WestConnect
2018 Annual Interregional Information

Annual Interregional Coordination Meeting

February 22, 2018

Topics

- WestConnect Regional Planning Overview
- 2016-17 Regional Transmission Plan
- 2018-19 Regional Planning Cycle Overview and Draft Study Plan
- Interregional Transmission Project Submittals
- Upcoming Meetings

WestConnect
Regional Planning Overview

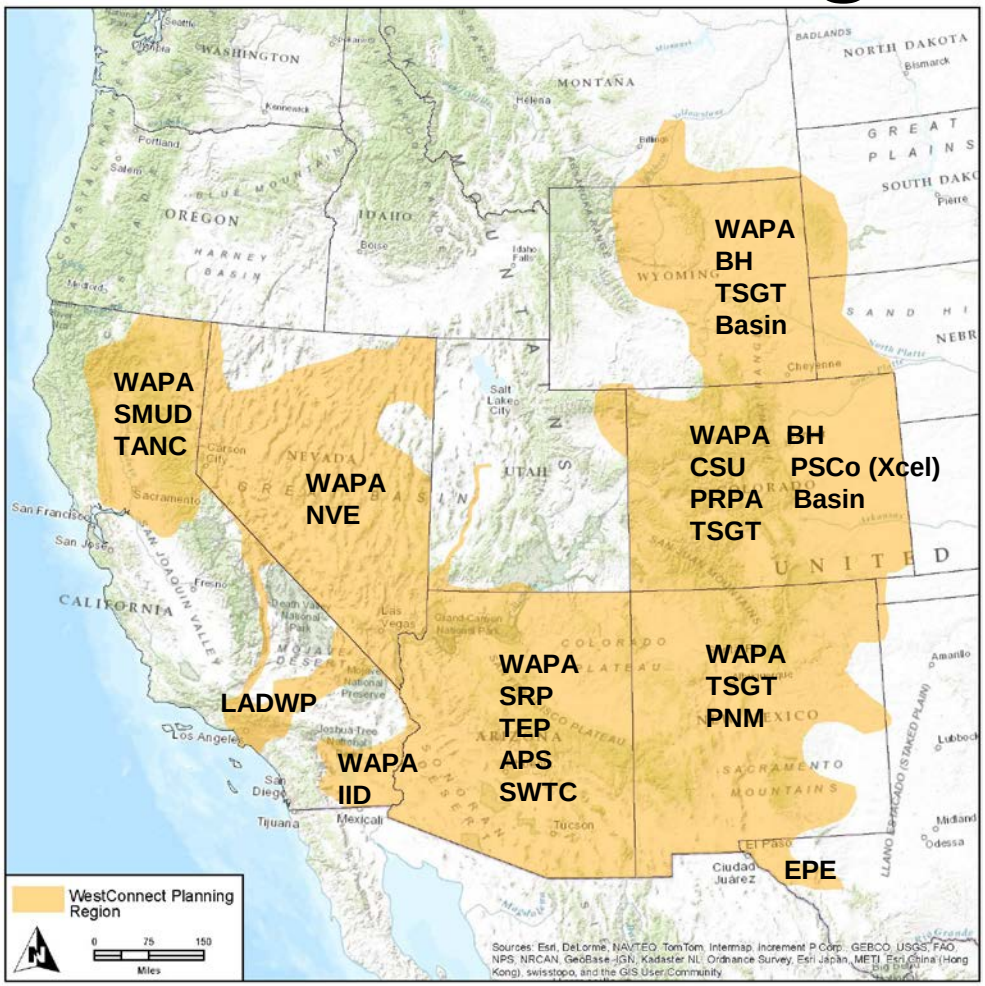
Charlie Reinhold,
WestConnect Project Manager

Regulatory Update

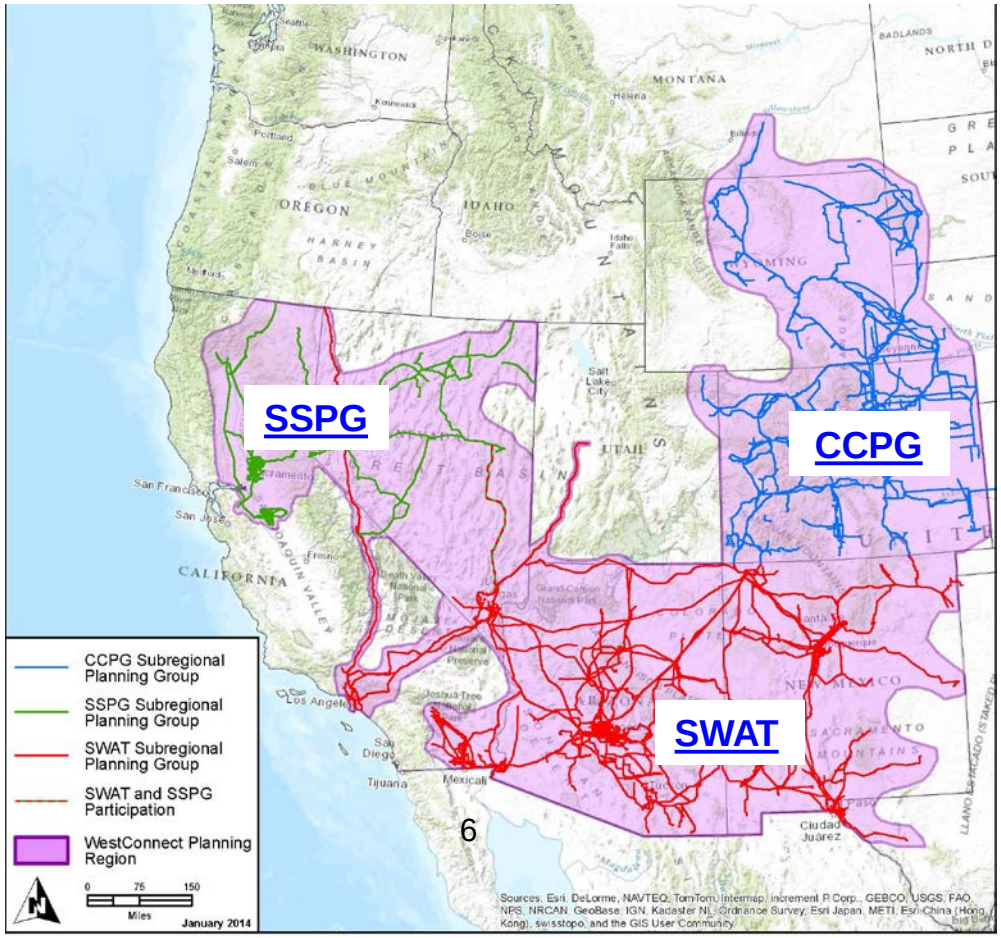
- Regional Compliance Filings
  - All tariff revisions related to the regional planning requirements of Order 1000 were fully accepted by FERC on January 21, 2016
  - On August 8, 2016 the 5th Circuit Court of Appeals vacated FERC's compliance orders related to mandates regarding the role of the non-jurisdictional utilities in cost allocation
    - On November 16, 2017 FERC upheld its previously compliance orders and provided further explanation as to why its mandates will ensure just and reasonable rates between public and non-public utility transmission providers in the WestConnect region
    - Numerous requests for review have been filed with FERC

