



California ISO
Shaping a Renewed Future



WEST
CONNECT

Western Planning Regions Coordination Meeting

Portland, Oregon
February 26, 2015



California ISO
Shaping a Renewed Future



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Welcome & Introductions

Sharon Helms,
NTTG Program Manager

Agenda for Today

- Status of Interregional Order No. 1000 compliance
- Summaries of each Planning Region's current planning process
- Interregional Order No. 1000 Implementation: key dates, deliverables and opportunities for stakeholder input
- Possible approaches for addressing compliance requirements
- Discuss coordination of planning data, study plans and reports
- Opportunities for coordination with WECC

FERC Interregional Order No. 1000 Compliance

Gary DeShazo, California ISO
Patrick Damiano, ColumbiaGrid

Western filing parties partially complied with the Order subject to further filings

- ✓ Requirement to coordinate with neighboring transmission providers within its interconnection
 - ✓ Proposed procedures to coordinate
 - ✓ Common tariff language meets “same language” requirement
- ✓ Definition of “Interregional Transmission Project” (ITP)
- ✓ Coordination and sharing of results
- ✓ Established procedures to jointly evaluate an ITP
- ✓ Common cost allocation methodology
- ✗ Cost allocation principle 1
 - ✗ CAISO’s proposal to use “avoided cost” was not accepted

CAISO Compliance Response

For purposes of allocating costs for an ITP, the CAISO will determine the regional benefits of an interregional project to the CAISO, in dollars, by calculating:

- (1) the net costs (cost of regional transmission solution minus net economic benefits determined in accordance with tariff section 24.4.6.7 and the Business Practice Manual for Transmission Planning Process) of the regional transmission solution for which the interregional transmission project eliminates or defers the regional need, and
- (2) the regional economic benefits of the interregional transmission solution consistent with section 24.4.6.7 of the ISO tariff and the Business Practice Manual for Transmission Planning Process

NTTG and WestConnect Compliance Response

- NTTG and WestConnect Filing Parties filed a transmittal letter notifying FERC that CAISO's proposed changes satisfy the compliance requirement
- CAISO, NTTG and WestConnect's effective date for Interregional Order No. 1000 is October 1, 2015

ColumbiaGrid Members and Planning Participants



- Avista Corporation
- Bonneville Power Administration
- Chelan County PUD
- Cowlitz County PUD*
- Douglas County PUD*
- MATL (formerly Enbridge)*
- Grant County PUD
- Puget Sound Energy
- Seattle City Light
- Snohomish County PUD
- Tacoma Power



* Non-Member PEFA Planning Participants

ColumbiaGrid Order 1000 Compliance (1 of 3)

- One planning process, two planning agreements:
 - Second Amendment to the Planning and Expansion Functional Agreement (PEFA)
 - First Amended and Restated Order 1000 Functional Agreement (Order 1000 Agreement), filed with FERC November 2014
- Began new biennial plan cycle in January 2015

ColumbiaGrid Order 1000 Compliance (2 of 3)

- Regional Order 1000 FERC ruling September 2014
- Compliance filings - including First Amended and Restated Order 1000 Agreement - filed November 2014 by Avista, PSE, and MATL
- First Amended and Restated Order 1000 Agreement – executed by Avista, PSE, MATL, and ColumbiaGrid
- Regional Order 1000 transmission planning effective January 2015
- Order 1000 Agreement provides for Enrolled and Non-Enrolled parties

ColumbiaGrid Order 1000 Compliance (3 of 3)

- Inter-regional Order 1000 FERC ruling December 18, 2014
- FERC required several clarifications of ColumbiaGrid's jurisdictional transmission providers, which could be addressed in transmittal letters – FERC ruling also addressed BPA
- Jurisdictional transmission providers (Avista, MATL, PSE) filed inter-regional compliance filings by February 17, 2015
- Inter-Regional Order 1000 transmission planning effective January 2015
- Coordinate inter-regional planning with CAISO, NTTG, and WestConnect (however, these three regions will launch inter-regional Order 1000 planning in October 2015)

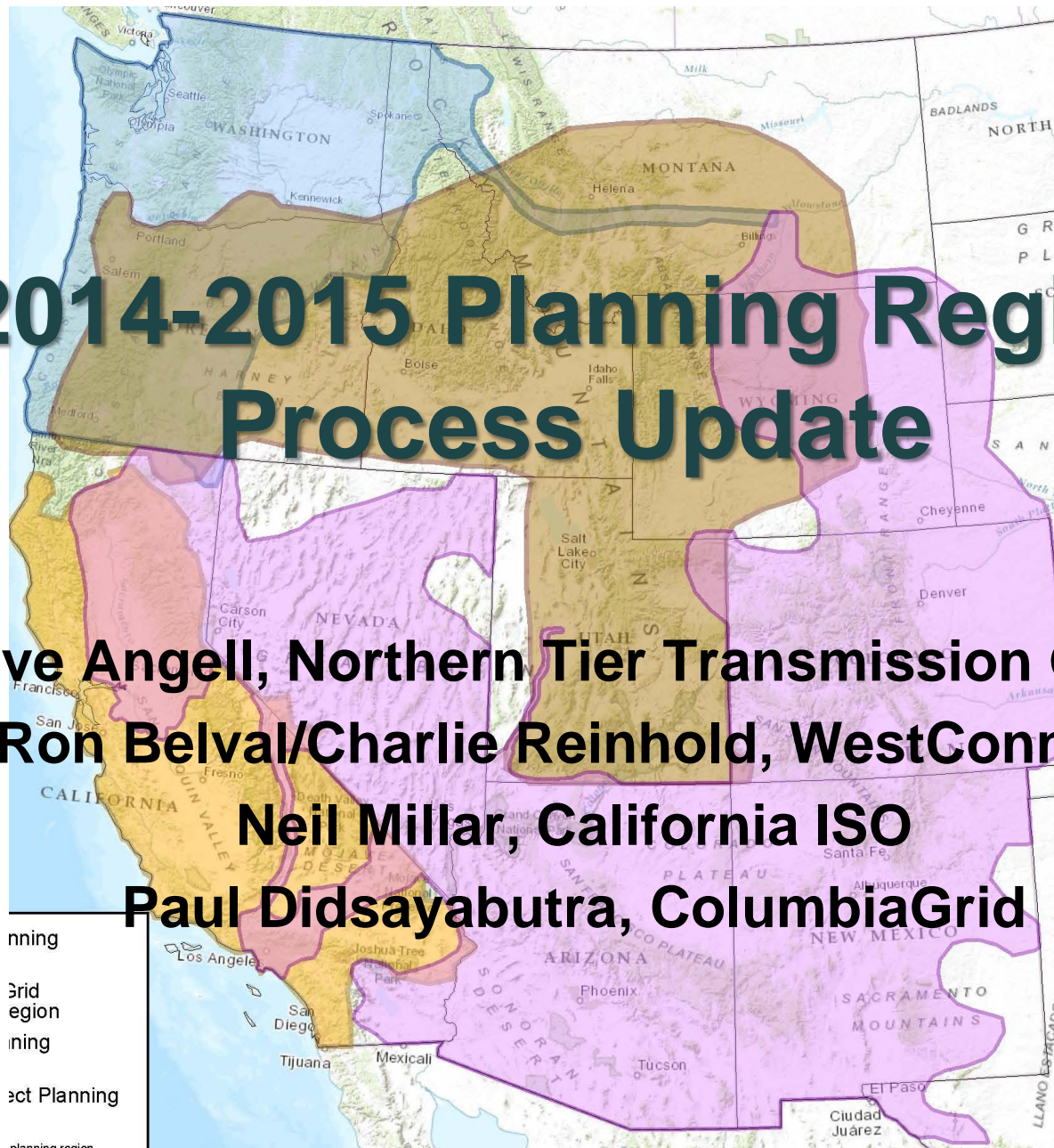
2014-2015 Planning Region Process Update

Dave Angell, Northern Tier Transmission Group

Ron Belval/Charlie Reinhold, WestConnect

Neil Millar, California ISO

Paul Didsayabutra, ColumbiaGrid



Planning

Grid region

Planning

Act Planning

Planning region

Interregional Planning

- Each Planning Region's regional Order No. 1000 methodologies are the principal vehicles through which Order No.1000 interregional compliance will be achieved for interregional evaluation and cost allocation



Northern Tier Transmission Group 'NTTG' Planning

Planning Regions Coordination Meeting
Portland, OR
February 26, 2015



NTTG Footprint

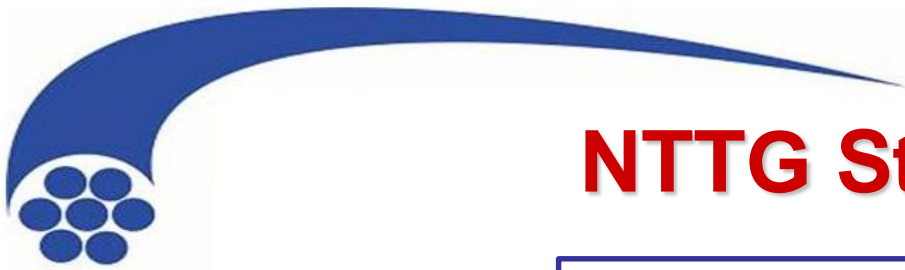
Participating Utilities

Deseret Power Electric Cooperative
Idaho Power
NorthWestern Energy
PacifiCorp
Portland General Electric
Utah Associated Municipal Power Systems

