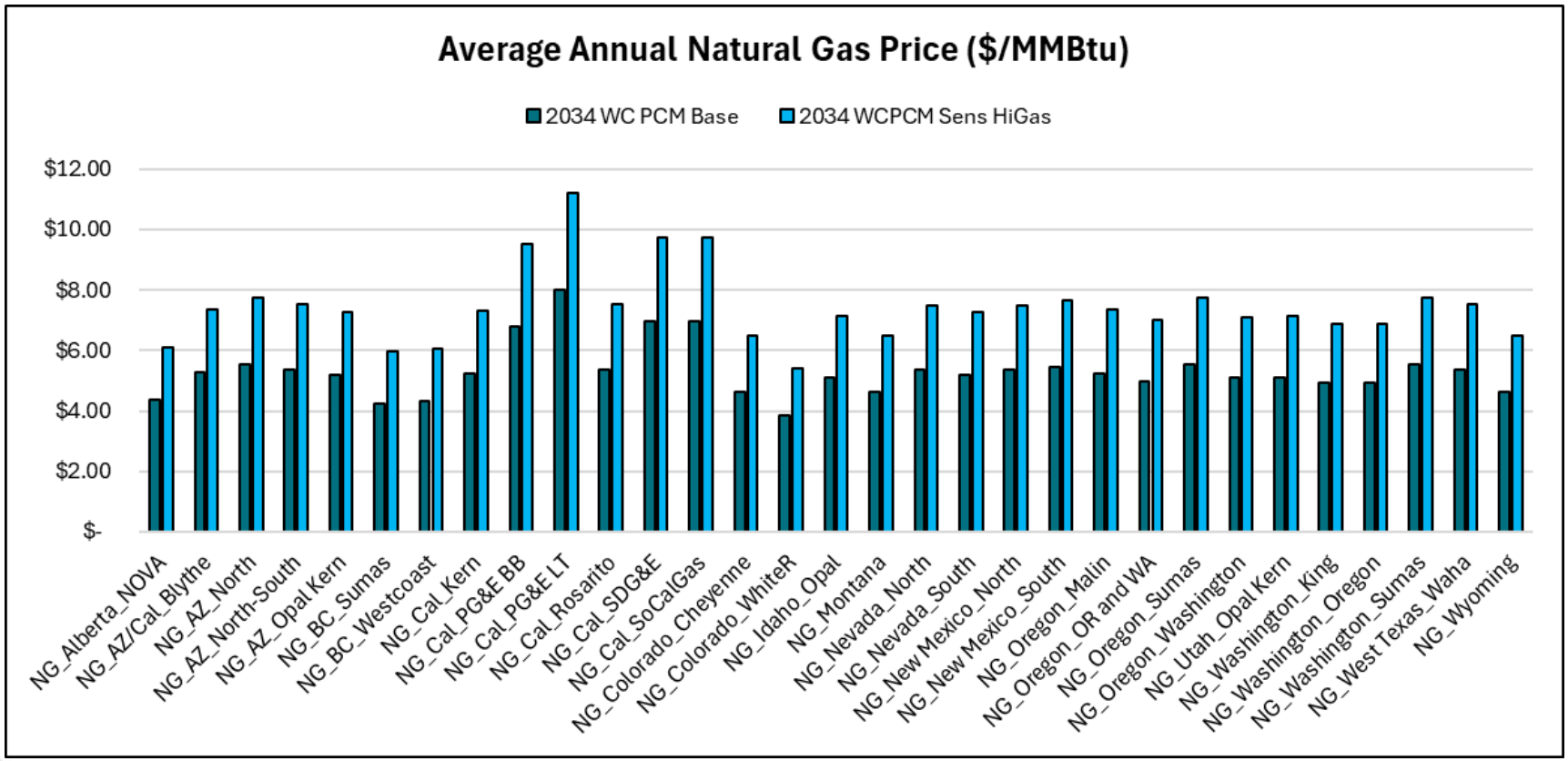
- The 2034 WCPCM Base Case uses a median year hydro condition. Hydro conditions from 2001 provide the best representation of hydro operations for a low water year. Low hydro shapes were derived from data developed by WECC for the 2024 TEPPC Common Case



Metric	Region	Fuel Type	Hydro	PS	PS Pump
Generation (GWh)	WECC	WC Base	261,892	4,524	-7,037
		Sens Low Hydro	228,314	4,825	-7,485
	WC	WC Base	19,944	1,630	-1,946
		Sens Low Hydro	20,900	1,742	-2,120
Capacity (MW)	WECC	WC Base	72,278	6,046	6,046
		Sens Low Hydro	72,278	6,046	6,046
	WC	WC Base	7,129	3,351	3,351
		Sens Low Hydro	7,129	3,351	3,351
Capacity Factor	WECC	WC Base	41.3%	8.5%	-13.3%
		Sens Low Hydro	36.0%	9.1%	-14.1%
	WC	WC Base	31.8%	5.5%	-6.6%
		Sens Low Hydro	33.4%	5.9%	-7.2%

High Gas Prices

- Assumed natural gas prices 40% higher than the base case
  - Base Case annual average gas price: $5.30/MMBtu
  - Sensitivity Case annual average gas price: $7.43/MMBtu