WESTCONNECT REGIONAL PLANNING

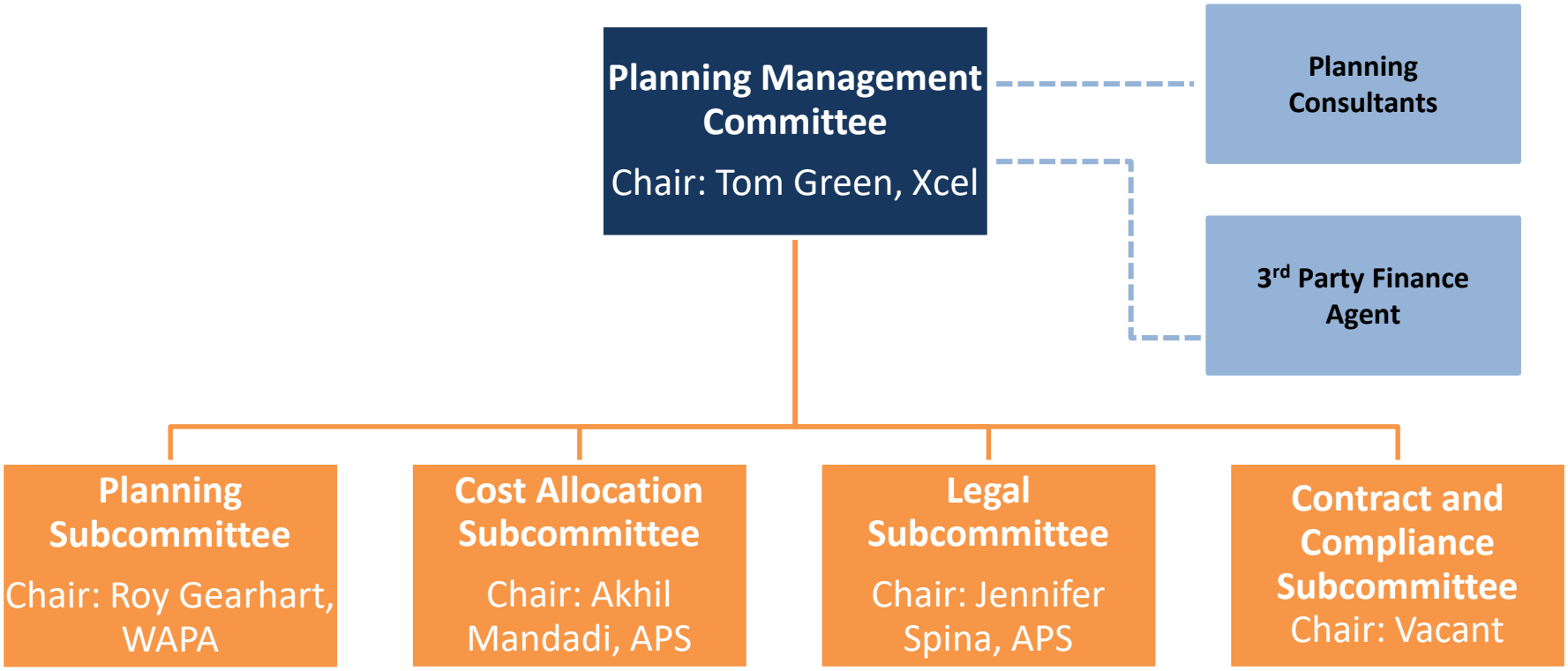
WestConnect Planning Region



WestConnect Subregional Planning Groups



PMC Organization



PMC Membership as of 12/21/2016

Transmission Owner w/Load Serving Obligation (18)

Enrolled TO
- Arizona Public Service
- Black Hills
- El Paso Electric
- NV Energy
- Public Service of New Mexico
- Tucson Electric
- Xcel - PSCo

Coordinating TO
- Arizona Electric Power Cooperative (formerly SWTC)
- Basin Electric
- Colorado Springs Utilities
- Imperial Irrigation District
- Los Angeles Department of Water and Power
- Platte River
- Sacramento Municipal Utility District
- Salt River Project
- Transmission Agency of Northern California
- Tri-State G&T
- Western Area Power Administration

Transmission Customer
- Vacant

Independent Transmission Developer (8)
- American Transmission Company
- Blackforest Partners
- Exelon Transmission
- ITC Grid Development, LLC
- Southwestern Power Group
- TransCanyon
- Western Energy Connection
- Xcel – Western Transmission Company

State Regulatory Commission
- Vacant

Key Interest Group (1)
- Natural Resources Defense Council

PMC Member Reps

Updated 12/21/16

PMC Activities

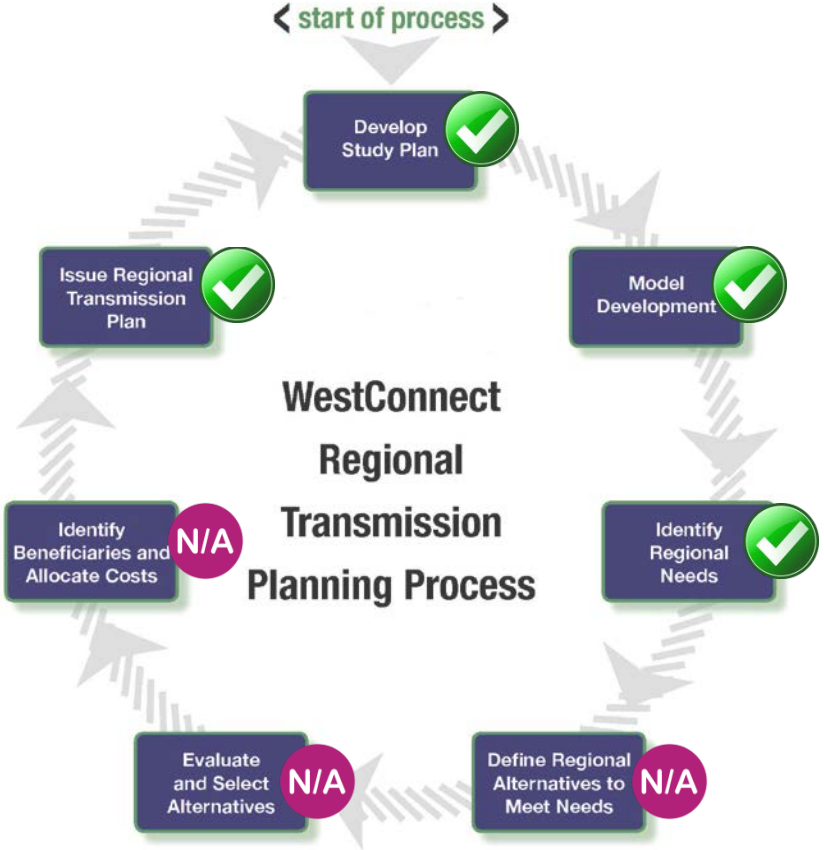
- Monthly in-person meetings (2nd Wednesday) held at rotating member facilities
  - Meeting information can be accessed via the WestConnect calendar
- Manages the Regional Transmission Planning Process
- Currently focused on developing the study plan for the 2018-19 regional planning cycle

2016-2017 Regional Transmission Plan

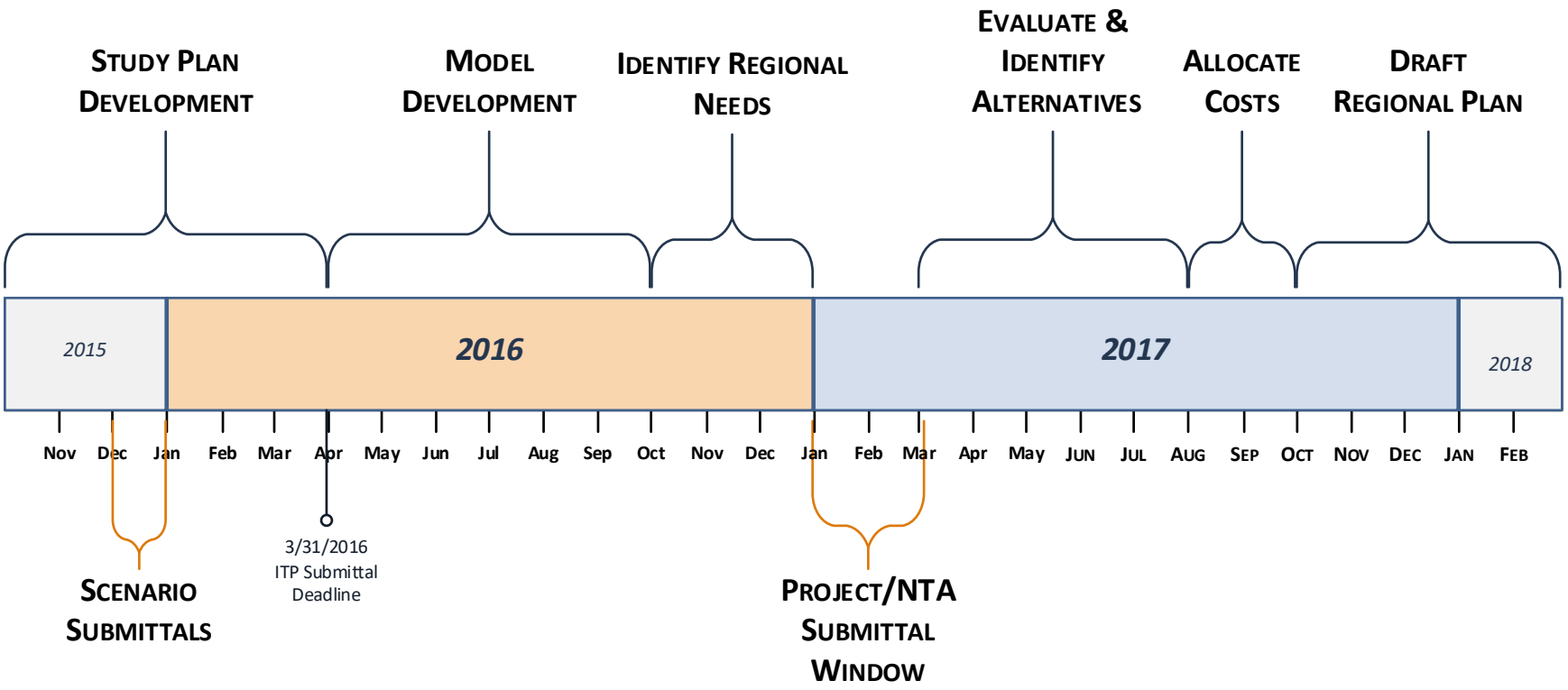
Tom Green, Planning Management Committee Chair,
Xcel Energy