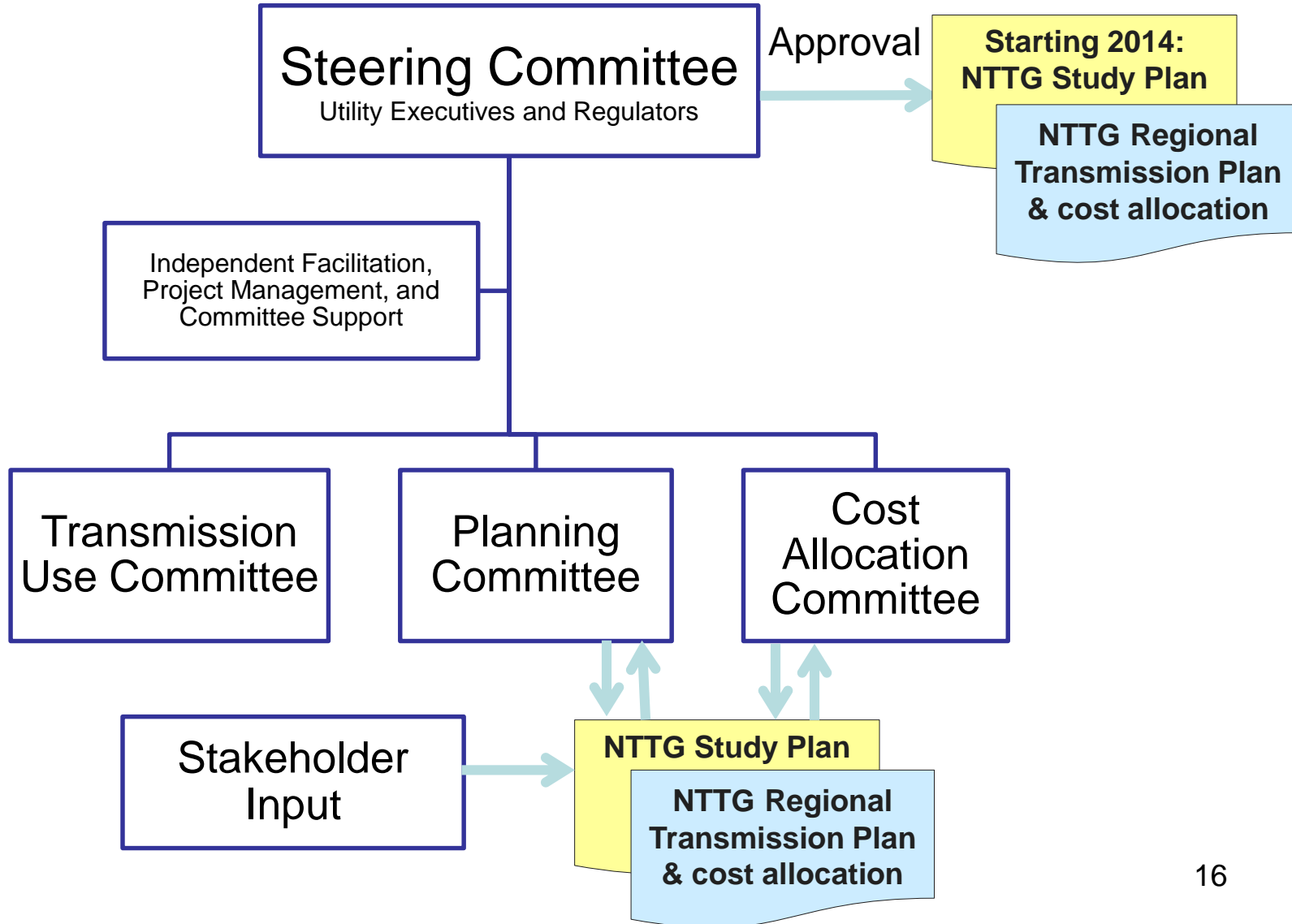
Participating State Representatives

Idaho Public Utilities Commission
Montana Consumer Counsel
Montana Public Service Commission
Oregon Public Utility Commission
Utah Office of Consumer Services
Utah Public Service Commission
Wyoming Public Service Commission





NTTG Structure





Planning Committee Membership

- Avista Corporation
- Absaroka Energy, LLC
- Deseret Power Electric Cooperative
- Gaelectric, LLC
- Idaho Office of Energy Resources
- Idaho Power Company
- Idaho Public Utilities Commission
- Montana Public Service
- NorthWestern Energy
- PacifiCorp
- Portland General Electric
- TransCanada
- UAMPS
- Utah Public Service Commission
- Wyoming Public Service Commission

Legend: Transmission Providers/Developers, Transmission Users, Regulators and other state agencies



Participating Utilities

Deseret Power Electric Cooperative
Idaho Power
NorthWestern Energy
PacifiCorp
Portland General Electric
Utah Associated Municipal Power Systems

4,308,200 customers served
29,239 miles of transmission

Participating State Representatives

Idaho Public Utilities Commission
Montana Consumer Counsel
Montana Public Service Commission
Oregon Public Utility Commission
Utah Office of Consumer Services
Utah Public Service Commission
Wyoming Public Service Commission





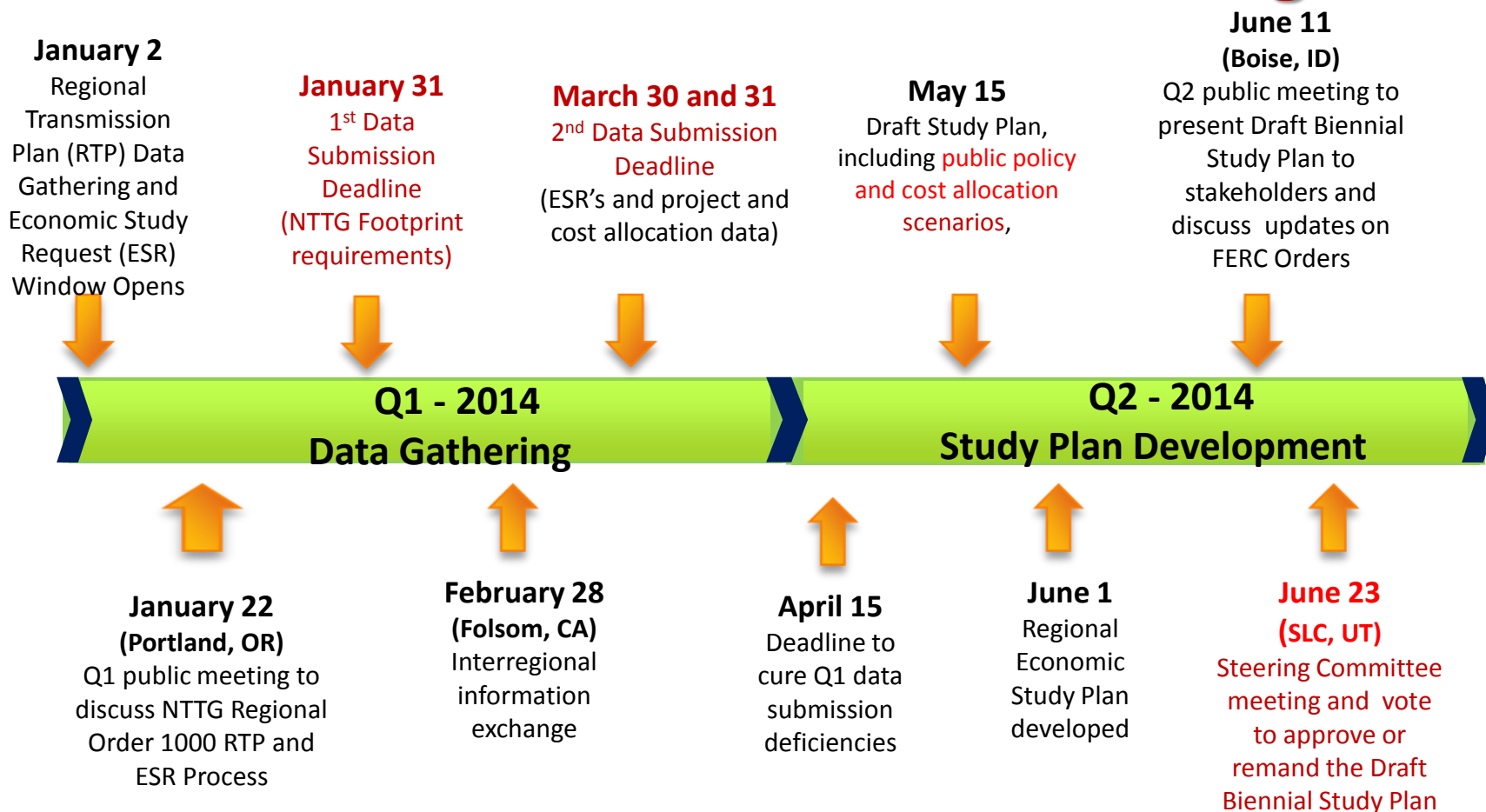
NTTG 2014-2015 Planning Cycle

NTTG EIGHT-QUARTER BIENNIAL PROCESS

NTTG Biennial Planning Cycle	Gather Information	01	Even Years	01	Economic Study Requests	NTTG Economic Study Cycle
	Develop Study Plan, Assumptions	02		02	Perform Economic Studies	
	Perform Draft Plan Analysis	03		03	Report and Review	
	Perform Draft Plan Analysis	04		04		
	Prepare & Review Draft Report	05	Odd Years	01	Economic Study Requests	
	Process Econ. Studies, Cost Alloc.	06		02	Perform Economic Studies	
	Prepare & Review Final Report	07		03	Report and Review	
	Obtain Final Plan Approval	08		04		