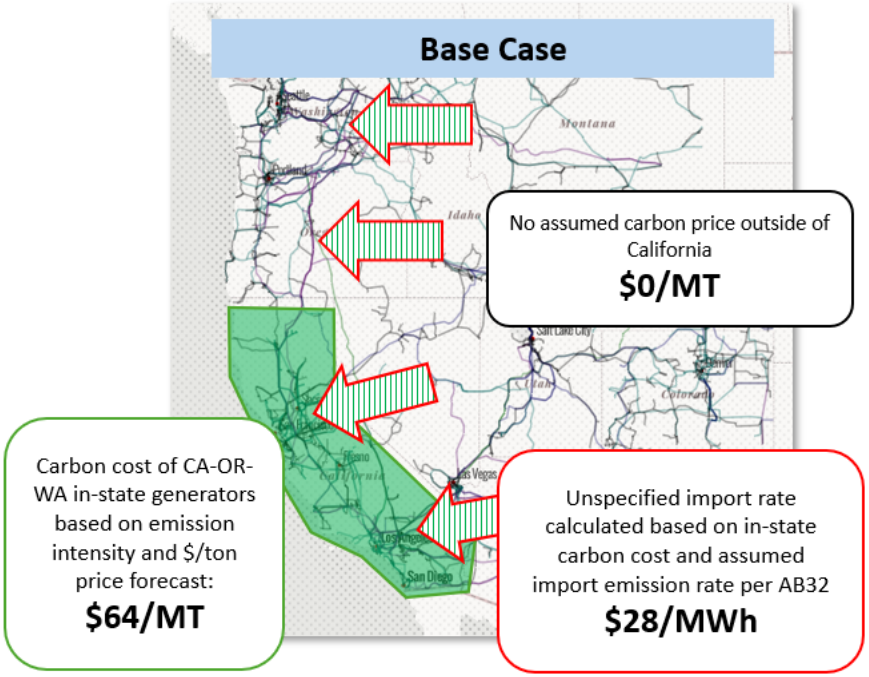
High Load Forecast

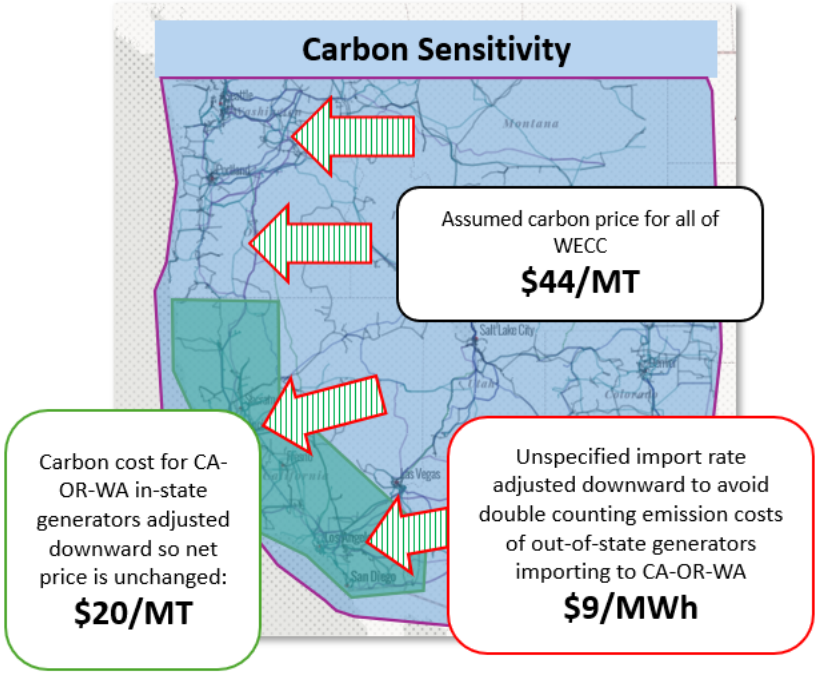
		2034 WCPCM Base		2034 WCPCM sens High Load			
Area	Region	Peak (MW)	Energy (GWh)	Peak Inc %	Energy Inc %	Peak (MW)	Energy (GWh)
AZPS	SW_AZPS	10,661	50,958	120%	120%	12,853	61,379
BANC	CA_BANC	5,252	18,967	120%	120%	6,325	22,858
EPE	SW_EPE	2,518	11,260	120%	120%	3,030	13,571
IID	CA_IID	1,183	4,035	120%	120%	1,422	4,861
LDWP	CA_LDWP	7,989	32,681	120%	120%	9,608	39,346
PNM	SW_PNM	3,092	15,376	120%	120%	3,721	18,550
PSCO	RM_PSCO	11,382	52,234	120%	120%	13,716	63,050
SRP	SW_SRP	11,322	51,221	120%	120%	13,624	61,692
TEPC	SW_TEPC	4,318	19,417	120%	120%	5,182	23,300
WACM	RM_WACM	6,700	40,181	120%	120%	8,059	48,323
WALC	SW_WALC	1,553	7,746	120%	120%	1,872	9,335

- Sensitivity case assumed peak loads and energy 20% higher than the Base Case

System Carbon Price

Carbon Sensitivity: Study Assumption





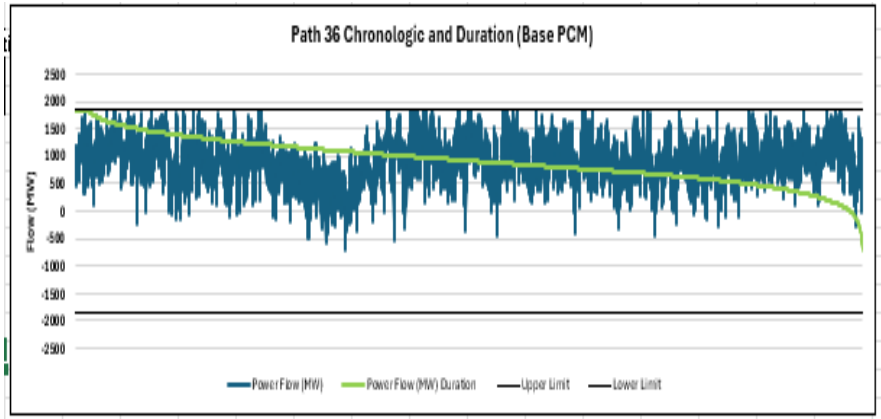
CA-OR-WA in-state/specified resources:	**$64/MT**	$20/MT + $44/MT = **$64/MT**
CA-OR-WA imports:	**$64/MT** ($28/MWh)	$20/MT ($9/MWh) + $44/MT = **$64/MT**
WECC system adder:	**$0/MT**	**$44/MT**