2016-17 Regional Process Overview

- First full biennial Order 1000 regional planning process for WestConnect
- 2016-17 Key Findings
  - Based on studies conducted in needs assessment, no regional transmission needs identified in 2016-17
  - PMC elected not to have project solicitation window based on this finding
  - Link to 2016-17 Regional Plan report



2016-17 Planning Cycle Schedule



Reliability Model Case Summary			
	Case Name	**Case ID**	**Case Description and Scope**
Base Cases	**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-LSP	Light spring load conditions between 0700 to 1000 MDT, with relatively high wind and solar generation
Scenario Cases	**CPP – WestConnect Utility Plans Scenario**	WC26-CPP1	Reflect individual WestConnect member utility plans for Clean Power Plan (CPP) compliance – *export stressed hour from PCM*
	CPP – Heavy RE/EE Build Out Scenario	WC26-CPP3	Additional coal retirements, additional RE/EE, minimal new natural gas generation – *export stressed hour from PCM*

Economic Model Case Summary			
	Case Name	**Case ID**	**Case Description and Scope**
Base Case	**2026 Base Case**	WC26-PCM	Business-as-usual case based on WECC 2026 Common Case with additional regional updates from PMC members.
Scenario Cases	**High Renewables**	WC26-PCM-HR	California 50% RPS with regional resources (Wyoming wind and New Mexico wind) *and* increase WestConnect state RPS requirement beyond enacted with other resources
	CPP – WestConnect Utility Plans	WC26-PCM-CPP1	Reflect individual WestConnect member utility plans for CPP compliance
	CPP – Market-based Compliance	WC26-PCM-CPP2	Model CO_2 price in WestConnect to achieve mass-based regional CPP compliance
	CPP – Heavy RE/EE Build Out	WC26-PCM-CPP3	Additional coal retirements, additional RE/EE, minimal new natural gas generation

"Base" Cases

Reliability Cases

- **Peak Summer**
  - Based on WECC 2026 Heavy Summer 1 Base Case
- **Light Spring**
  - Based on WECC 2026 Light Spring Base Case
  - Low Load / High Renewable

Economic Case

- Updated WECC 2026 Common Case

2016-17 Regional Needs Assessment

- Local versus Regional transmission issues
  - Regional needs impact more than one TOLSO
- Regional Reliability Assessment
  - NERC TPL-001-4 Table 1 (P0 and P1) and TPL-001-WECC-CRT-3
- Regional Economic Assessment
  - Reviewing modeling for congestion (hours and cost)
- Regional Public Policy Assessment
  - Enacted public policies are represented in regional base models
  - Proposed public policies considered as a part of planning process

2016-17 Regional Needs Assessment (cont.)

- Based on the Base Case scenarios performed as a part of the WestConnect 2016-17 Regional Planning Process there were:
  - *No regional reliability needs identified;*
  - *No regional economic needs identified; and*
  - *No regional public policy needs identified.*
- Because there were no regional needs identified, in 2017 there was no:
  - *Evaluation and selection of project solutions to meet regional needs (including interregional transmission projects);*
  - *Cost allocation evaluation and identification; and*
  - *Project developer selection.*

High-level Summary of Scenario Cases

Scenario Name	Description	*Key Assumptions (changes to Base)*	*Study Scope*
Regional Renewables (RR)	50% increase to enacted WestConnect-state RPS with required resources added locally to TOs. 4,000 MW of resources added in Wyoming and New Mexico for CA 50% RPS purposes.	• 3,651 MW of wind in WestConnect • 7,166 MW of solar in WestConnect • 396 MW of geothermal in WestConnect • 4,000 MW of wind in WY/NM for CA	*Economic assessment only*
CPP – WestConnect Utility Plans (CPP1)	Reflect individual WestConnect member utility plans for CPP compliance, including retirements and replacement assumptions. Represents compiled set of assumptions developed independently by TOs from IRPs or other planning initiatives.	• 1,322 MW of coal retirements • 444 MW of gas retired (175 MW of repowering) • 1,127 MW of gas added • 595 MW of renewable energy	*Economic and reliability assessment*
CPP – Heavy RE Build Out (CPP3)	Reflects more aggressive coal retirements than in CPP3, with replacement capacity from additional RE minimizing new natural gas generation (while meeting resource adequacy).	• 4,188 MW of coal retirements • 444 MW of gas retired (175 MW of repowering) • 1,158 MW of gas added • 10,286 MW of additional renewable energy	*Economic and reliability assessment*

Scenario Findings

- RR
  - Major Impact on Regional Congestion and Inter-regional Paths
  - 3% of added renewable gen curtailed due to transmission constraints
  - No Unserved Load
  - Also Had Inter-regional Impacts
- CPP1
  - Minimal impact on regional and single-TO congestion
  - zero curtailment due to transmission
  - No Unserved Load
  - No Apparent Regional Economic Issues
- CPP3
  - Major Impact on Regional Congestion and Inter-regional Paths
  - 10% of the added renewable generation curtailed due to transmission
  - No unserved load
  - Some Inter-regional Impacts

WestConnect (& WECC) Production Cost

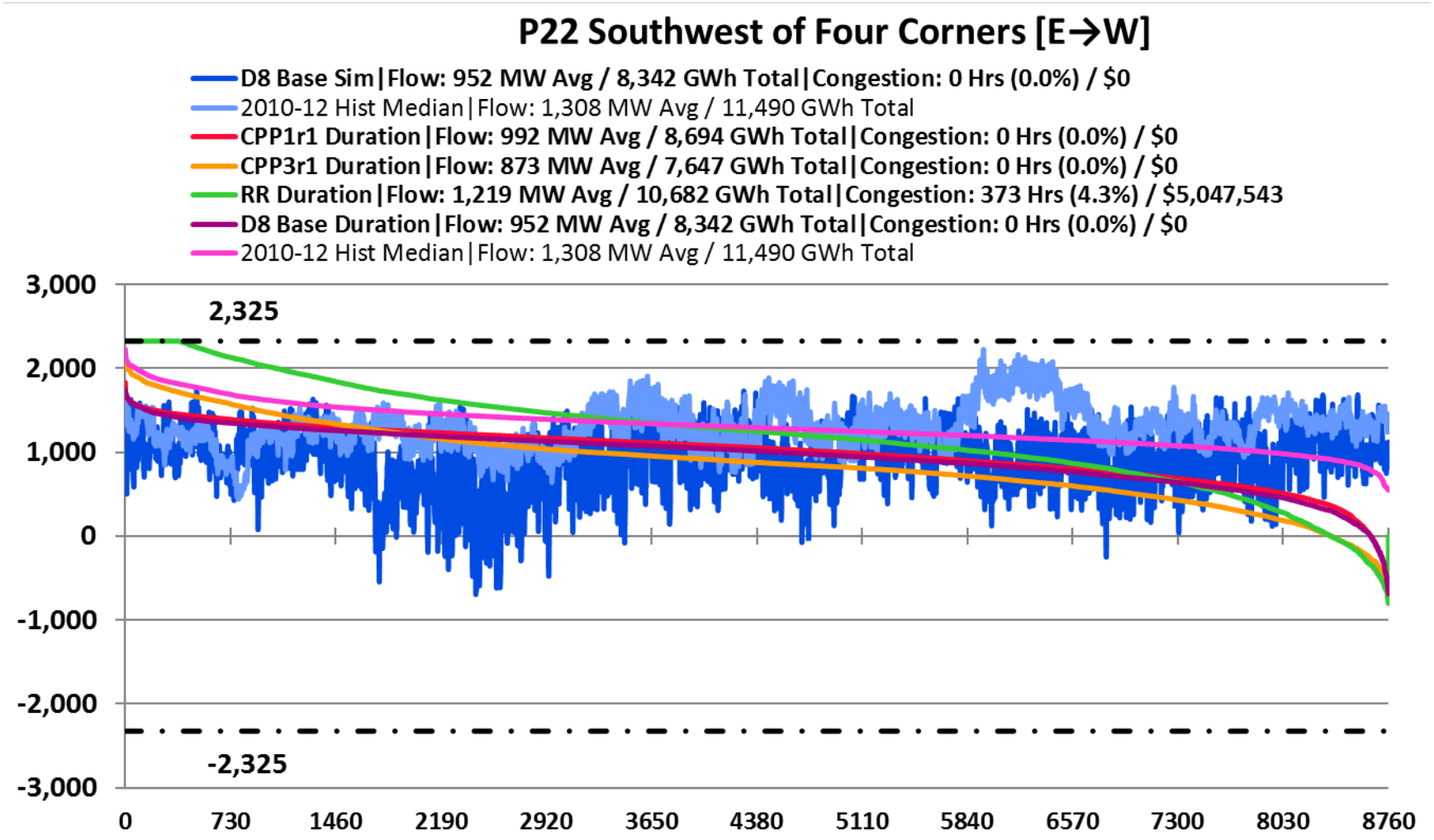
Scope	*Total Production Cost (M$) Across Cases*			
	WC 26PCM-D8_170108	***CPP1rev1***	***CPP3rev1***	***RR***
System (WECC)	$19,532	$19,561	$18,945	$17,991
	Δ from Base	$29	($587)	($1,541)
		0.15%	-3%	-8%
WestConnect Generation Shares	$6,520	$6,405	$5,944	$5,831
	Δ from Base	($115)	($577)	($689)
		-2%	-9%	-11%