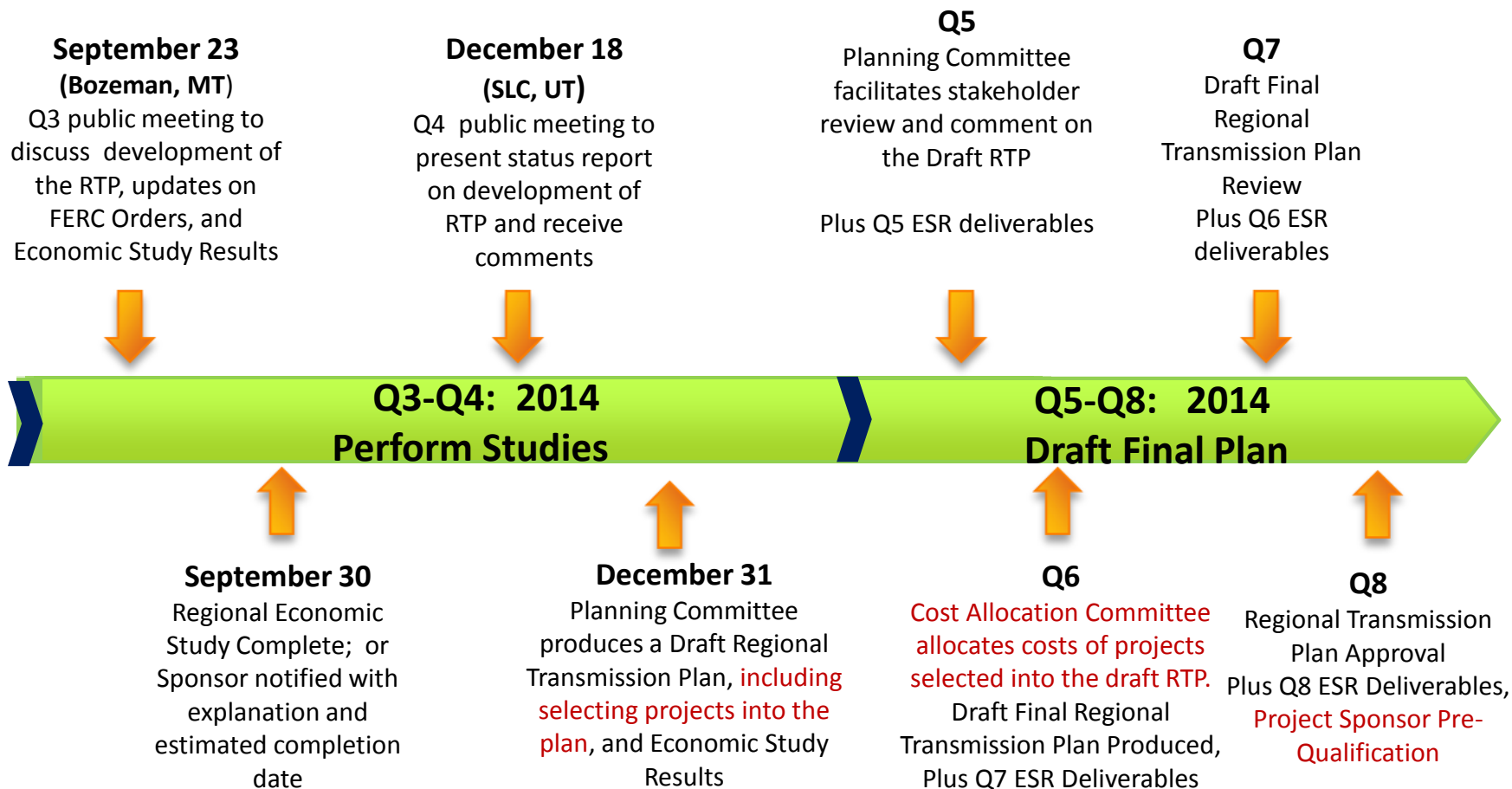


NTTG 2014-2015 Key Milestones Deliverables and Process Changes





NTTG 2014-2015 Key Milestones Deliverables and Process Changes



Draft Schedule - subject to change

2014 Q1 Data Submittals

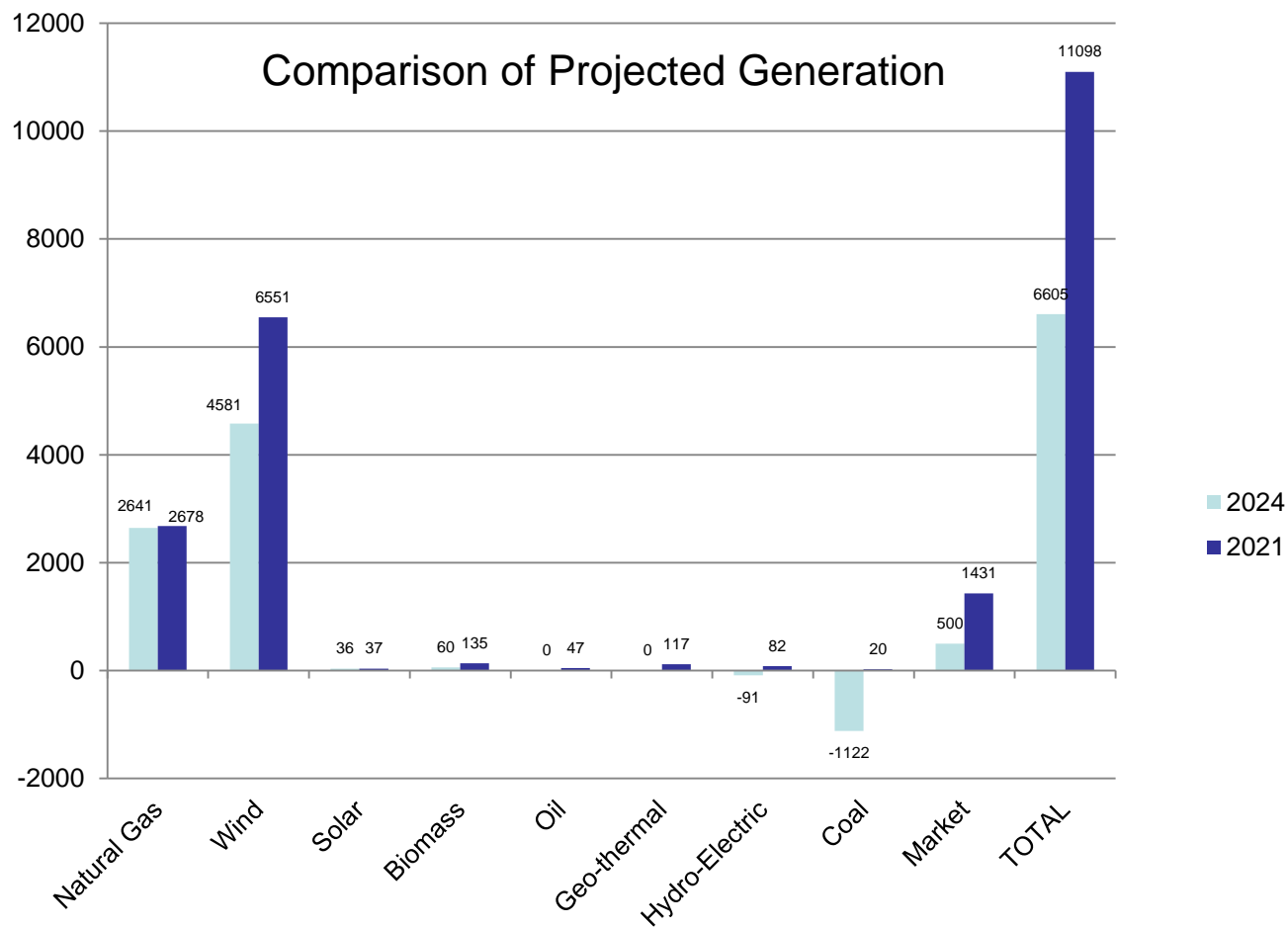


Load Submissions

SUBMITTED BY:	2013 Actual Peak Demand (MW)	2021 Summer Load Data Submitted in Q1 2012 (MW)	2024 Summer Load Data Submitted in Q1 2014 (MW)	Difference (MW) 2021-2024	2024 Summer Load Data (MW) submitted in Q5 (2015)
Basin Electric	No Data Submitted	476	No Data Submitted		
Black Hills	No Data Submitted	465	No Data Submitted		
Idaho Power	3,407	4,383	4,193	-190	
NorthWestern	1,707	1,680	1,774	94	
PacifiCorp East	No Data Submitted	9,842	10,358	506	
PacifiCorp West	No Data Submitted	3,795	3,644	-151	
Portland General	3,900	4,119	3,933	-186	
TOTAL*		23,819	23,892	73	



Resource Submissions





Transmission Submissions

Sponsor	Type	Projects	Voltage	Circuits
Idaho Power	LTP	Gateway West Project	500 kV	2
	LTP	B2H Project	500 kV – 230 kV	2
Great Basin Transmission	Sponsored (1)	Southwest Intertie Project North	500 kV	1
NorthWestern Energy	LTP	Broadview – Garrison Upgrade	500 kV	1
	LTP	Millcreek – Amps Upgrade	230 kV	1
PacifiCorp East	LTP	Gateway South Project	500 kV	1
	LTP	Gateway West Project	500 kV – 230 kV	5
Portland General	LTP	Blue Lake - Gresham	230 kV	1
TransWest Express	Merchant Transmission Developer (2)	TransWest Express	±600 kV DC	1

- (1) Sponsored Projects and Un-sponsored will be evaluated
- (2) Per customer request, the TransWest Express (Merchant) project will not be evaluated this planning cycle as an Alternative Project for selection in the Regional Transmission Plan



New or Existing Transmission Service

Submitted by	MW	Start Date	End Date	POR	POD
Idaho Power	500	2020	-	Northwest	IPCo
	67	01/01/15	01/01/24	LGBP	BPASID
	2	04/01/15	04/01/28	LaGrande	BPASID
	5	07/01/16	07/01/28	LaGrande	BPASID
	85	10/01/11	10/01/28	LGBP	RR
	100	10/01/11	10/01/28	LGBP	OTEC
	188	10/01/11	10/01/28	LGBP	BPASID
	60	2020	-	Northwest	BPASID
NorthWestern Energy	39	7/1/2013	71/2018	YTP	BRDY
	7	7/1/2013	71/2018	NWMT.SYS	BRDY



Draft Regional Transmission Plan Evaluation

- Analysis performed on Initial Regional Transmission Plan, only committed projects, and alternative projects
 - Initial Regional Transmission Plan is the NTTG Transmission Providers' local plan
 - Selected stressed hours through production cost model (PCM) simulation
 - Performed reliability analysis with power flow simulation
 - Determined plan benefits from changes in losses, reserves and capital expense

PCM of 2024 TEPPC Case

2024 Common Case Transmission Assumptions (CCTA)

The purpose of the CCTA is to provide a basic set of transmission facilities that TEPPC can use as a starting point for their own studies. The CCTA is a list of facilities that are expected to be in service by 2024.