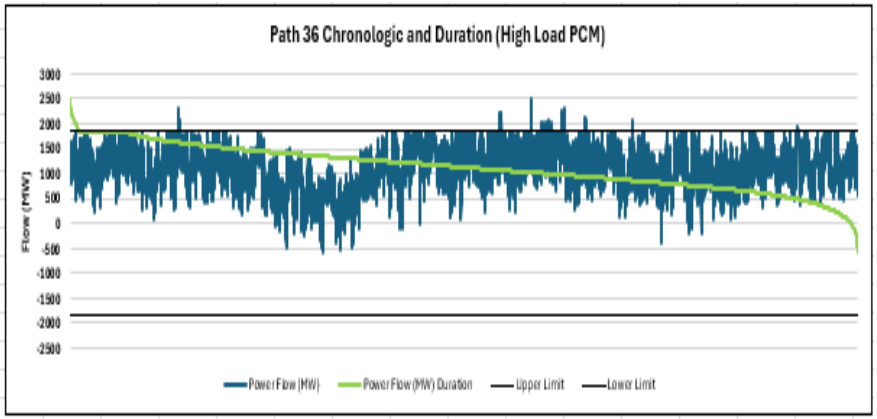
Economic Sensitivities - Congestion

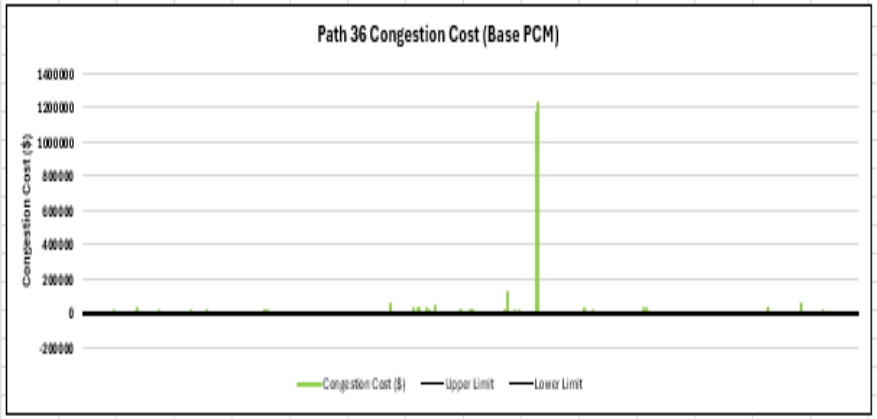
		Congestion Hours (% hrs)/Cost(K$)				
Assumed Grouping	**Branch or Path Name**	**Base**	**Low Hydro**	**High Gas**	**High Load**	**System Carbon Price**
Multiple WC Entities	P36 TOT 3	138 (2%) / 10,032	82 (1%) / 1,542	128 (1%) / 3,423	600 (7%) / 557,608	131 (1%) / 3,620
	DAVEJOHN - LAR.RIVR 230 kV Line #1	311 (4%) / 7,720	196 (2%) / 4,193	422 (5%) / 13,389	915 (10%) / 148,314	369 (4%) / 12,304
	PPAPS W - PINPK 230 kV Line #1	396 (5%) / 1,760	409 (5%) / 1,435	418 (5%) / 2,485	873 (10%) / 6,216	361 (4%) / 1,626
	P46 West of Colorado River (WOR)	0	0	0	0	17 (%) / 0,163
Single WC Entity, Multi-Regional	P15 Midway -LosBanos	1658 (19%) / 80,760	1925 (22%) / 82,188	1549 (18%) / 90,163	1405 (16%) / 65,188	1229 (14%) / 60,300
	INTERMT - MONA 345 kV Line #1&#2	2006 (23%) / 22,374	2743 (31%) / 40,855	1987 (22%) / 26,867	1940 (22%) / 29,605	2061 (23%) / 30,632
	P77 Crystal-Allen	1023 (12%) / 11,211	1035 (12%) / 12,072	885 (10%) / 10,561	536 (6%) / 5,280	836 (10%) / 9,353
	P27 Intermountain Power Project DC Line	2876 (33%) / 4,757	2976 (34%) / 8,753	2682 (31%) / 5,350	2449 (28%) / 4,734	3674 (42%) / 8,441
	P61 Lugo-Victorville 500 kV Line	639 (7%) / 3,229	429 (5%) / 2,189	705 (8%) / 4,683	664 (8%) / 5,338	444 (5%) / 2,337
	BONANZA - MONA 345 kV Line #1	0	0	0	95 (1%) / 35,773	0
	MOEN-ELD SC3 - ELDORDO 500 kV Line #1	0	0	128 (1%) / 0,279	0	278 (3%) / 1,067
	Total Multi-TO Congestion ($)	**$19,799,835**	**$7,796,176**	**$19,530,215**	**$714,651,192**	**$16,381,009**
	Total Single-TO Congestion ($)	**$351,235,427**	**$2,199,721,200**	**$410,161,617**	**$524,517,270**	**$408,658,109**
	Total Non-WestConnect Congestion ($)	**$1,181,388,575**	**$1,173,742,503**	**$1,459,723,788**	**$1,414,828,709**	**$1,254,995,584**
	Total Multi-TO Congestion (% Change)		**-61%**	**-1%**	**3509%**	**-17%**
	Total Single-TO Congestion (% Change)		**526%**	**17%**	**49%**	**16%**
	Total Non-WestConnect Congestion (% Change)		**-1%**	**24%**	**20%**	**6%**

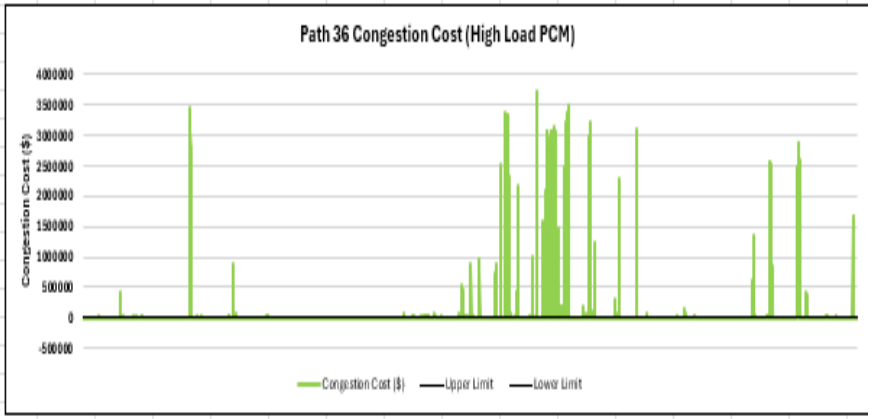
WESTCONNECT REGIONAL PLANNING

Path 36


Path 36 Chronologic and Duration (Base PCM)
Flow (MW)
Power Flow (MW)
Power Flow (MW) Duration
Upper Limit
Lower Limit


Path 36 Chronologic and Duration (High Load PCM)
Flow (MW)
Power Flow (MW)
Power Flow (MW) Duration
Upper Limit
Lower Limit


Path 36 Congestion Cost (Base PCM)
Congestion Cost ($)
Congestion Cost ($)
Upper Limit
Lower Limit


Path 36 Congestion Cost (High Load PCM)
Congestion Cost ($)
Congestion Cost ($)
Upper Limit
Lower Limit

Public Policy Assessment

- WestConnect begins evaluation by identifying a list of enacted public policies that impact the local TOs (see study plan)
- The regional base models reflect the enacted public policies driving local transmission needs
- If the assessments identify regional issues that are related to enacted public policy these may constitute a public policy-driven transmission need
- There is also an opportunity to make suggestions as to whether a TO's local policy-driven project may constitute a regional public policy-driven transmission need
  - Stakeholders are invited to make a recommendation to the Planning Subcommittee
  - ***Stakeholders are asked to review the local public policy-driven transmission projects outlined on the next two slides and submit any suggestions regarding potential regional public policy-driven transmission needs to the PMC via the Comment Form posted with the meeting slides. All comments must be received by the end-of-business Wednesday, December 4th.***

Regional Needs Determination

- WestConnect has determined there are no reliability, economic, or public policy driven issues that are regional in nature based on a review of the regional assessments.
  - Performance results from the base reliability models
  - Congestion results from the base economic model
  - PS Recommendation
  - Stakeholder opportunity for comment
  - PMC Final Recommendation

2024-25 PLANNING PROCESS NEXT STEPS AND SCHEDULE

2024-25 SCENARIO ASSESSMENT

Scenario Planning

- In addition to the regional needs assessment, WestConnect also conducts information-only scenario studies that look at alternate but plausible futures, with resource, load, and public policy assumptions that are different than what is assumed in the Base Cases.
- Three scenarios were included in the 2024-25 Study Plan:

Decreased Facility Rating Scenario:

- Purpose: evaluate the impacts of an overall decrease in facility ratings by a given percentage. The intent is to provide a view of how decreased facility ratings might impact reliability.

Extreme Cold Weather Scenario:

- Purpose: evaluate the reliability of the WestConnect footprint for a 10-year, heavy winter condition, with higher-than-expected loads and reduced resource availability that would be the result of extremely cold weather throughout the region. The intent is to provide information into system import or export capabilities, and potential reliability issues, including how to serve load, that could result in the need for transmission or resource enhancements.

20-Year Increased Renewable Scenario:

- Purpose: perform assessments of a 20-year timeframe with aggressive renewable energy penetration. The objective is to help WestConnect members understand transmission-related issues associated with a 20-year future that attempts to capture current and potential public policy requirements that are expected to trend towards more aggressive objectives for carbon reduction.