- Production cost of WestConnect generators reduced in all scenarios. Modeled RE additions have zero operation costs whereas the gas & coal they replaced had operating costs, mostly fuel costs.
- CPP1 reduced WestConnect cost yet slightly increased WECC cost
- RR case has lowest production cost because of renewables offseting thermal generation

WestConnect (& WECC) CO_2 Emissions

Scope	CO2 Emissions (Short Ton) Across Cases			
	WC 26PCM-D8_170108	CPP1rev1	CPP3rev1	RR
System (WECC)	342,423,714	337,084,544	311,636,370	318,163,454
	Δ from Base	(5,339,170)	(30,787,344)	(24,260,260)
		-2%	-9%	-7%
WestConnect Generation Shares	142,240,853	136,605,743	115,772,953	128,575,232
	Δ from Base	(5,635,109)	(26,467,900)	(13,665,620)
		-4%	-19%	-10%

- From a regional perspective, a bold set of coal retirements (>4 GW) plus additional renewables (CPP3) is more effective at reducing WestConnect CO2 emissions than a major buildout of renewables on its own (RR)



- Base: Flow going SW out of Four Corners into Arizona system decreased 350 aMW from historical averages (driven by Four Corners retirements)
- CPP1: Similar to Base Case, Cholla retirement had little effect
- CPP3: More volatile flows (higher highs, lower lows) than Base & CPP1, likely due to the added variable resources
- RR: Significant congestion out of Four Corners (4%, $5M)

Congestion Across All Cases (Branches & Paths)			Total Congestion Hours (% Hrs) / Cost ($)			
Scope	**Owner(s)**	**Branch/Path Name**	**WC 26PCM-D8_170108**	**CPP1rev1**	**CPP3rev1**	**RR**
Multi-TO	PSCO|TSGT	BOONE_230.0 - LAMAR_CO_230.0	-	-	3,625 (41%) / $61,160K	2,290 (26%) / $29,193K
	PSCO|TSGT	SANLSVLY_230.0 - PONCHABR_230.0	-	-	2,311 (26%) / $20,127K	2,311 (26%) / $18,019K
	PSCO|TSGT	BOONE_230.0 - MIDWAYPS_230.0	-	-	-	131 (1%) / $1,522K
	PSCO|WAPA-RM	MIDWAYPS_230.0 - MIDWAYBR_230.0	-	-	-	19 (0%) / $123K
WECC Path		P24 PG&E-Sierra	493 (6%) / $1,286K	511 (6%) / $1,217K	896 (10%) / $2,170K	554 (6%) / $1,323K
		P66 COI	4 (0%) / $58K	5 (0%) / $46K	9 (0%) / $89K	35 (0%) / $514K
	PNM	P48 Northern New Mexico (NM2)	3 (0%) / $3K	4 (0%) / $13K	-	1 (0%) / $5K
		P61 Lugo-Victorville 500 kV Line	1 (0%) / $1K	-	1 (0%) / $2K	99 (1%) / $747K
		P52 Silver Peak-Control 55 kV	2 (0%) / $0K	2 (0%) / $0K	34 (0%) / $5K	995 (11%) / $154K
		P41 Sylmar to SCE	2 (0%) / $0K	1 (0%) / $1K	1 (0%) / $1K	-
		P32 Pavant-Gonder InterMtn-Gonder 230 kV	-	1 (0%) / $8K	127 (1%) / $793K	223 (3%) / $1,114K
	PNM|EPE	P47 Southern New Mexico (NM1)	-	1 (0%) / $0K	-	-
		P36 TOT 3	-	-	4 (0%) / $23K	132 (2%) / $1,292K
		P22 Southwest of Four Corners	-	-	-	373 (4%) / $5,048K
		P30 TOT 1A	-	-	-	9 (0%) / $15K
Single TO	APS	CTRYCLUB_230.0 - LINCSTRT_230.0	145 (2%) / $1,705K	161 (2%) / $2,035K	227 (3%) / $2,638K	98 (1%) / $975K
	LADWP	TARZANA_230.0 - OLYMPC_230.0	18 (0%) / $1,327K	14 (0%) / $1,043K	19 (0%) / $1,864K	23 (0%) / $1,787K
	NEVP	HIL TOP - HIL TOP	144 (2%) / $492K	219 (3%) / $798K	115 (1%) / $423K	110 (1%) / $336K
	LADWP	RINALDI_230.0 - AIRWAY_230.0	2 (0%) / $118K	4 (0%) / $183K	3 (0%) / $74K	5 (0%) / $235K
	PSCO	LEETSDAL_230.0 - MONROEPS_230.0	2 (0%) / $16K	-	366 (4%) / $2,801K	600 (7%) / $4,942K
	NEVP	CLARK 6 - CLARK	1 (0%) / $2K	1 (0%) / $2K	20 (0%) / $109K	8 (0%) / $14K
	PSCO	GREENWD_230.0 - MONACO12_230.0	1 (0%) / $0K	3 (0%) / $29K	189 (2%) / $2,731K	482 (6%) / $6,545K
	APS	MEADOWBK_230.0 - SUNYSLOP_230.0	-	1 (0%) / $8K	2 (0%) / $16K	-
	WAPA-SN	TRCY PMP_230.0 - HURLEY S_230.0	-	-	10 (0%) / $1,479K	-
	NEVP	FRONTIER_230.0 - MACHACEK_230.0	-	-	17 (0%) / $74K	776 (9%) / $5,218K
	NEVP	FT CHUR - FT CH PS	-	-	18 (0%) / $61K	110 (1%) / $298K
	WAPA-RM	SANJN PS - WATRFLW	-	-	8 (0%) / $43K	-
	PSCO	STORY_230.0 - PAWNEE_230.0	-	-	5 (0%) / $22K	-
	NEVP	FAULKNER - FAULKNER	-	-	1 (0%) / $12K	-
	NEVP	GONDER_230.0 - MACHACEK_230.0	-	-	3 (0%) / $9K	197 (2%) / $717K
	WAPA-RM	ARCHER_230.0 - TERRY_RANCH_230.0	-	-	-	179 (2%) / $2,360K
	PSCO	BOONE - BOONE	-	-	-	140 (2%) / $1,065K
		Total Congestion Cost:	**$5,008K**	**$5,383K**	**$96,725K**	**$84,700K**

**Phase shifting transformers (PST) removed*

Negligible regional congestion in Base Case & CPP1 study

CPP3 & RR studies shows potential for regional congestion

Scenario Reliability Study Method

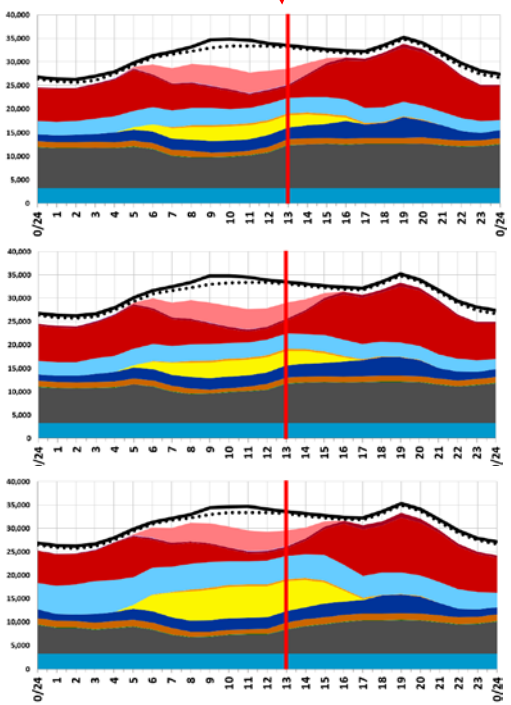
- Production cost modeling used to identify what stressed dispatch might look like under scenario futures
- Condition at 1pm on April 15th was selected and dispatch/flow assumptions were transferred to the reliability model for study
  - Did this for entire WECC system
- Reliability assessment scope included steady-state contingency analysis but focused on transient stability analysis to assess frequency response of system under major disturbances
  - The goal was to identify occurrences of under frequency load shedding (UFLS), system frequency losing stability (e.g., undamped oscillations), and system instability (e.g., cascading trips)

Studied stressed hour with low thermal headroom, high renewable dispatch, and lower loads