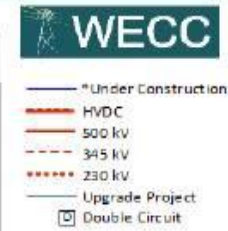
- ① Boardman-Hemingway (B2H)
- ② Central Ferry - Lower Monumental (Little Goose Area Reinforcement)
- ③ Delaney - Palo Verde Line
- ④ Delaney - Sun Valley Line
- ⑤ Desert Basin - Pinal Central
- ⑥ Devers - Colorado River (DCR) Project
- ⑦ Gateway Central Project: Sigurd - Red Butte
- ⑧ Gateway South Project: Segment 2 (Aeolus - Mona)
- ⑨ Gateway West Project: Segment 1A (Windstar to Jim Bridger)
- ⑩ Gateway West Project: Segment 1B (Bridger - Populus single circuit)
- ⑪ Gateway West Project: Segment 1C (Populus - Midpoint)
- ⑫ Gateway West Project: Segment E (Midpoint - Hemingway)
- ⑬ Hassayampa - North Gila #2 Line
- ⑭ I-5 Corridor Reinforcement Project (Castle Rock - Troutdale)
- ⑮ Interior to Lower Mainland Transmission (ILM) Project
- ⑯ Morgan - Sun Valley Line
- ⑰ Northwest Transmission Line
- ⑱ One Nevada Line (ON Line)
- ⑲ Path 8 Upgrade/Colstrip Transmission Upgrade
- ⑳ Pinal Central-Tortolita
- ㉑ Pinal West-Pinal Central-Browning (SEV)
- ㉒ West of McNary Reinforcement Project Group 2 (Big Eddy - Knight)

Blue text - Indicates Under Construction

Regional Planning Coordination Group (RPCG)

CAISO - California Independent System Operator	SIERRA - Sierra Subregional Planning Group
CTPG - California Transmission Planning Group	SWAT - Southwest Area Transmission
CG - ColumbiaGrid	AESO - Alberta Electric System Operator
CCPG - Colorado Coordinated Planning Group	BCCPG - BC Coordinated Planning Group
NTTG - Northern Tier Transmission Group	

* As of November 11, 2013





Draft Transmission Plan

- The most efficient and cost effective plan is the existing system plus a new Aeolus - Anticline - Populus 500 kV line
- However, the transmission service obligations are not met

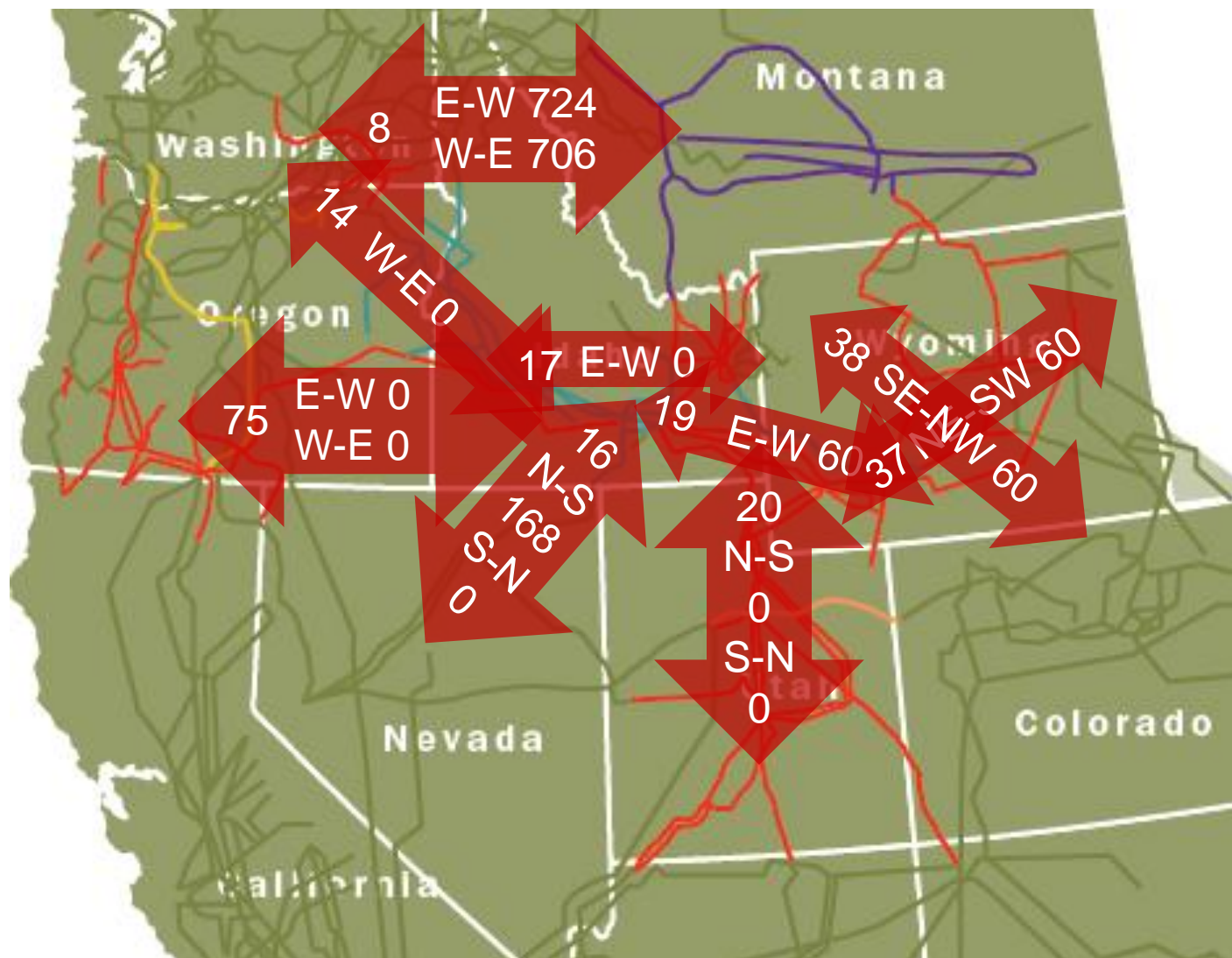


Draft Revised Study Plan

- Add a second threshold requirement to the Attachment K identified reliability requirement
 - Plan must meet the footprint transmission needs
 - Loads
 - Resources
 - Public Policy Requirements
 - Transmission service obligation and
 - Other identified transmission requirements
- Stakeholder comment period
- Requires Steering Committee approval



NTTG Path 2015 ATC





Public Policy Considerations Study

- Planning Committee approved study plan
- Power flow assessment that includes actions from the existing remedial action scheme
- Retire Colstrip units 1 and 2
- Add 610 MW of wind generation at Broadview



Regional Cost Allocation

- Challenge
 - No projects selected into the Regional Transmission Plan
 - No requirement to perform cost allocation
- Opportunity
 - Dry run



Cost Allocation Scenarios

- Load
 - Add/Subtract 1,000 MW in the NTTG footprint
- Resources
 - Replace 50 % of the of new wind with solar
 - Replace 1000 MW of coal with wind & solar

Questions?



WestConnect Regional Planning

Planning Regions Coordination Meeting

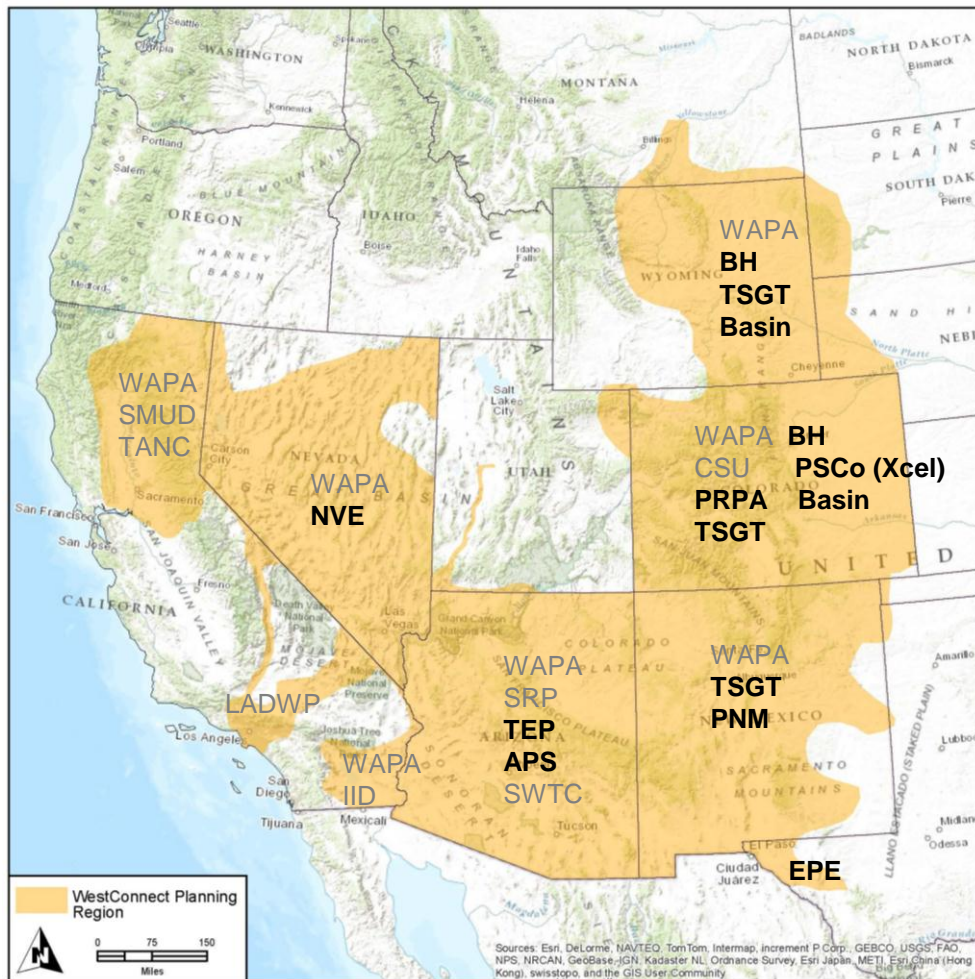
February 26, 2015

Portland, OR

Outline

- WestConnect Overview
 - Membership & Footprint
 - Structure
 - Where we stand in our process
- Order 890 Update (2014)
- Order 1000 Update (2015 and 2016/17)