Decreased Facility Rating - Scope

A. Model
- 2034 Heavy Summer WestConnect Base

B. Methodology
- Perform reliability analysis only
- Same steady state contingencies and monitoring from the base
- Members will have opportunities to review the results
- Region-wide 5% reduction in the level of loading monitored for facilities

C. Documentation
- Results will be presented in same format as the Regional Assessment

Extreme Cold Weather Scenario – Scope

A. Approach

1. Seed Case:
   - 2033-34 WECC Heavy Winter Base (34HW1b1, same development year as 34HS)
   - Modified to match WestConnect base transmission topology
2. Model Adjustments
   - Adjust loads - ES Proposal
   - Adjust resources – ES Proposal

B. Methodology

- Perform reliability analysis only
- Same steady state contingencies from the base
  - Monitoring settings will be updated to Winter

C. Documentation

- Results will be presented in same format as the Regional Assessment

20-Year Scenario - Scope

1. Run 2045 High Renewable PCM to identify stressed regional flowgates and transmission
   - Stress = high congestion, high shadow prices, high flow
2. Select subset of stressed regional flowgates and transmission for reliability analysis
   - PS recommendation
3. Perform regional reliability assessment on base case dispatch and develop transfer models the simulates high flow conditions on selected flowgates and transmission

Interregional Transmission Project Submittals

Heidi Pacini, WestConnect Project Manager

Interregional Transmission Project Submittals

- ITP Evaluation Process Plans for each Interregional Transmission Project submitted to WestConnect for which WestConnect is a Relevant Planning Region can be found on the WestConnect Interregional Coordination webpage
- WestConnect determined that there are no regional transmission needs for the 2024-25 Planning Cycle, and as such, it will not evaluate any regional or interregional projects this planning cycle

Upcoming Meetings

Heidi Pacini, WestConnect Project Manager

Next Meetings

- **April 2025 WestConnect Meetings**: *all meetings are scheduled as webinars*
  - **PS meeting:** Tuesday, April 15th
    - 9:00 a.m. - 12:00 p.m. MDT
  - **PMC meeting:** Wednesday, April 16th
    - 9:00 a.m. - 12:00 p.m. MDT
- 2025 PMC meetings are posted to the WestConnect calendar

THANK YOU

Presenter Contact Information:
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Tom Green, tgreen@energystrat.com

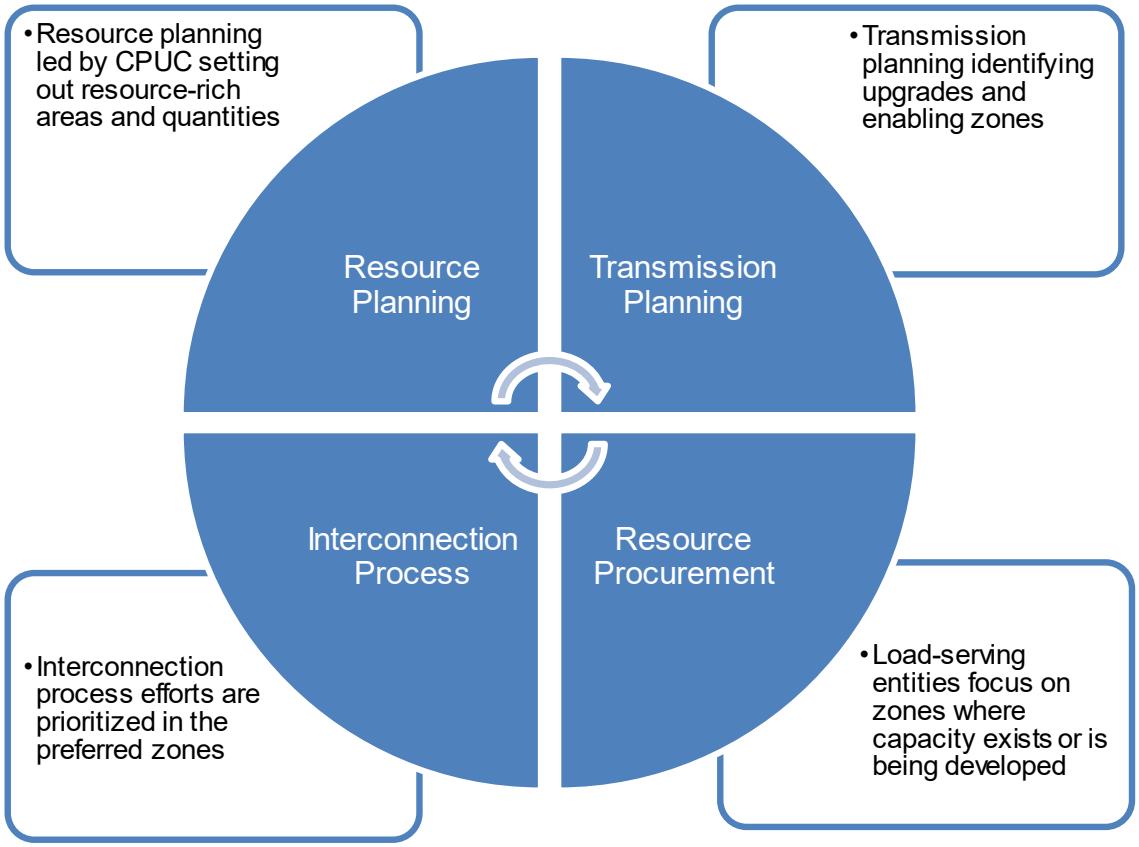
California ISO –Transmission Planning

Annual Interregional Coordination Meeting (AICM)
Folsom, California ISO

March 24, 2025

CAISO's Transmission Planning Process

- Operates under the terms of the FERC approved tariff
  - Section 24 - Comprehensive Transmission Planning Process
- Meet the NERC, WECC, and CAISO standards & criteria.
- Coordinate and consolidate in a single plan the transmission needs of the CAISO Balancing Authority Area for maintaining the security and reliability of the CAISO controlled grid.



The CAISO leads the transmission planning process for our footprint, coordinated with load forecasts from the CEC and resource planning from the CPUC

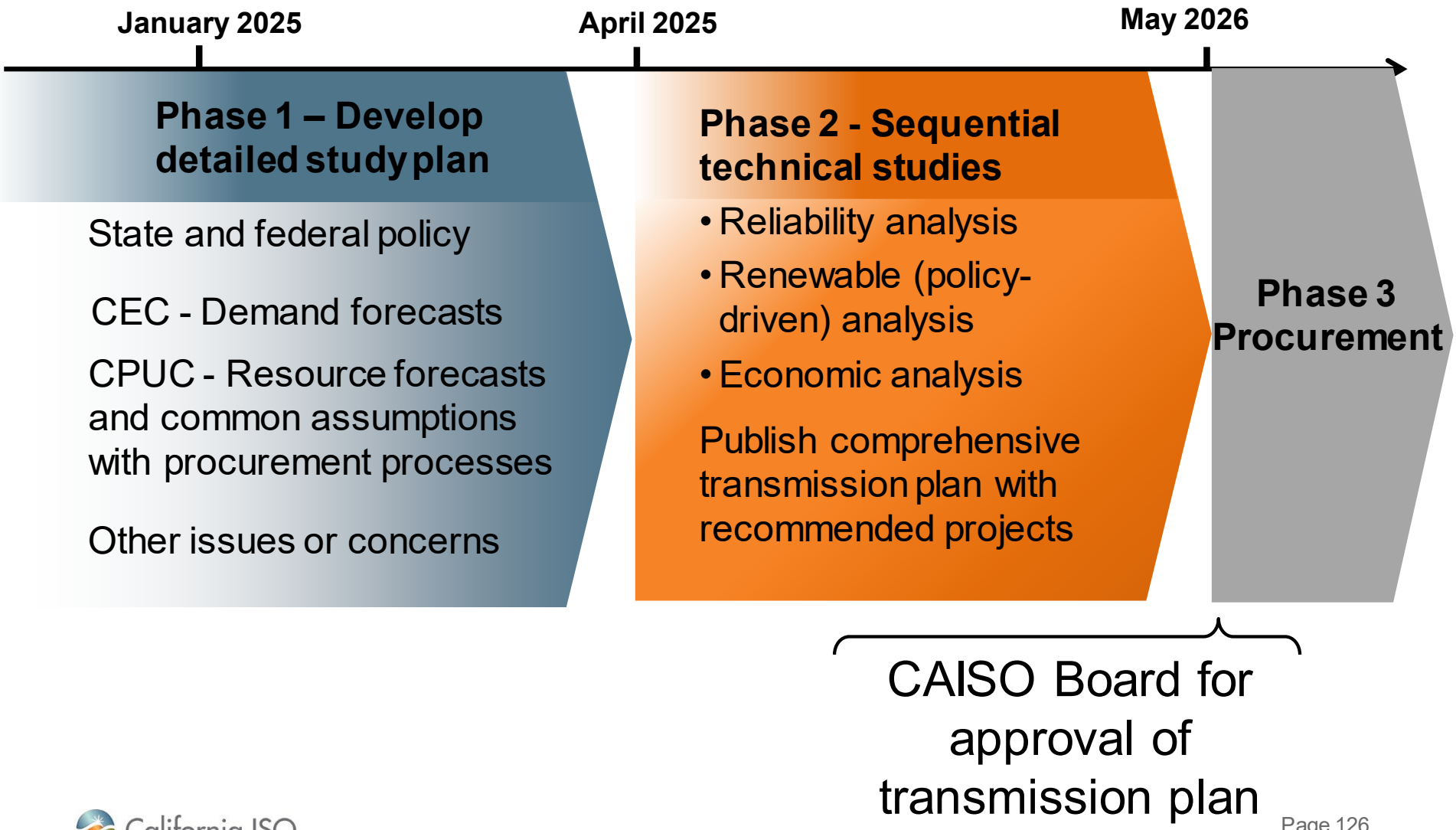
- Annual 10-Year transmission plan is the formal approval document for expansion planning in our footprint
  - Ramped from 10 year average of $650 million per year to $3 billion in 2021-2022 plan, $7.3 billion in 2022-2023 plan and $6.1 billion in 2023-2024 plan
  - Responded to accelerating load growth and escalating renewable energy needs
  - Focuses on most efficient and effective long term solutions – including Grid Enhancing Technologies and non-wires solutions