Base Case
Renewables: 29% load
Load: 33.5 GW
Headroom: 3 GW

Utility Plans Scenario
Renewables: 30% load
Load: 33.5 GW
Headroom: 3.1 GW

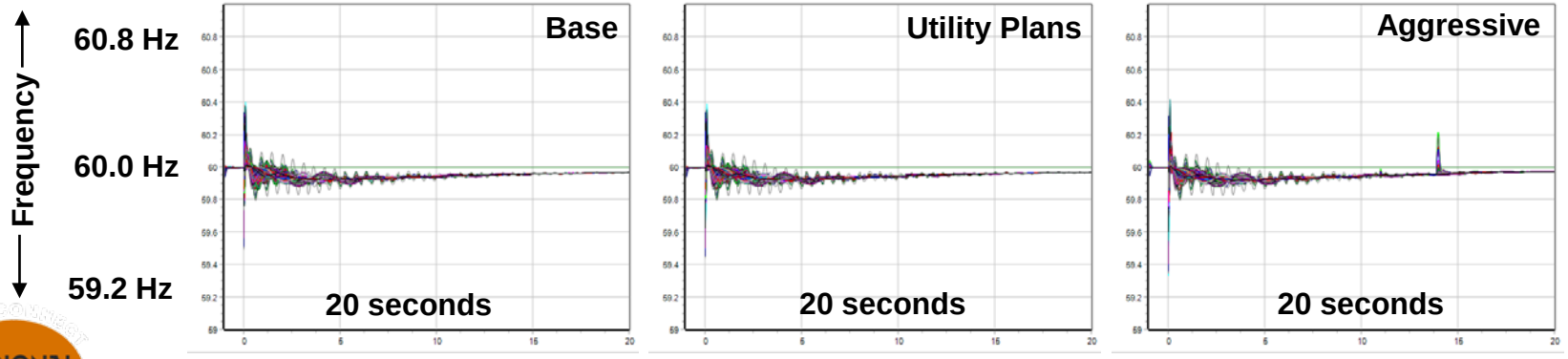
Aggressive Scenario
Renewables: 45% load
Load: 33.5 GW
Headroom: 4.5 GW



April 15th

Scenario Reliability Study Results

- **Key qualifications:** Operating reserves, reliance on neighboring systems, no mitigations studied, no local system analysis
- **Steady-state analysis:** Ability of system to maintain extended safe operation post-contingency
  - No regionally significant overloads or voltage issues were identified through contingency analysis
  - Several *single-system* issues were identified but were not addressed consistent with the study scope
- **Transient stability/frequency response analysis:** Ability to maintain synchronism following disturbance
  - Studied robust set of regionally-significant contingencies provided by members, including major generator trips, line trips, faults, stuck breakers, etc.
  - Results of scenarios were compared to base case to track relative performance – focus on first 30 seconds
  - System achieved stable frequency recovery within 20 seconds under all scenarios for condition studied, which is within WECC criterion



“Opportunity” Investigation

- PMC agreed to explore scenario congestion
  - Limited Scope for a Single Example
- Not a perfect example, due to radial nature of the congested line
  - Ideally would also address “Deliverability”
- Investigation evaluated three alternatives
- Numerous assumptions required
  - some of these discussed and supported by the WC
  - others have not been contemplated.
- Scope:

1. Confirm alternatives mitigates regional opportunity and do not cause additional regional issues

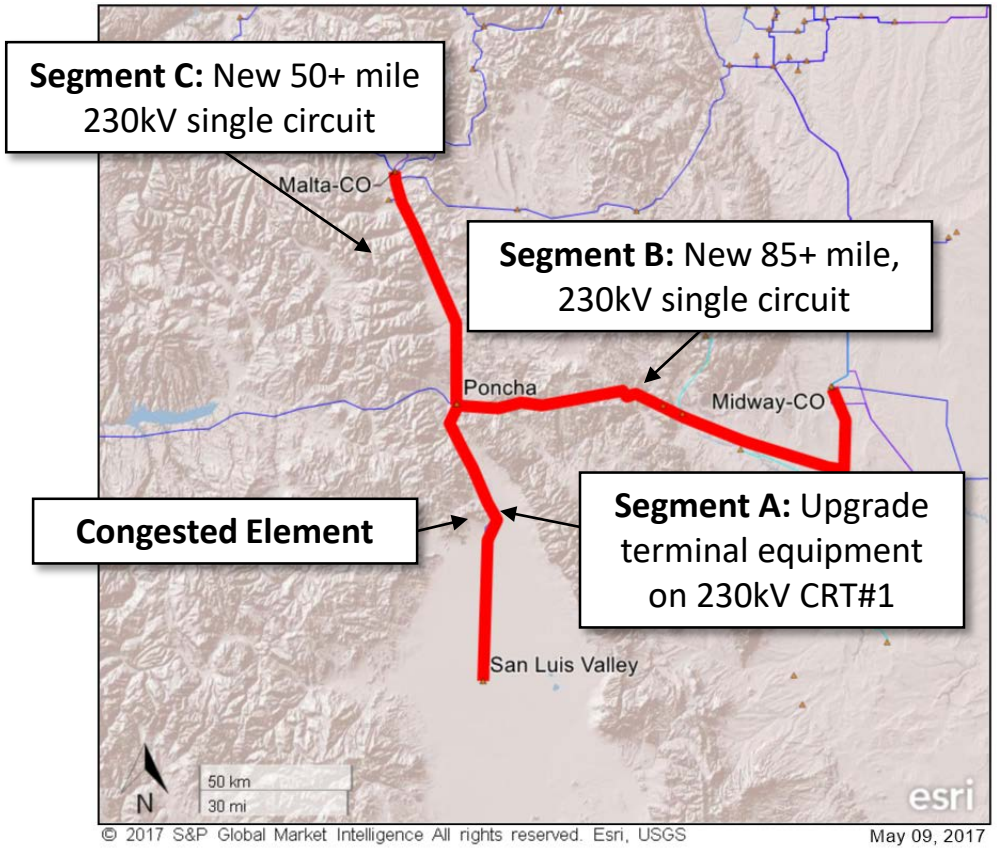
2. Evaluate Alternatives for Cost Effectiveness

3. Cost Allocation

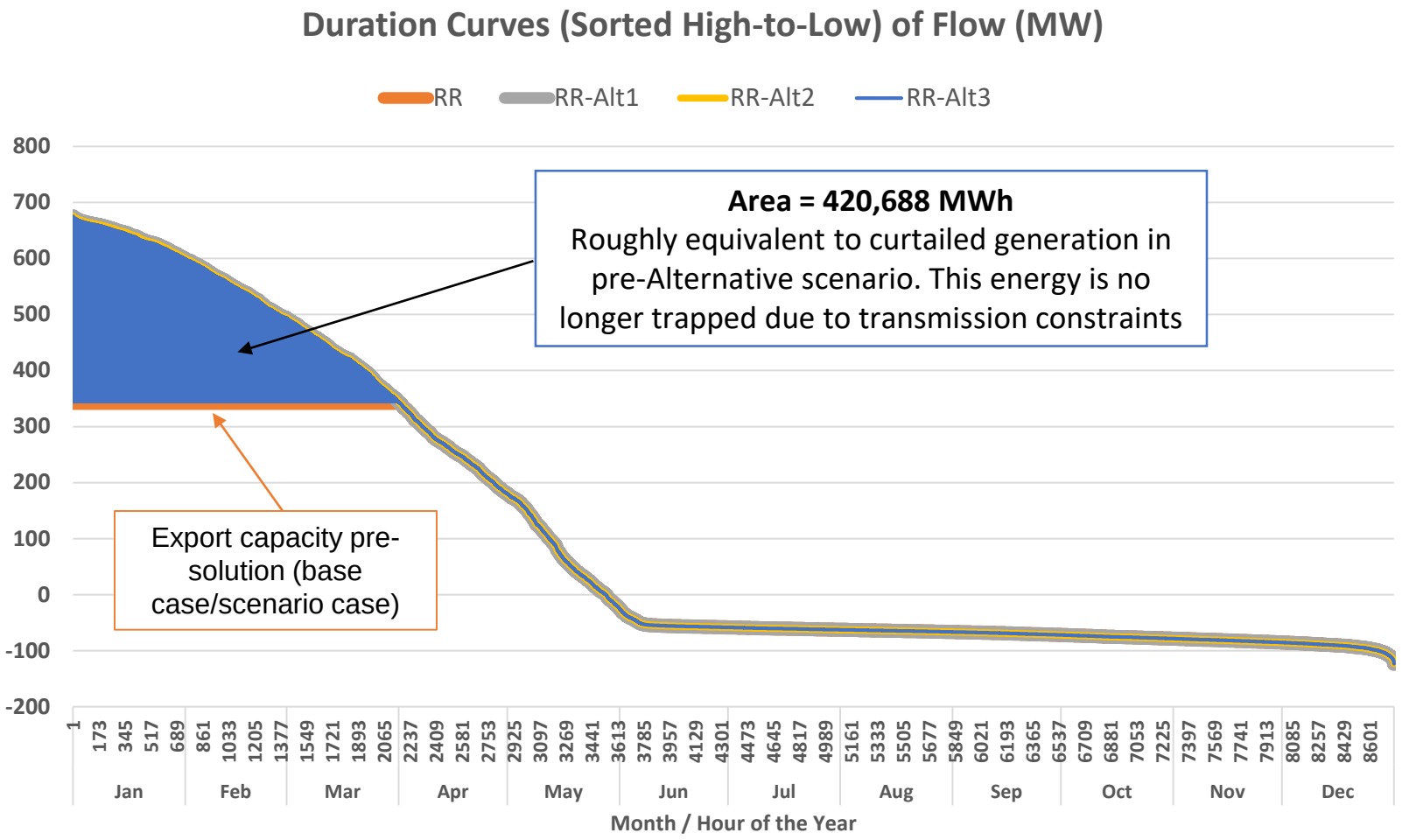
Opportunity Alternatives

- **Base Case**
- **Alt 1: Build Segment B** is a new 230 kV
- **Alt 2: Build Segment C** is a new 230 kV
- **Alt 3: Energy storage**