Approximate WestConnect Planning Region



- All entities are required to sign the Planning Participation Agreement (PPA) to become a voting member
- Planning footprint may change due to changes in membership

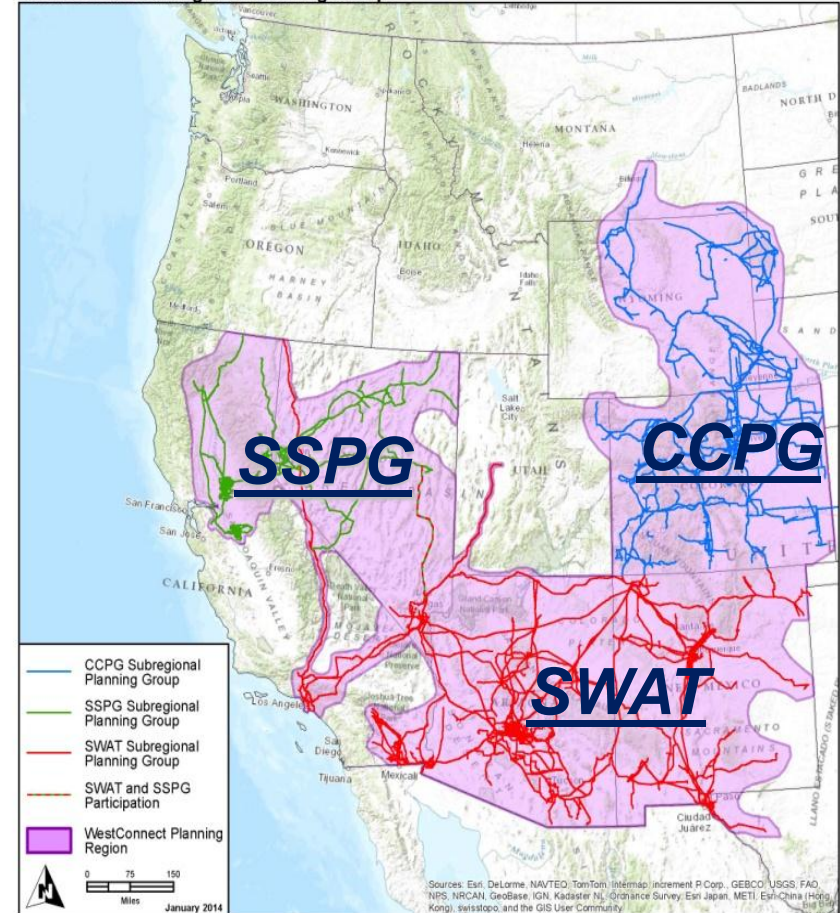
Entities in **grey** text are transmission providers that participate in the WestConnect Order 890 planning process but have not yet signed the Order 1000 PPA

WestConnect Subregional Planning Groups

CCPG, SSPG and SWAT are the WestConnect technical subregional planning groups for the WestConnect planning region

- Coordinate subregional data input for regional base cases
- Define subregional study plans, provide study resources, and perform subregional planning studies
- Provide forum for coordination and peer review of TO 10-year plans and regional planning studies

WestConnect Subregional Planning Groups



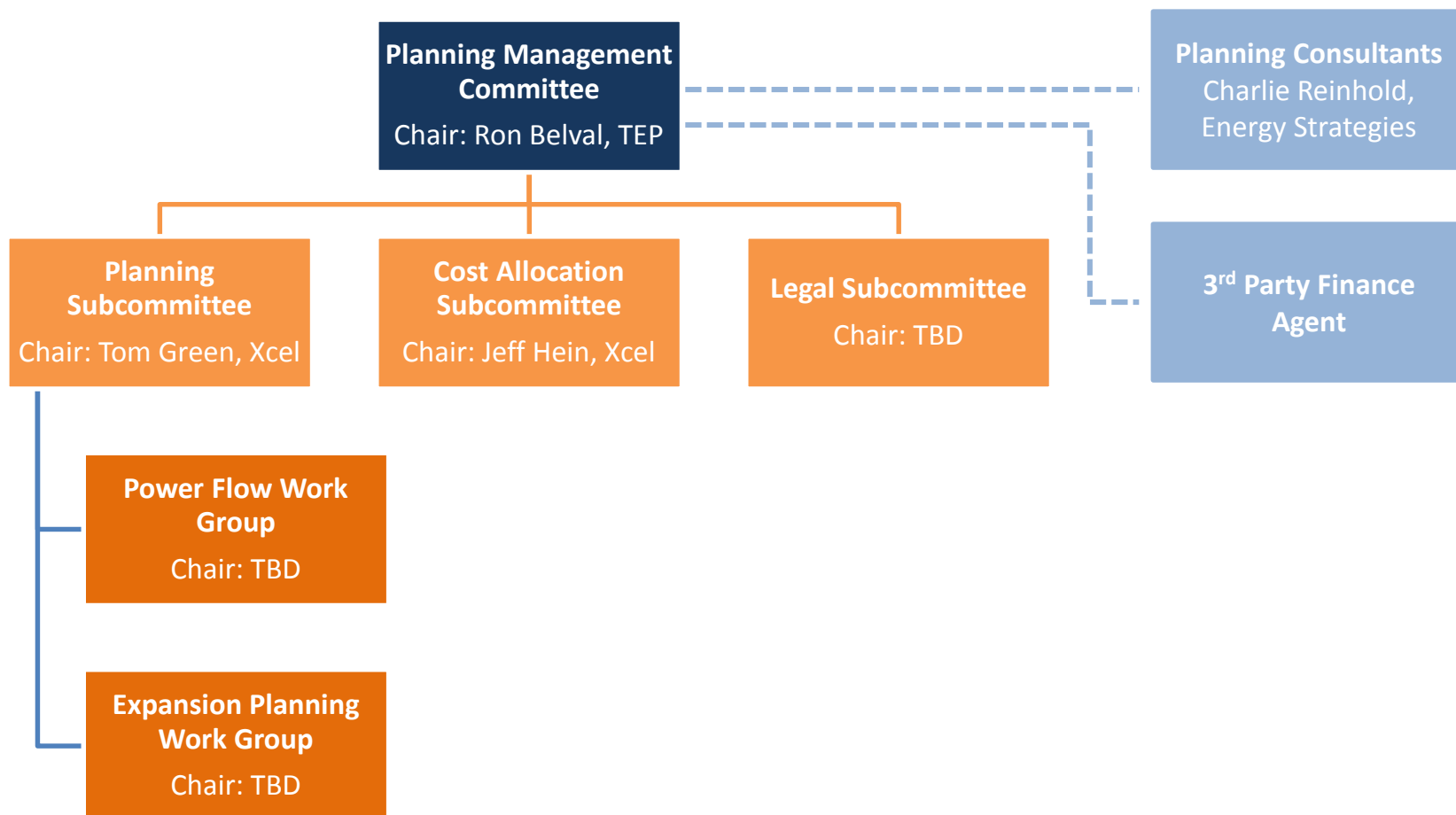
Regulatory Update - Regional

- Regional Compliance Status
 - 2nd Regional order issued September 18, 2014
 - Required WestConnect to file the Planning Participation Agreement (PPA) with FERC
 - Directed abbreviated cycle to start January 1, 2015
 - 3rd Regional compliance filings submitted November 17, 2014
 - Waiting on response from FERC

Participant Enrollment by Sector

- Transmission Owners
 - APS
 - Basin Electric
 - Black Hills
 - El Paso Electric
 - NV Energy
 - Public Service New Mexico
 - Platte River Power Authority
 - Tucson Electric Power
 - Tri-State
 - Xcel
- Transmission Customers
 - None
- Independent Transmission Developers
 - Southwestern Power Group
 - TransCanyon
 - Xcel Energy Western Transmission Company
- State Regulatory Commission Members
 - None
- Key Interest Groups
 - None

PMC Organization



WestConnect Order 890 Ten-Year Transmission Plan Guide

- Documents the results of the subregional planning processes within the WestConnect planning area
 - Provides a summary of all studies conducted and reported by the SPGs and workgroups within the WestConnect footprint.
 - Provides a proposed study plan for the SPG's next planning cycle.
- Provides a summary of the WestConnect and SPGs Stakeholder activities
- Plan includes ten-year transmission projects of:
 - Entities that have signed WestConnect Project Agreement for Subregional Transmission Planning,OR
 - Other entities whose projects meet the following prerequisites

WestConnect Order 890 Ten-Year Transmission Plan Guide (2)

- **Prerequisites for inclusion:**

- New transmission projects with nominal system voltage ≥ 100 kV
- Located within WestConnect Planning Area or interconnecting WestConnect to adjacent Subregional planning areas
- Studied in accordance with federal and state regulatory requirements
- Demonstrated performance compliant with NERC and WECC reliability planning criteria
- Final study report or summary must have been through a documented open and transparent stakeholder or industry peer review process and available for posting on WestConnect website
- Results of study must have been presented at one or more WestConnect subregional planning meetings