- 20 Year Outlook assesses longer term needs
  - First prepared in 2022, updated in 2024
  - Establishes a longer term direction and strategy
  - Provides context for nearer term decision
- FERC Order No. 1920 will require changes and add new considerations to regional transmission planning

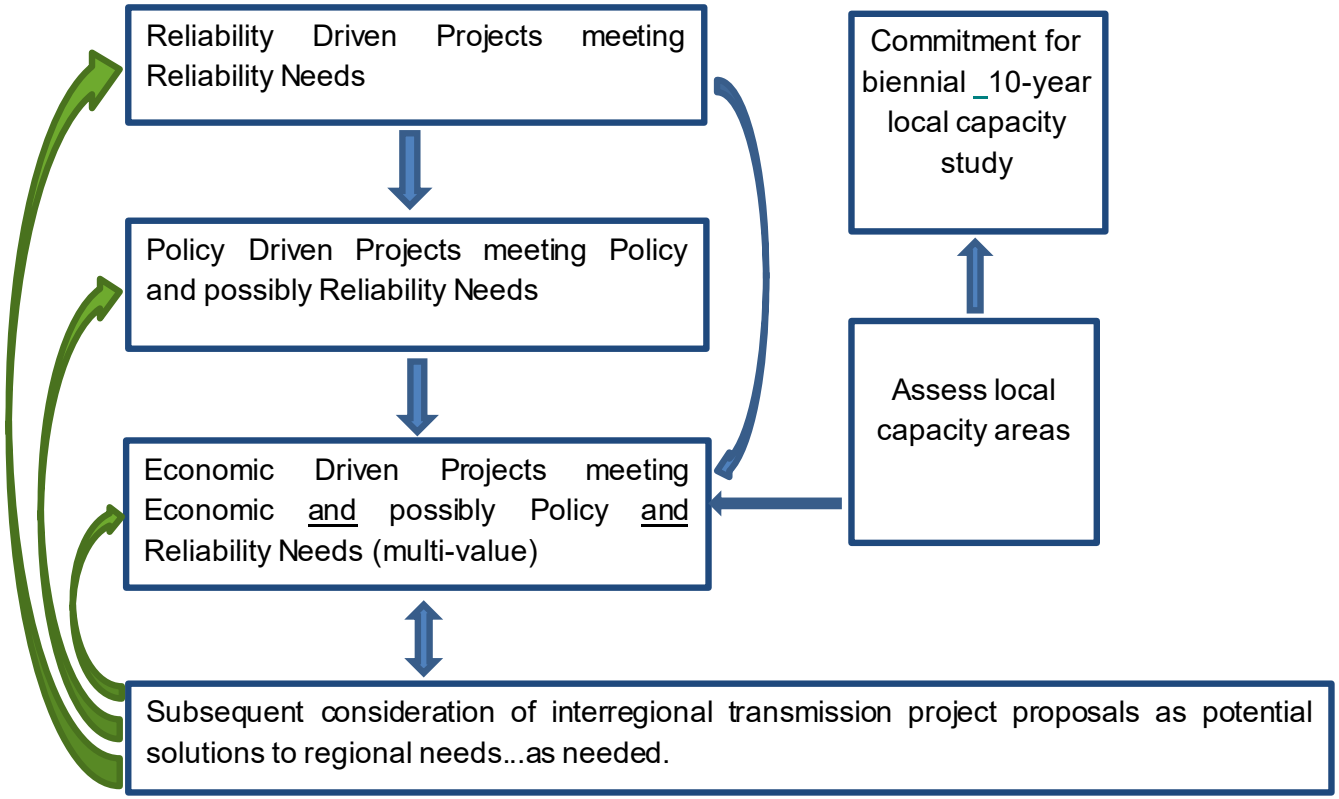
The CAISO continues to advance interregional transmission planning projects

- FERC accepted the Development Agreement between CAISO and Great Basin Transmission for SWIP-N on January 21, 2025
  - The agreement details the entitlements, cost-effectiveness, and cost management controls
  - Idaho Power submitted the SWIP-N CPCN to its PUC for approval on March 7, 2025 - Case Details – IPUC
- CAISO continues to operationalize TransWest Express (TWE) and SunZia
  - TWE and SunZia are sPTO transmission models
  - TWE supports integration of 1,500 MW of wind resources from Wyoming and SunZia supports about 3,000 MW of wind resources from New Mexico