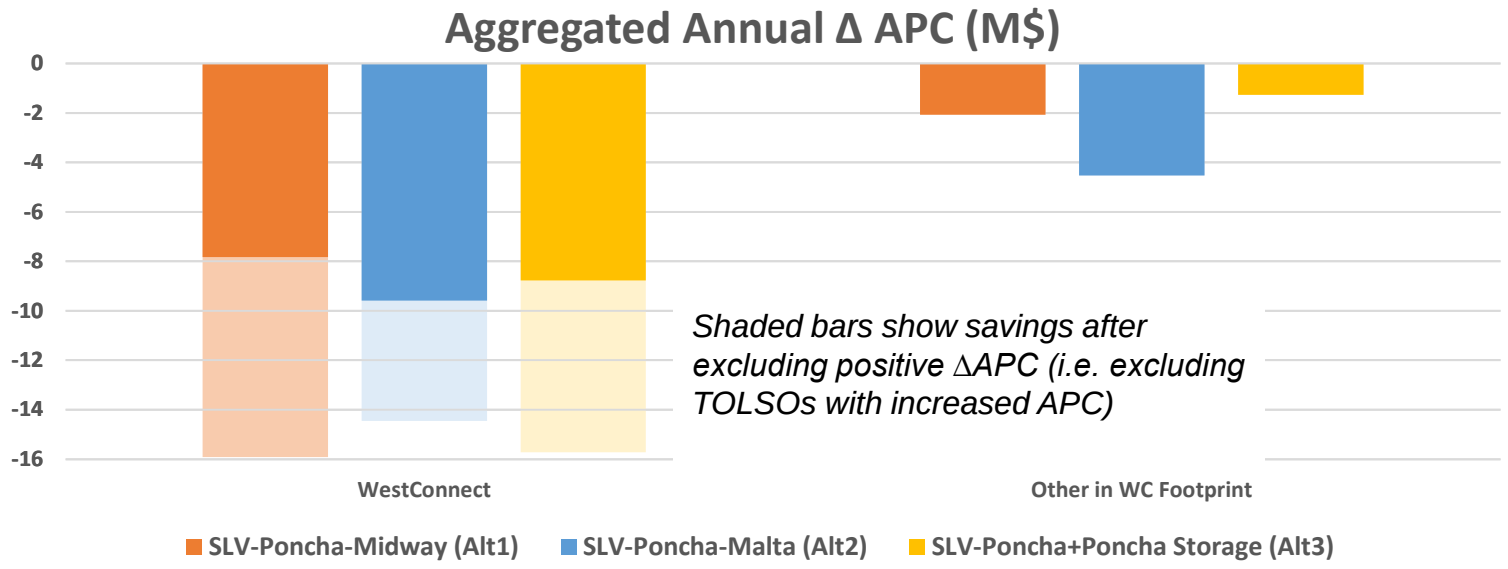
Project Alternative	Description
Alt 1	Upgrade A + New Build B
Alt 2	Upgrade A + New Build C
Alt 3	Upgrade A + 250 MW Battery Storage at Poncha

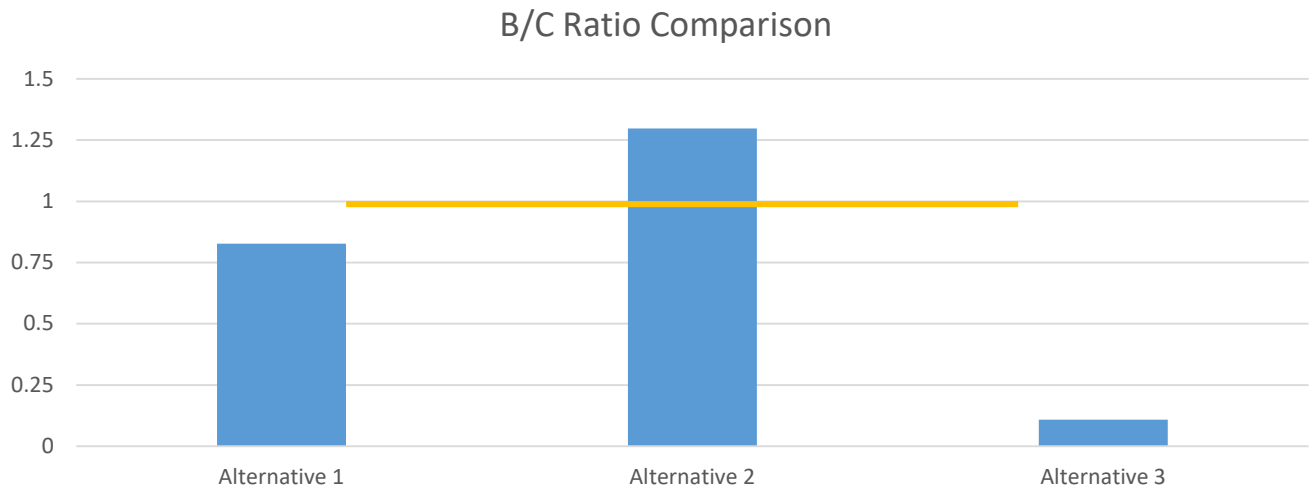


All alternatives allowed for increased Flow



Economic Benefit & B/C Ratio





Regional Plan Report Outline

1 Summary and Introduction
2 Study Plan
3 Model Development
4 Regional Transmission Needs Assessment
5 Scenario (Opportunity) Assessment
6 Stakeholder Involvement and Interregional Coordination
7 Regional Plan Conclusions