2015 WC Plan (Order 890)

Project Organization

- WC Plan is organized by Planned and Conceptual projects as defined by the following:
 - **Planned:** Project has a sponsor, incorporated in entity's regulatory filing, has participation / construction agreement, or permitting has been obtained or will be sought.
 - **Conceptual:** Project lacks formal sponsor, or requires more study and refinement prior to committing to construct. Such projects may be viewed as viable alternatives still seeking sponsorship.
- Sorted by Voltage Class
- Sorted by In-Service Date
- Sorted by State
- Sorted by SPG

2015 WC Plan Summary

Status of Projects	No. Projects	Total Miles	Estimated Cost (B\$)
Planned	183	5,334	\$ 13.294
Conceptual	75	6,920	\$ 12.055

2015 WC Plan – Planned and Conceptual Projects

Type of Project	Number of Projects	Transmission Line Project Miles	Planned Investment (\$ x 1,000)	Number of Projects	Transmission Line Project Miles	Conceptual Investment (\$ x 1,000)	Total Investment (\$ x 1,000)
	PLANNED			CONCEPTUAL			
<i>Substation</i>	39	N/A	\$ 321,000	9	N/A	\$ 70,000	\$ 391,000
<i>Transmission Line</i>	75	4,130	\$ 10,178,000	48	4,450	\$ 4,150,000	\$ 14,328,000
<i>Transmission Line and Substation</i>	27	1,182	\$ 1,969,000	16	2,470	\$ 7,795,000	\$ 9,764,000
<i>Transformer</i>	28	N/A	\$ 232,000	2	N/A	\$ 40,000	\$ 272,000
<i>Other</i>	14	22	\$ 594,000	0	N/A	\$ -	\$ 594,000
Total Projects	183	5,334	\$ 13,294,000	75	6,920	\$ 12,055,000	\$ 25,349,000

Transmission Projects Comparison 2015 WC Plan vs. previous WC Plans

	2015	2014	2013
Planned	183	199	205
Conceptual	75	66	68
Total No. Projects	258	265	273
Planned	5,334	6,418	6,028
Conceptual	6,920	6,453	7,305
Total Miles	12,254	12,871	13,333
Planned	\$13,294	\$14,494	\$11,099
Conceptual	\$12,055	\$12,085	\$18,342
Total Estimated \$M	\$ 25,349	\$ 26,579	\$ 29,441

2015 WC Plan Summary

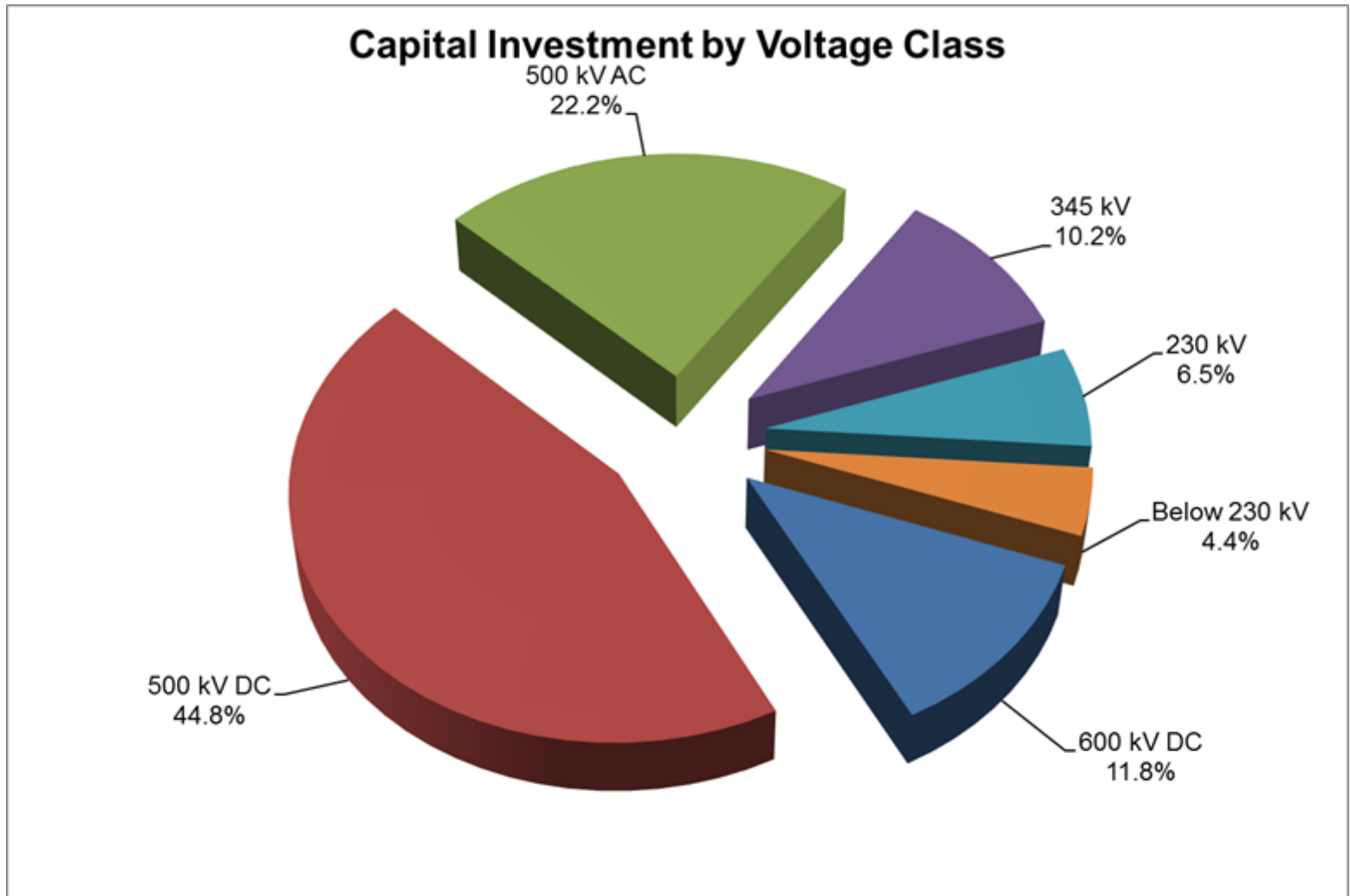
Project Status

Year	In-Service	Under Construction	Planned	Conceptual	Withdrawn	Total
2015	43	37	183	75	24	362
2014	23	39	199	66	36	363
2013	27	19	205	68	19	338
2012	35	19	215	71	38	378

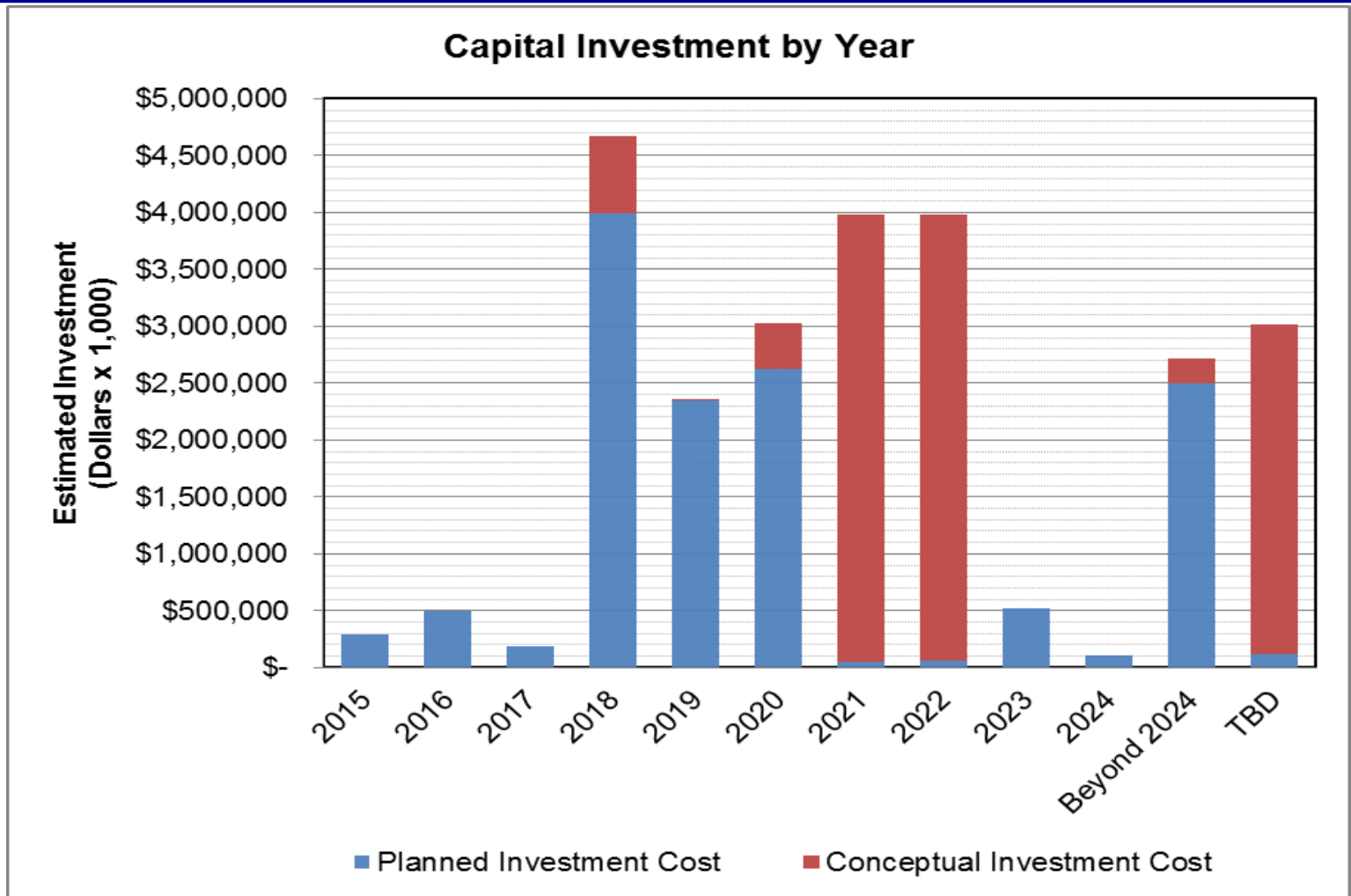
2015 WC Plan – In-Service and Under Construction Projects