2025-2026 Transmission Planning Process

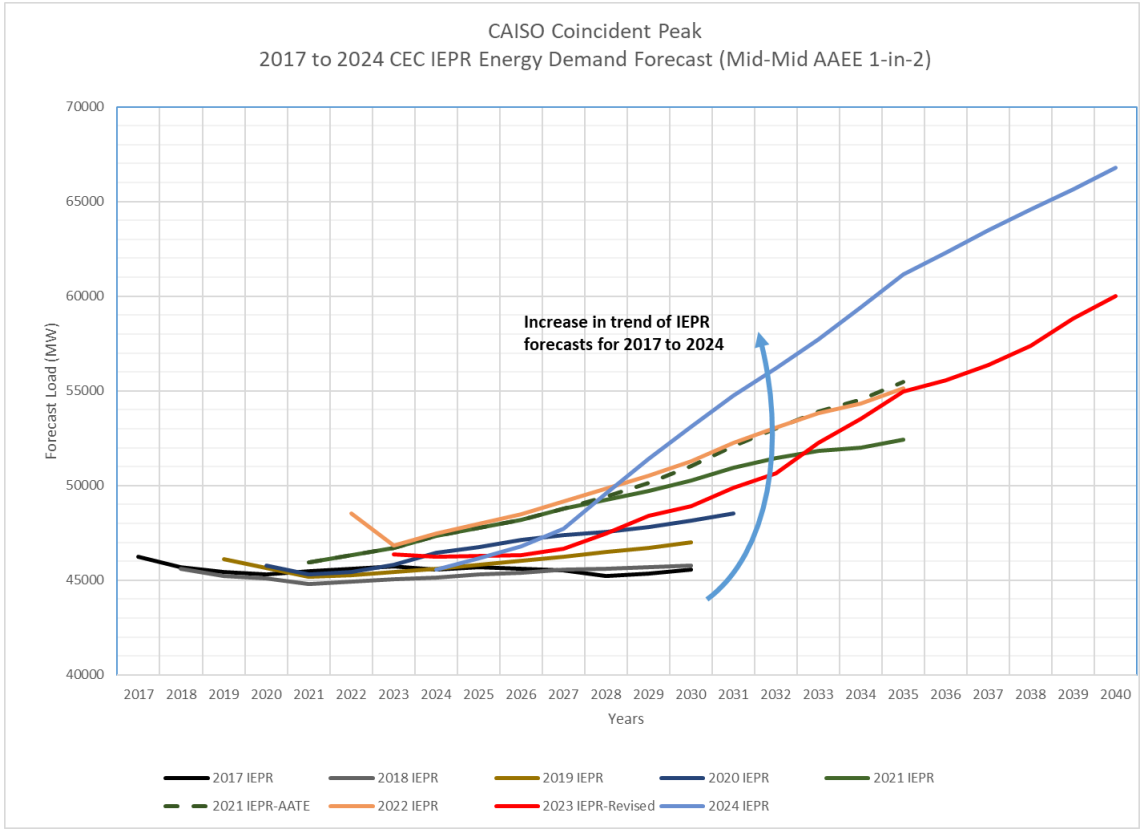


Transmission planning studies are coordinated as a part of the transmission planning process



California's climate change goals and other load growth are driving escalating load forecasts

The CEC's load forecast is used in both the CPUC's Integrated Resource Planning process and the ISO's transmission planning process.



The ISO uses:

- The 1-in-10 weather event forecast for local reliability studies
- The 1-in-5 weather event forecast for bulk system reliability-driven and policy-driven studies
- The 1-in-2 weather event forecast for economic (market efficiency) studies

2025-2026 Transmission Planning Process Key Inputs

- On February 20, 2025 CPUC adopted a base and a sensitivity portfolio for 2035 and 2040 for use in the 2025-2026 TPP

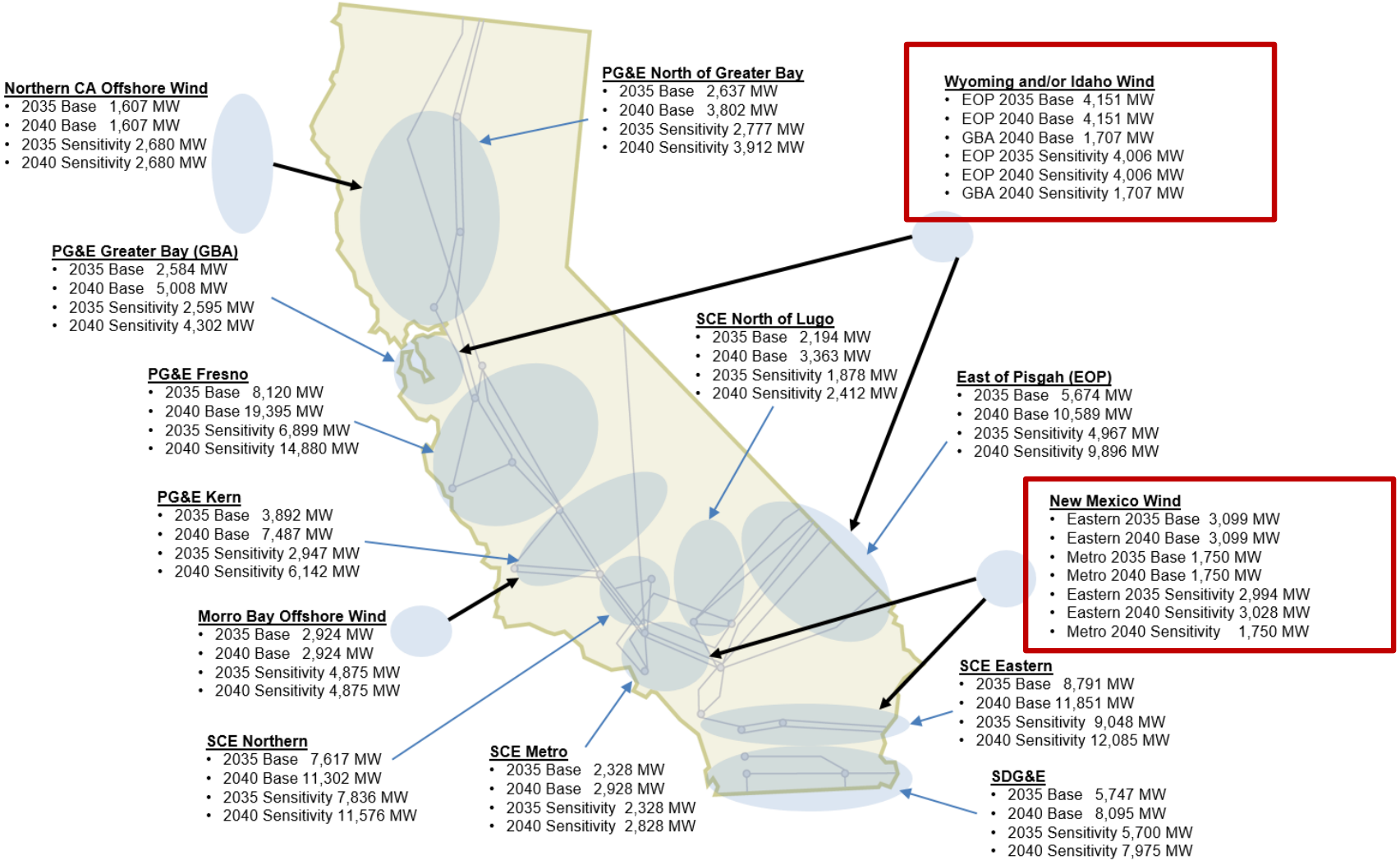
  https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2024-26-irp-cycle-events-and-materials/assumptions-for-the-2025-2026-tpp

- 2024 IEPR California Energy Demand forecast adopted by the CEC on January 21, 2025

  https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report-iepr/2024-integrated-energy-policy-report