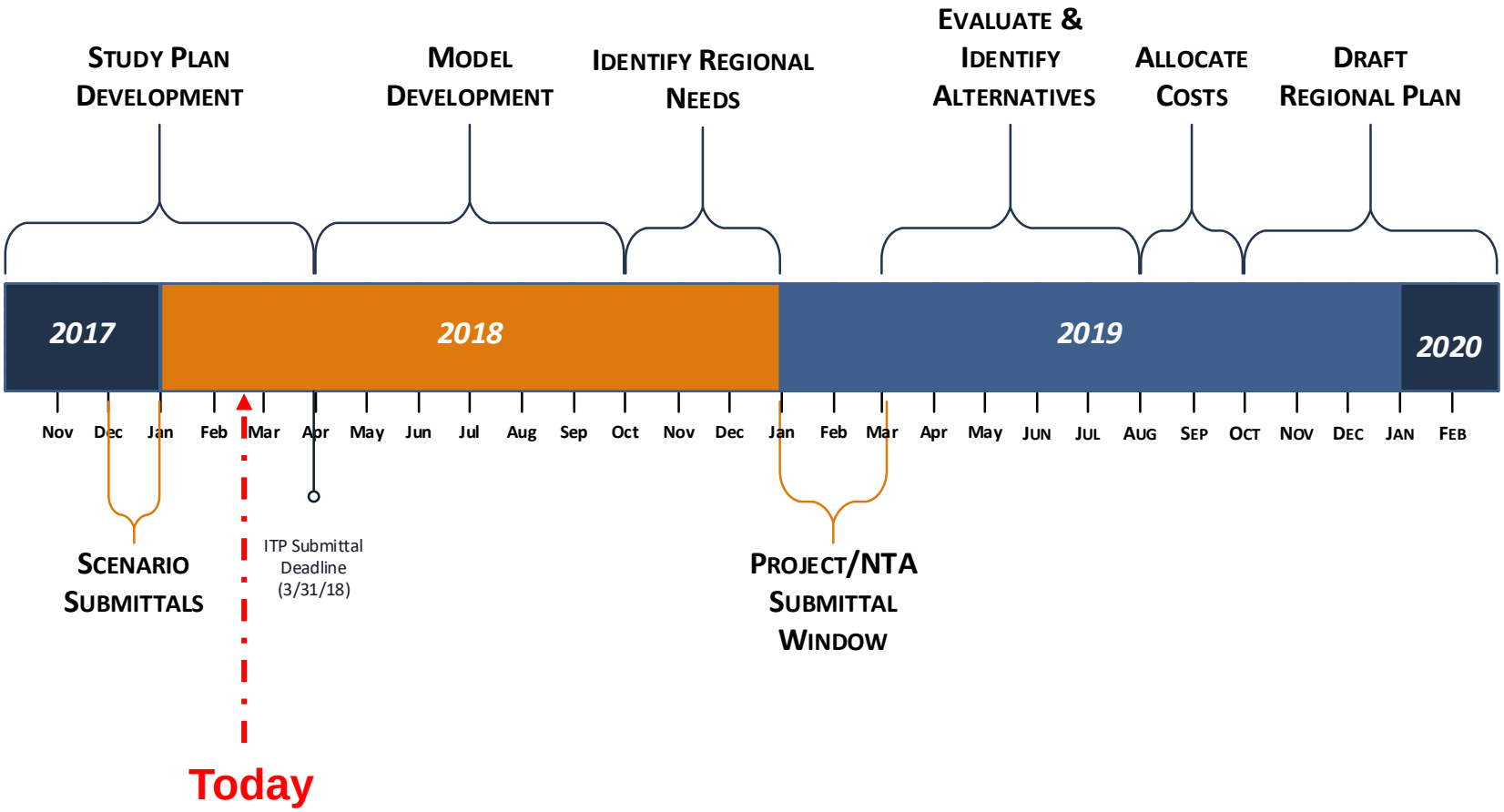
Appendix A – Information Confidentiality
Appendix B – Base Transmission Plan Process
Appendix C –Base Transmission Plan (2016-2026 Projects)
Appendix D – WestConnect Regional Project Submittal Form
Appendix E – WestConnect Scenario Submittal Form
Appendix F – 2026 Base Case (PCM) Assumptions
Appendix G – Results of Reliability Need Assessment
Appendix H – Results of Economic Need Assessment
Appendix I – Scenario Resource Assumptions
Appendix J – Results of Reliability Scenario Assessment

2018-2019 Regional Planning Cycle Overview and Draft Study Plan

Keegan Moyer, WestConnect Planning Consultant, Energy Strategies

Roy Gearhart, Planning Subcommittee Chair, WAPA

2018-19 Process Timeline



2018-19 Study Plan Overview

- Study Plan identifies the scope and schedule of the study work to be performed during the planning cycle
- The subsequent slides review:
  - Base Transmission Plan
  - Regional Need Assessments (including key models)
  - Scenario Studies
  - Opportunities for participation and next steps
- Note that the Study Plan does not explain every aspect of the process and the BPM should be consulted for details not provided (especially when referenced)

2018-19 Base Transmission Plan

Base Transmission Plan

- Base Transmission Plan: transmission network topology that is to be reflected in each of the regional planning models.
  - Base Transmission Plan = ***Planned*** **TO Projects** + ***High probability*** **ITD Projects**
- Based on project information gathered in WestConnect's Transmission Plan Project List for 2018-19 cycle
- Will document Base Transmission Plan in 2018-19 Study Plan (which will be approved by PMC), and **ensure this transmission is included in base models**
- Based on member feedback from survey, plan is to provide more details about what the 2018-19 Base Transmission Plan represents, and how it is different than the 2016-17 Base Transmission Plan
- The Base Transmission plan is current in draft form and will not be finalized until the Study Plan is approved
- The Model Development Report will include a summary as to how this Base Transmission Plan has changed relative to the 2016-17 Base Plan

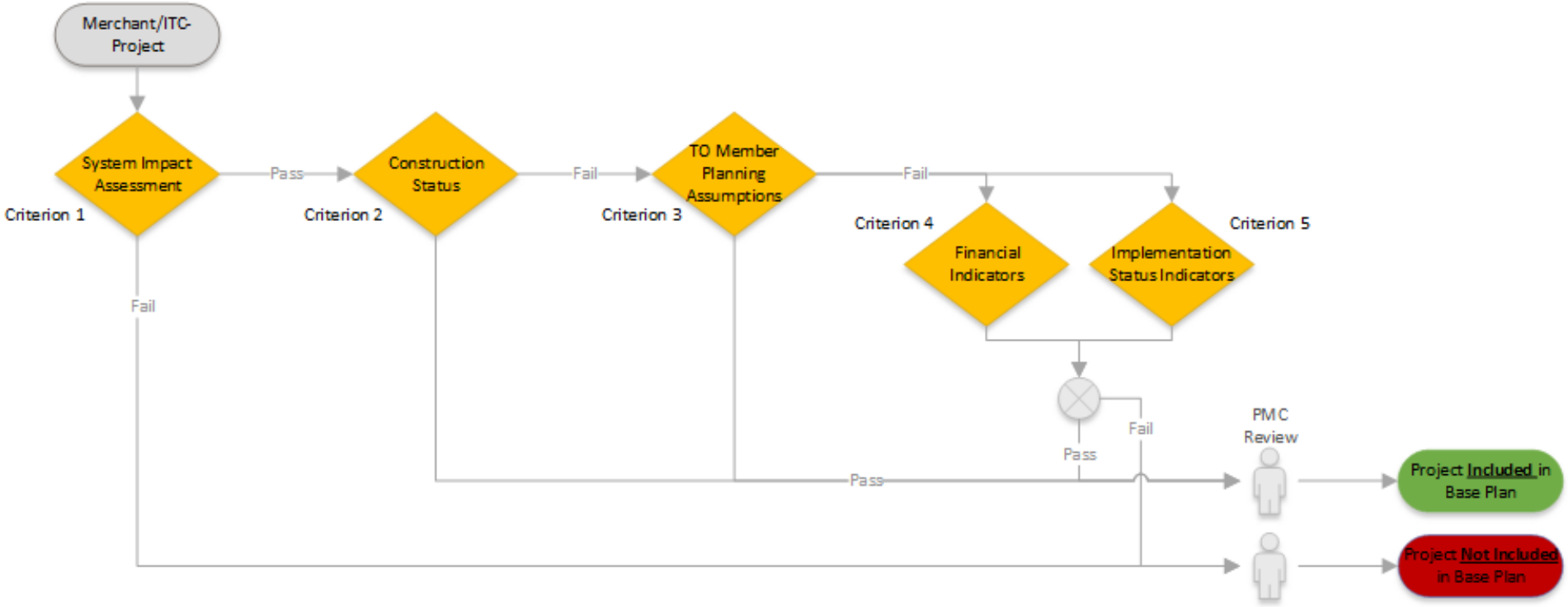
Planned TO Projects

- Criteria from last study plan and BPM:
  - 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.

“High Probability” Merchant/ITD Projects

- BPM lays out set of criteria to identify “high probability” ITD projects for inclusion in base transmission plan
  - Criteria uses information gathered in TPPL
- PS needs to compile initial list and include it in Study Plan for review and approval by PMC
- Inclusion means that WestConnect has high certainty that the project will be built
  - Would remove project for any evaluation against a regional need since it would be included in Base Transmission Plan

Process for Including ITD Projects in Base Transmission Plan



Regional Assessments

Regional Needs Assessment Background

- The PMC will conduct assessments using models developed for year 2028
- Cases from WECC will be used as seed cases and they will include the systems of all WECC TOs.
  - Members will update the WECC models to ensure the WestConnect footprint is properly represented.
- The PMC will not evaluate regional transmission needs for systems outside of the WestConnect planning region
- Local vs. regional transmission issues
- After the regional transmission assessments, the Planning Subcommittee (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.
  - Includes development of a Regional Transmission Needs Assessment Report (which will allow for stakeholder comment and input)
- This report will be delivered to the PMC for review and approval, and it will contain the PS's recommendation on regional transmission needs for the study cycle. The regional transmission needs will be finalized pending the PMC's approval of the report.

Reliability Assessment

- Conducted to ensure the WestConnect planning region as a whole is in compliance with applicable North American Electric Reliability Corporation (NERC) standards and WECC regional criteria for the 2028 planning horizon.
- Assessment will include steady state contingency analysis and transient stability analysis.
- Transmission elements of 100 kV and above will be monitored for performance along with any Member specified lower voltage Bulk Electric System (BES) elements.