Type of Project	Number of Projects	Transmission Line Project Miles	Planned Investment (\$ x 1,000)	Number of Projects	Transmission Line Project Miles	Conceptual Investment (\$ x 1,000)
	IN-SERVICE			UNDER CONSTRUCTION		
<i>Substation</i>	17	N/A	\$ 138,000	7	N/A	\$ 56,000
<i>Transmission Line</i>	14	212	\$ 303,000	18	700	\$ 596,000
<i>Transmission Line and Substation</i>	4	231	\$ 564,000	8	133	\$ 353,000
<i>Transformer</i>	6	N/A	\$ 42,000	4	N/A	\$ 21,000
<i>Other</i>	2	N/A	\$ 4,000	0	N/A	\$ -
Total Projects	43	443	\$ 1,051,000	37	833	\$ 1,026,000

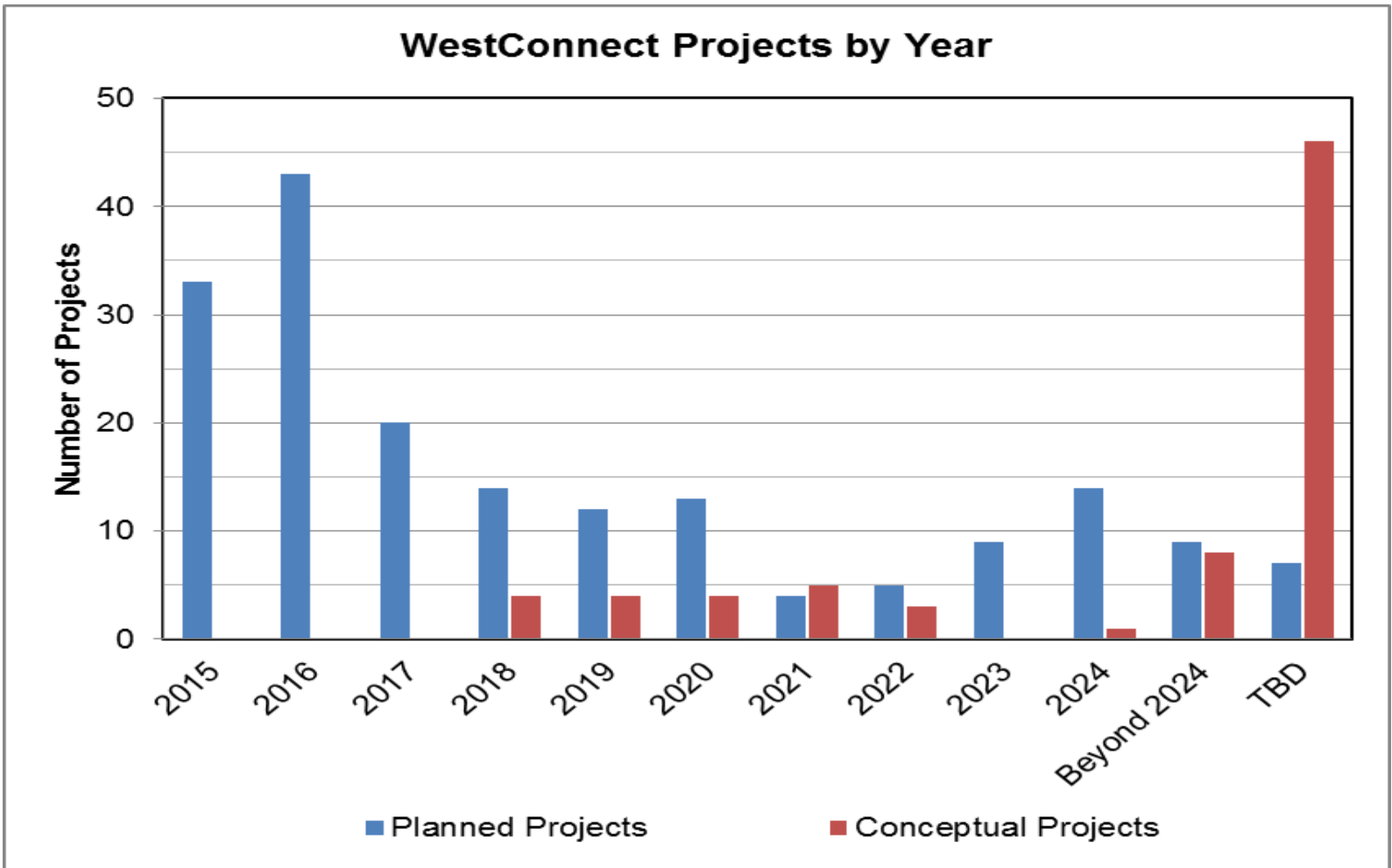
2015 WC Plan Capital Investment by Voltage Class



2015 WC Plan Project Investments by Year and Status



2015 WC Plan Number of Projects by Year and Status



Planned and Conceptual Projects by State

State(s) Traversed	Number of Projects	Transmission Line Project Miles	Planned Investment (\$ x 1,000)	Number of Projects	Transmission Line Project Miles	Conceptual Investment (\$ x 1,000)
	PLANNED			CONCEPTUAL		
Arizona	66	555	\$ 722,000	49	1,089	\$ 1,020,000
California	21	815	\$ 3,154,000	2	140	\$ 54,000
Colorado	26	386	\$ 532,000	10	668	\$ 1,312,000
Nebraska	1	0	\$ 4,000	0	0	\$ -
Nevada	21	23	\$ 248,000	8	293	\$ 667,000
New Mexico	15	107	\$ 131,000	2	255	\$ 602,000
South Dakota	1	0	\$ 4,000	0	0	\$ -
Texas	12	14	\$ 34,000	0	0	\$ -
Wyoming	6	217	\$ 108,000	0	0	\$ -
Multi-State	14	3,217	\$ 8,357,000	4	4,475	\$ 8,400,000
Total	183	5,334	\$ 13,294,000	75	6,920	\$ 12,055,000

Interstate and Merchant Transmission Projects in the WestConnect 2015 Plan

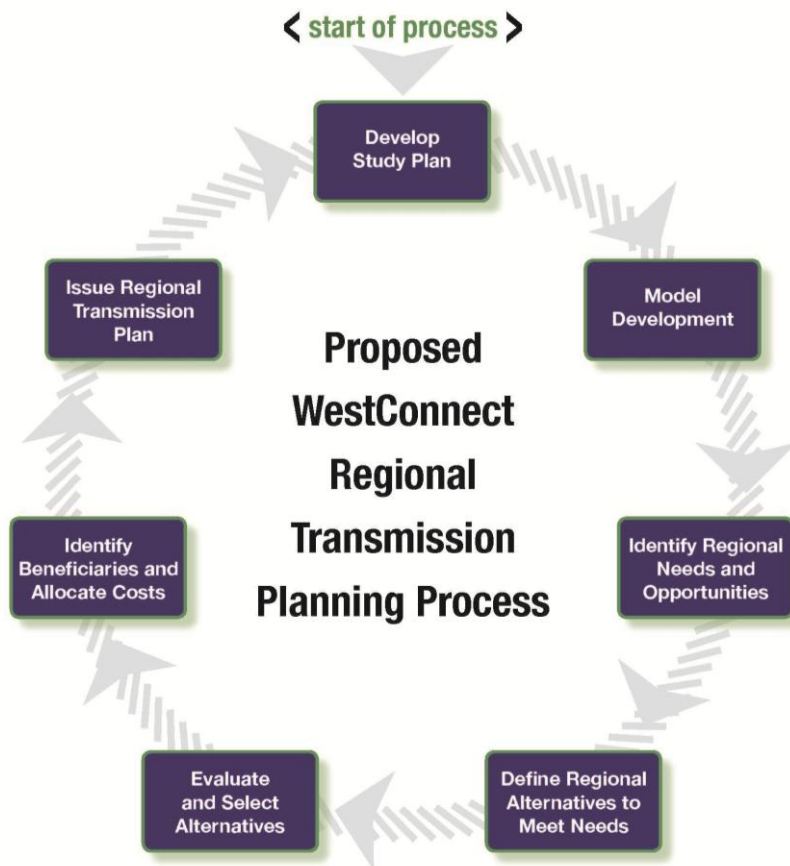
Name of Project	Line Miles	Voltage	From	To
Centennial West Clean Line	900	500 kV DC	New Mexico	California
Chinook Project	1000	500 kV DC	Montana	Nevada
Harcuvar Transmission Project	90	230 kV	Arizona	Arizona
High Plains Express Initiative	2500	500 kV	Wyoming	Arizona
Long View Energy Exchange	90	500 kV	Arizona	Arizona
Lucky Corridor Project	130	345 kV	New Mexico	New Mexico
North Gila – Imperial Valley #2 Project	85	500 kV	Arizona	California
Southline Transmission Project	240/120	345 kV/230 kV	New Mexico	Arizona
Southwest Intertie Project	339	500 kV	Idaho	Nevada
SunZia Southwest Transmission Project	515	500 kV	New Mexico	Arizona
TransWest Express	725	600 kV DC	Wyoming	Nevada
Tres Amigas Project	22	345 kV	New Mexico	New Mexico
Western Spirit Clean Line	125	345 kV	New Mexico	New Mexico
Wyoming-Colorado Intertie	180	345 kV	Wyoming	Colorado
Zephyr Project	850	500 kV DC	Wyoming	Nevada

The background of the slide features a stylized illustration of a sunset or sunrise over a mountain range. A large, bright yellow sun is on the right side, partially obscured by the mountains. A power line tower is visible in the center, with power lines stretching across the sky. The mountains are depicted in dark, layered silhouettes.