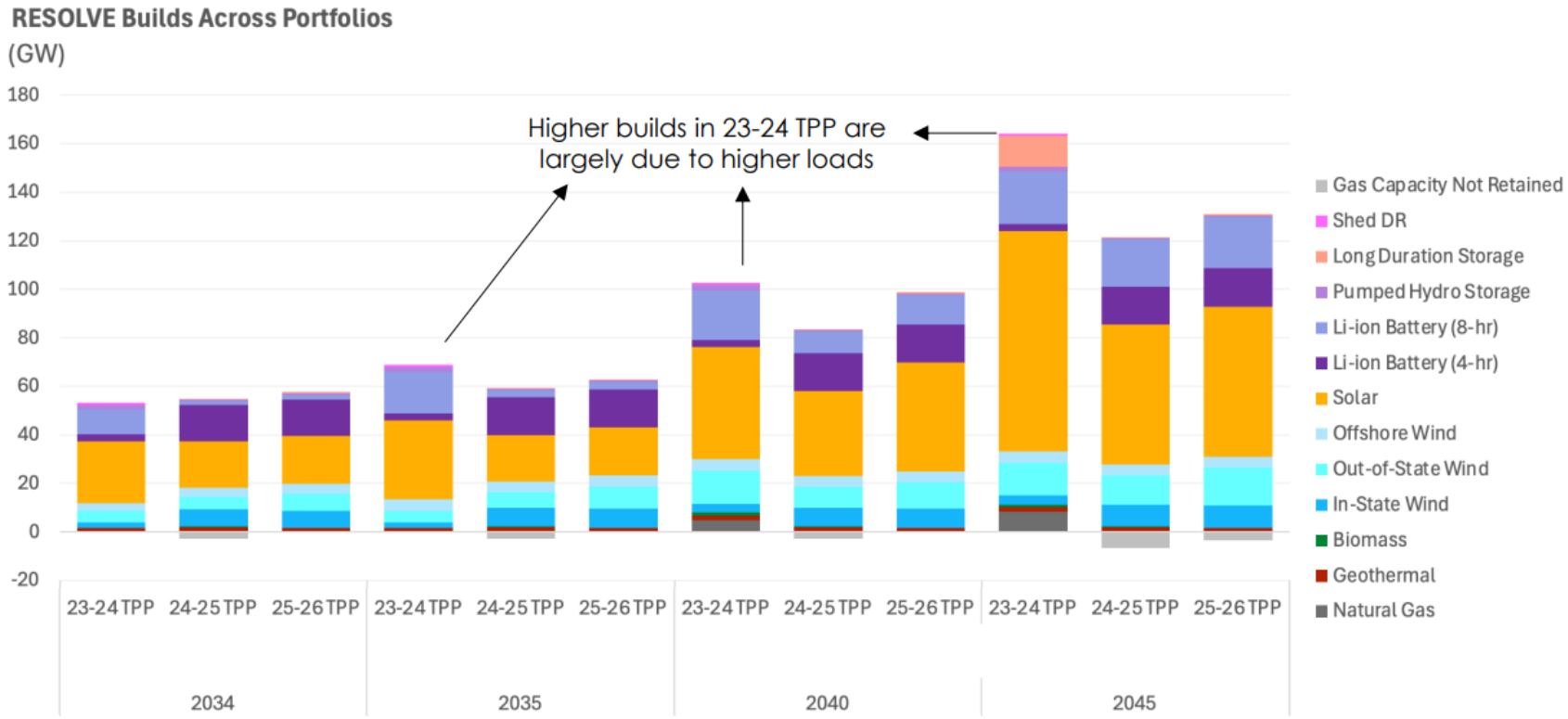
- Non-CPUC jurisdictional approved IRP will be incorporated in the analysis with the CPUC busbar mapped IRP base portfolio

2035 and 2040 portfolio resources by area for the 2025-2026 TPP



*The above diagram has been updated to reflect Final Busbar Mapping Results published by the CPUC 2/20/2025

Comparison of resource portfolios with previous TPP shows increased solar and OOS wind resources



Reference: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2024-2026-irp-cycle-events-and-materials/assumptions-for-the-2025-2026-tpp/25-26-tpp-pd-resolve-and-servm-analysis-slide-deck.pdf

Resource category build-outs breakdown by year in the 2025-2026 TPP

Resource Category	2026	2028	2030	2032	2034	2035	2039	2040	2045
Natural Gas	-	-	-	-	-	-	-	-	-
Geothermal	0.8	1.1	1.5	1.6	1.6	1.6	1.6	1.6	1.6
Biomass	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
In-State Wind	0.7	1.0	5.2	7.0	7.0	7.9	7.9	7.9	9.0
Out-of-State Wind	1.8	3.4	4.7	4.7	7.0	9.0	9.1	10.7	15.7
Offshore Wind	-	-	-	2.7	3.9	4.5	4.5	4.5	4.5
Solar	5.5	8.5	14.8	16.3	19.8	19.8	42.6	44.9	61.8
Li-ion Battery (4-hr)	8.0	9.0	11.6	12.7	15.0	15.7	15.7	15.7	15.7
Li-ion Battery (8-hr)	0.4	1.0	1.2	1.4	1.9	2.8	11.2	12.0	21.1
Pumped Hydro Storage (12-hr)	-	0.5	0.5	0.8	0.8	0.8	0.8	0.8	0.8
Long Duration Storage (8-24 hr)*	0.1	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5
Shed DR	-	-	-	-	-	-	-	-	-
Gas Capacity Not Retained	-	-	-	-	-	-	-	-	(3.5)
Total	17.3	25.1	40.0	47.7	57.7	62.9	94.1	98.8	127.4

Reference: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2024-2026-irp-cycle-events-and-materials/assumptions-for-the-2025-2026-tpp/25-26-tpp-pd-resolve-and-servm-analysis-slide-deck.pdf

2025-2026 Transmission Plan Study Plan

- Reliability Assessment to identify reliability-driven needs
- Policy Assessment to identify policy-driven needs
- Economic Planning Studies to identify needed economically-driven elements
- Other Studies
  - Local Capacity Requirement (LCR)
  - Maximum Import Capability expansion requests
  - Long-term Congestion Revenue Rights
  - Frequency response
- No special studies are currently planned for the 2025-2026 TPP

2025-2026 Transmission Plan Milestones

- Draft Study Plan posted on February 19
- Stakeholder Meeting: Draft Study Plan on February 26
  - Comments to be submitted by March 12
- Final Study Plan to be posted in April
- Preliminary reliability study results to be posted on August 15
- Stakeholder Meeting: Preliminary Reliability Results on September 24 and 25
  - Comments to be submitted by October 9
- Request window closes October 15
- Stakeholder Meeting: Preliminary policy and economic results on November 19
  - Comments to be submitted by December 5
- Draft transmission plan to be posted on March 31, 2026
- Stakeholder Meeting: Draft Transmission Plan on April 15, 2026
  - Comments to be submitted by April 29, 2026
- Revised draft for approval at May 2026 Board of Governor meeting

All Western Planning Regions are consistent in how they address interregional transmission projects (ITPs) within their Order 1000 regional processes

- The ITP must electrically interconnect directly with at least two FERC Order 1000 planning regions
- The ITP must be submitted to the ISO before it can be considered in the CAISO's regional transmission planning process
- When a sponsor submits an ITP into the regional process of an Order 1000 planning region it must indicate whether or not it is seeking cost allocation from that Order 1000 planning region
- When a properly submitted ITP is successfully validated, the two or more Order 1000 planning regions that are identified as Relevant Planning Regions are then required to assess the ITP