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

Economic Assessment

- To create Base Case model, PS will initiate and coordinate a review of the data and assumptions contained within the WECC ADS dataset
- Assessment will include review of metrics such as congested hours and congestion cost for regional transmission elements greater than 100 kV and WECC transfer paths (or other defined interfaces in the WestConnect footprint) along with any Member specified lower voltage BES elements
- Regional transmission with significant congestion are identified and verified through Planning Subcommittee review, historical benchmarking, and follow-up study
- WestConnect will also conduct sensitivity studies on the 2028 Base Case

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

Public Policy Assessment

- WestConnect begins evaluation by identifying a list of enacted public policies that impact local TO (see study plan)
- The regional base models will reflect the enacted public policies
- 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 policy-driven project may constitute a public policy-driven regional transmission need
  - Stakeholders are invited to make a recommendation to the Planning Subcommittee

2018-19 Scenario Considerations

Scenario Status Summary

- **Scenario requests** were collected in December 2017
  - 8 Scenarios were submitted for 4 companies. These were reviewed and discussed by the PS.

Original Submission from Requestors

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

  - The PS has recommended to include a list of three scenarios in the draft 2018-19 study plan, motivated by concepts of increased RPS, lower carbon, and high CAISO export

2018-19 Draft Scenarios

1. **Load Stress Study (Heavy Summer)**
   - Reliability study based on 2028 Heavy Summer case where regional peak load is increased 10% and the load/gen imbalanced is filled with renewable capacity not dispatched in Base Case, or incremental renewable capacity if no headroom is available. Details of dispatch are TBD.
   - Purpose of analysis is to test robustness of Base Transmission Plan against potential changes in load and incremental dispatch of renewable resources. Will consider congestion/economic study if deemed useful.
2. **CAISO Export Stress Study**
   - Reliability study based on regional model that will be adjusted based on CAISO export conditions observed in regional production cost model. Alternatively, will seek guidance from CAISO on assumptions appropriate for export study.
   - Purpose of analysis is to evaluate reliability of regional system if power flows from the CAISO to WestConnect during CAISO overgeneration conditions
3. **EV Load Stress Study**
   - Reliability study and/or economic study designed to evaluate the effects of high EV penetration non the regional transmission system. Study scoping will determine the exact study scope. Study requires developing estimates for (1) EV penetration levels; (2) charging shape; (3) distribution of shape to loads for select conditions/hours. Option to test impact of different charging behaviors and their impact to the transmission system (reliability or congestion) and/or option to identify what penetration of EVs begin to substantially impact the reliability of the regional transmission system.

Next Steps

- Stakeholder/WPR comment period for draft 2018-19 Study Plan v3 will be February 17-March 1
  - Comment window will be announced via email and will include instructions for submitting comments
- 2018-19 Study Plan will be finalized and approved by the PMC by the end of March
- The PS will then proceed with developing the regional planning models
  - More detail on this process will be provided in later agenda items

Interregional Transmission Project (ITP) Submittals

Charlie Reinhold,
WestConnect Project Manager

2016-17 Interregional Transmission Project Submittals

Project Name	Company	Project Submitted To	Relevant Planning Regions	Seeking Cost Allocation from WestConnect
SWIP North	Western Energy Connection, LLC	WestConnect CAISO NTTG	WestConnect NTTG*	Yes
Cross-Tie Project	TransCanyon, LLC	WestConnect CAISO NTTG	WestConnect* NTTG	Yes
TransWest Express	TransWest Express, LLC	WestConnect CAISO NTTG	WestConnect CAISO* NTTG	Yes
HVDC Conversion Project	San Diego Gas & Electric	WestConnect CAISO	WestConnect CAISO*	No

* = Indicates lead planning region

WestConnect did not identify any regional transmission needs in the 2016-17 regional planning cycle, and as such, did not evaluate any ITPs in 2016-17.

2018-19 ITP Submittals

- Proponents of an ITP for which WestConnect is a Relevant Planning Region must submit the project to WestConnect by March 31, 2018
- Link to project submittal form
  - $25k study deposit is not required at this stage
- The project will need to be resubmitted following the needs identification stage of the 2018-19 planning cycle, at which time the study deposit is required
- WestConnect has received no ITP submittals to-date

Upcoming Meetings

- **WestConnect PS & PMC Meetings**:
  - March 13-14, Salt Lake City, UT(Energy Strategies)
  - No CAS meeting, Next CAS meeting April 10, 2018
- **2018 WestConnect Stakeholder Meetings:**
  - November 15, 2018, Tempe, AZ *(tentative)*

Additional Information Regarding the Regional Planning Process can be Accessed at:

www.WestConnect.com

Questions?

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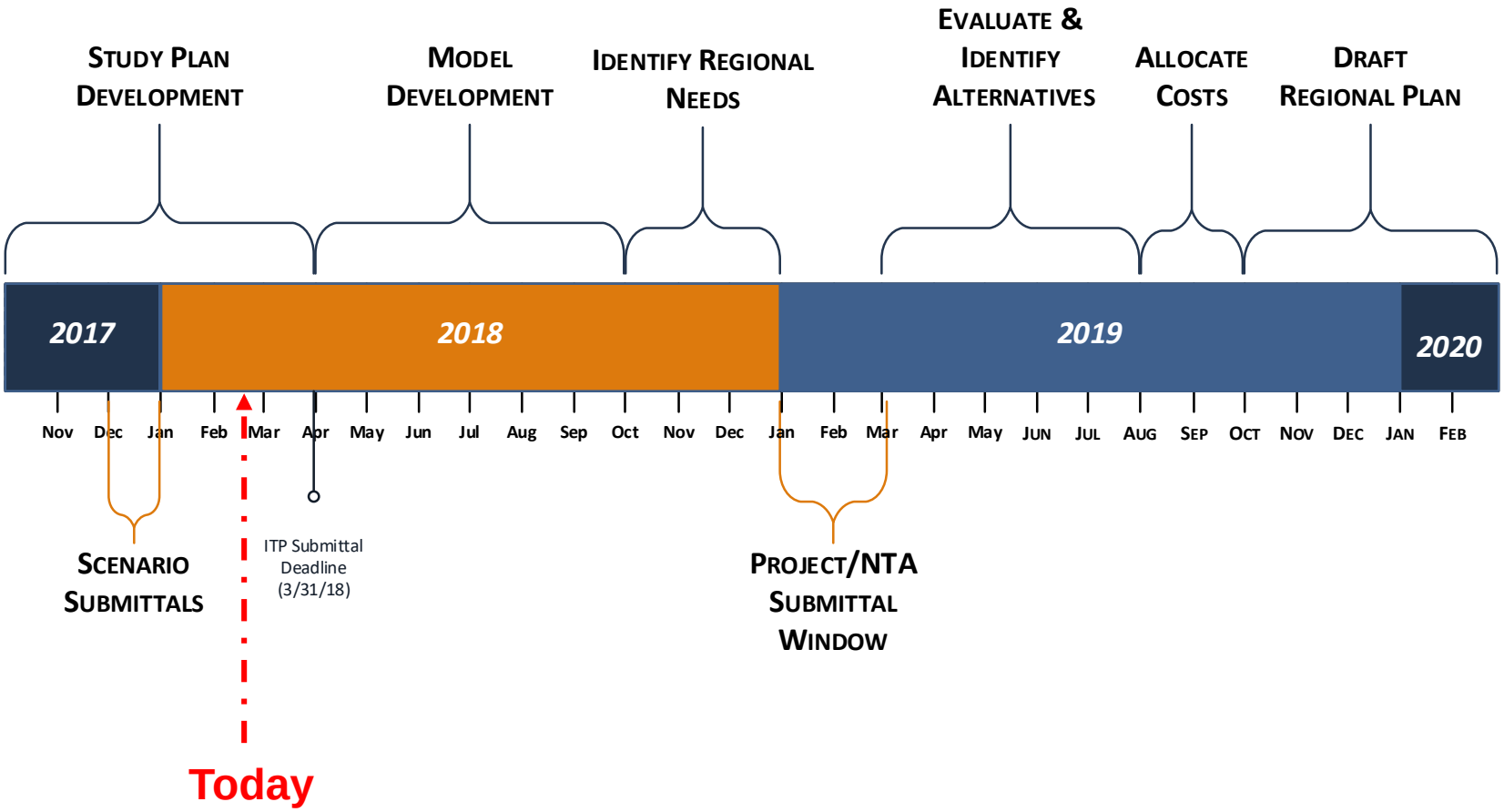
2018-19 WestConnect Planning Activities

2018-19 Process Timeline



2018-19 Schedule

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

WestConnect Regional Model Development

Keegan Moyer, WestConnect Planning Consultant, Energy Strategies

Roy Gearhart, Planning Subcommittee Chair, WAPA

2018-19 Regional Models

Powerflow Models

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

Production Cost Models

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

- Depending on the final scenarios selected for the Study Plan, WestConnect may utilize the round trip to evaluate the reliability of the regional system under flows observed in the PCM dispatch (CAISO Export Stress Study)

2017 Technical Schedule

Finalize Study Plan
Stakeholder comment
PMC comment

Draft Model Development Report
Stakeholder & PMC comment

Draft and Transmission Assessment Report
Stakeholder & PMC comment

Develop Base Powerflow Model(s)

Develop Base Economic Model(s)

Develop Scenario Model(s)

Perform Regional Transmission Assessments