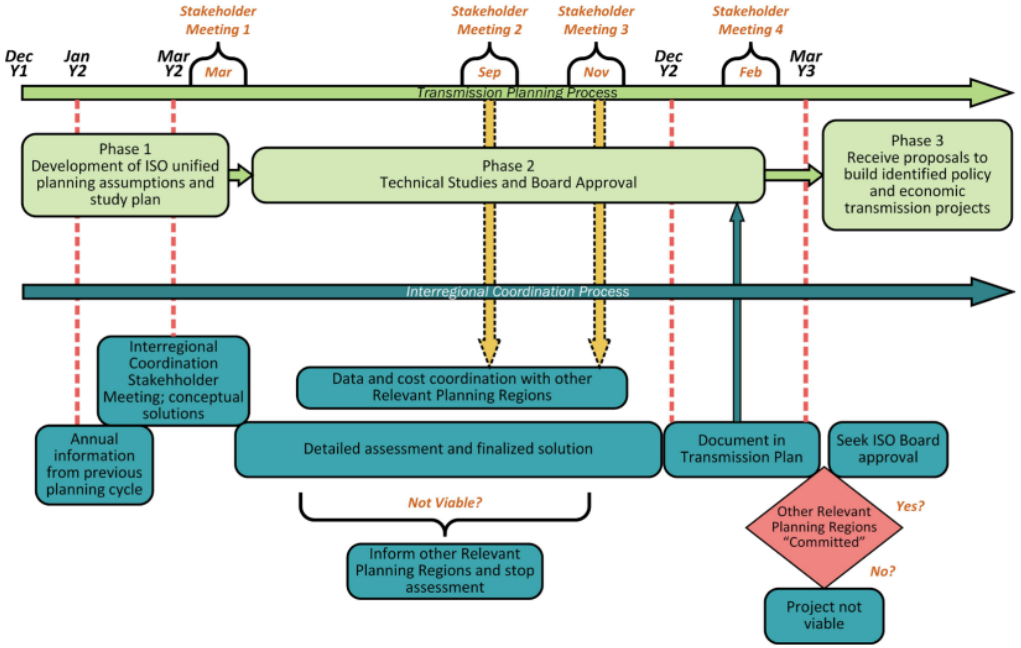
Summary of Q1 2024 ITP submittals

Project Name	Company	Project Submitted to	Relevant Planning Regions	Cost Allocation Requested From	Description	In Service Date
Sloan Canyon – Mead 230 kV Ckt 2	GridLiance West LLC	CAISO, WC	CAISO, WC	CAISO, WC	An 890 MVA, AC circuit to be added to the existing GLW Sloan Canyon to WAPA Mead double-circuit capable 230kV towers	2028
Mead – Mohave	GridLiance West LLC	CAISO, WC	CAISO, WC	CAISO, WC	Rebuilding the existing Mead to Davis 230 kV line to 500 kV and building a 5-mile Davis to Mohave extension	2030
GLW Upsize to Sagebrush	GridLiance West LLC	CAISO, NG	CAISO, NG	CAISO, NG	Upgrade to sections of the CAISO 2022-2023 TPP approved GridLiance West (GLW)/ Valley Electric Association (VEA) Area Upgrades and Beatty 230kV Upgrade projects	2028
GLW Upsize to Esmeralda	GridLiance West LLC	CAISO, NG	CAISO, NG	CAISO, NG	The project upgrades existing double circuit 230 kV configuration to 500 kV-capable towers to sections of GLW's approved Core and Beatty upgrades	2030
Western Bounty Transmission System	Western Bounty LLC	CAISO, NG, WC	CAISO, NG, WC	Not requested	A three-segment 500- to 800-kilovolt (kV) HVDC transmission system connecting renewable energy resources produced near Western Bounty's Hub in Esmeralda County, NV to termini in Southern California, central Oregon, and southwestern Idaho	2033

Interregional Transmission Coordination – 2025 being Year 2 of 2

- Annual interregional coordination meeting -- March 24, 2025
- WestConnect has determined that there are no regional transmission needs for ITPs submitted during the 2024-2026 ITP cycle
- Northern Grid has yet to make a regional need determination on the submitted ITPs
- Until a final determination is made by Northern Grid, the ISO does not intend to continue assessment of submitted ITPs

Odd year Interregional Coordination Process



https://www.caiso.com/meetings-events/topics/interregional-transmission-coordination

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Questions & Discussions

Additional information

- Visit the webpage for more information: https://www.caiso.com/meetings-events/topics/interregional-transmission-coordination
- If you have any questions, please contact Biju Gopi bgopi@caiso.com

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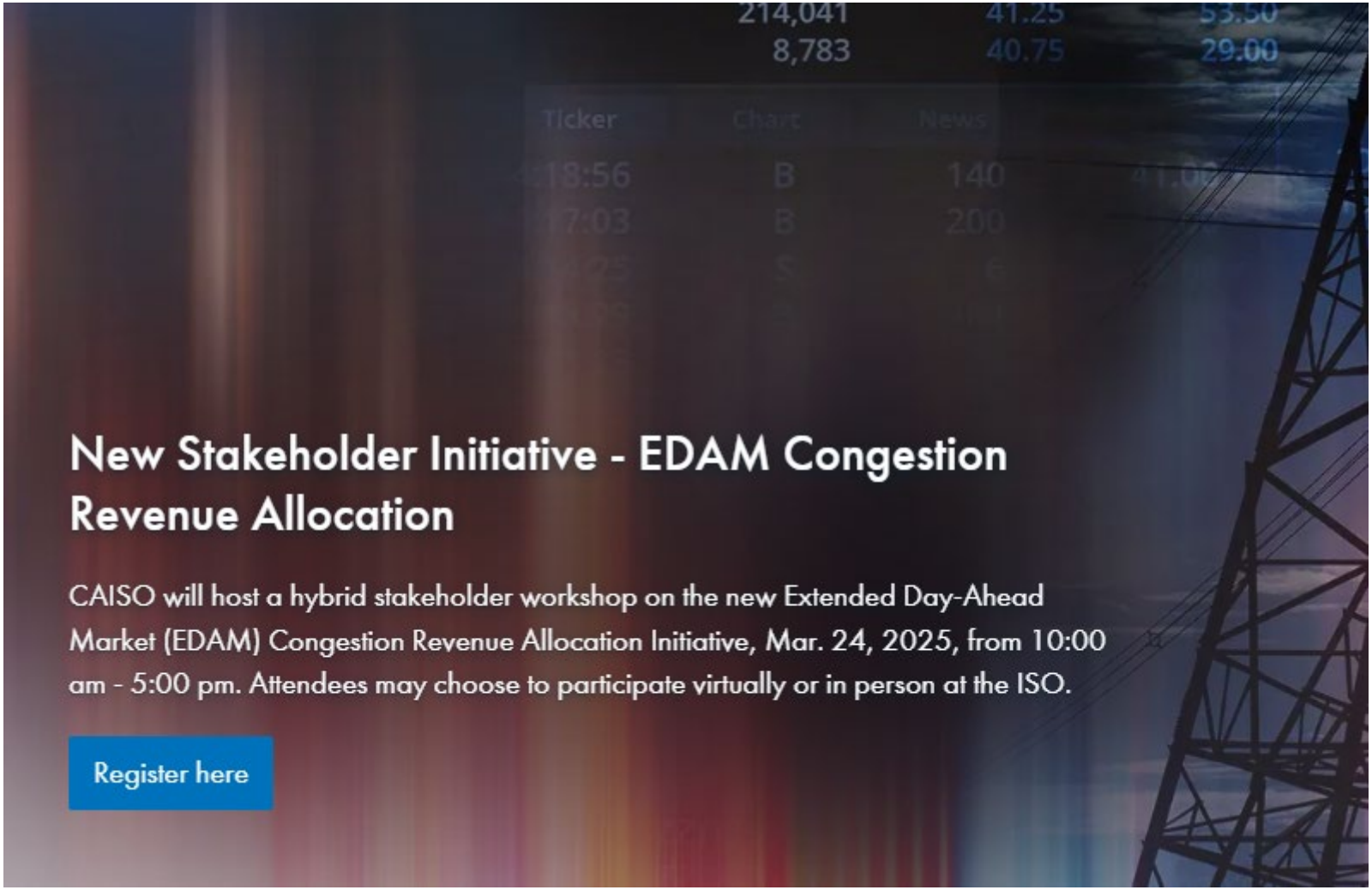

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Thank you!