Order 1000 Planning Process

2015 Abbreviated Cycle

Order 1000 Process Overview



- Biennial study cycle
- Information flows from TOs and SPGs up to WC
- Enhancements as compared to current 890 planning efforts:
 - WestConnect will perform a regional reliability assessment
 - Production cost modeling will be used to identify economic needs
 - Cost allocation will be performed on eligible projects and cost allocation is binding
- WC [Business Practice Manual](#) (BPM)

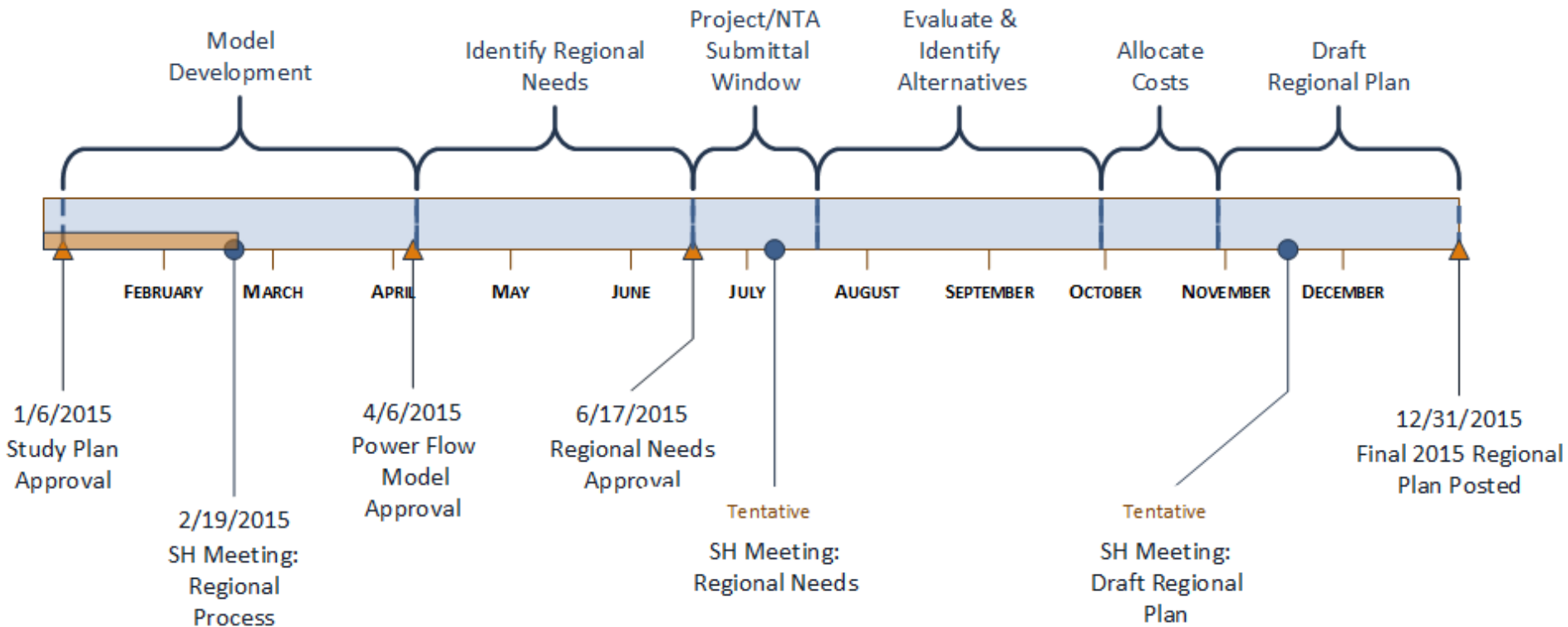
Process Status

- Initial regional planning effort for WestConnect
 - Technical differences between Order 890 versus Order 1000
- 2015 Abbreviated Cycle
 - Shake-down cruise for full cycle
 - Approved Study Plan on January 7, 2015
 - Posted to westconnect.com [here](#)
 - Entering model development phase
- 2016-2017 Biennial Cycle
 - Study plan development in Q4 2015
 - Expect robust powerflow and production cost modeling efforts in full cycle

2015 Study Plan: Major Components

- **Regional Model Development**
 - Reliability: 2024 Heavy Summer Regional power flow case
 - Economic: 2024 WestConnect Regional Production Cost Model (PCM)
 - Public Policy: Verify RPS in powerflow model
- **Identification of Regional Needs**
 - Reliability assessment: Steady state N-1 TPL evaluation
 - Economic assessment: limited, focused on model development
 - Policy: RPS driven needs apparent in powerflow model
- **Collection of Alternatives**
- **Evaluation and Identification of Regional Alternatives**
- **Regional Cost Allocation**
- **Issuance of Regional Study Plan**

2015 Abbreviated Planning Cycle Schedule

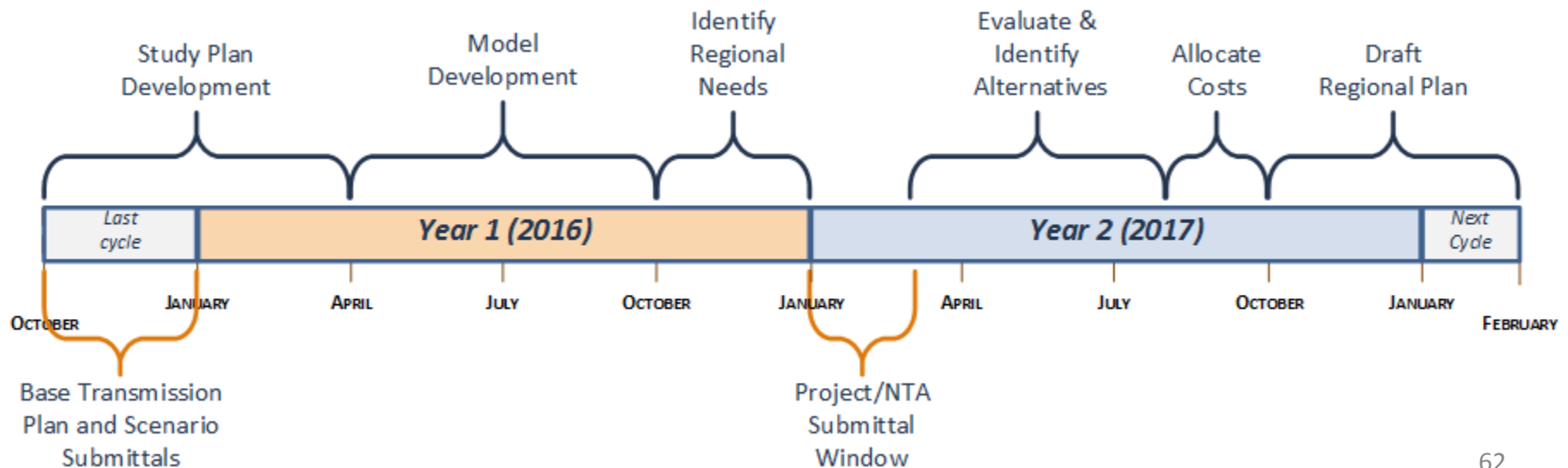


Abbreviated versus Full-Cycle: Process Elements

Process Element	2015 Abbreviated Process	2016-2017 Biennial Process
Develop study plan	Yes (Complete)	Yes
Model Development: Powerflow	Yes (one case)	Yes
Model Development: Production Cost Model	TBD	Yes
Model Development: Public Policy Check	Yes (RPS only)	Yes
Identify Regional Needs	Yes (Reliability and Policy only)	Yes
Open Season for Alternatives to Meet Needs	Yes	Yes
Evaluate and Select Alternatives	Yes	Yes
Identify Beneficiaries and Allocate Costs	Yes	Yes
Issue Regional Transmission Plan	Yes	Yes

2016-2017 Biennial Process

- Full process
- Starts in Q4 2015...



Next Meetings

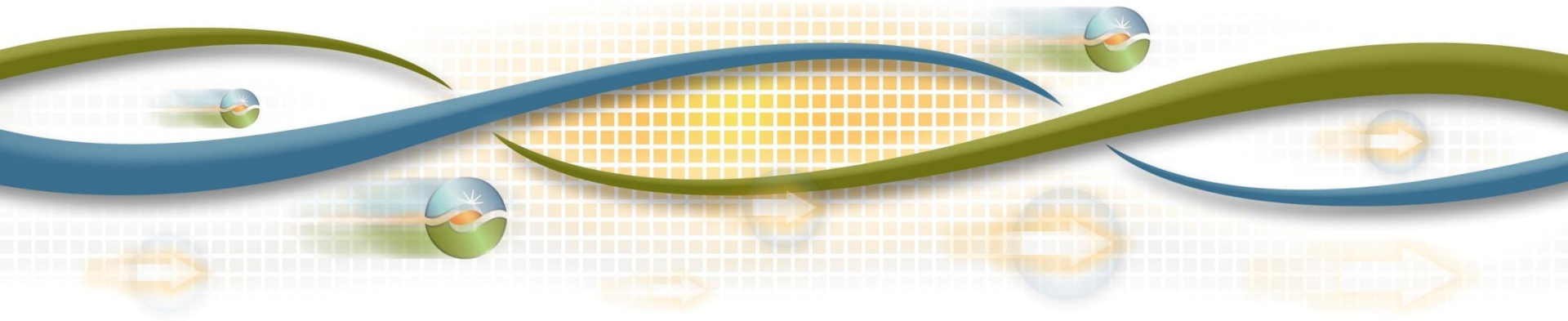
- **PMC Meetings:**
 - March 3- 9:00 a.m. to Noon (PPT), webinar/conference call
 - March 17- 9:00 a.m. to 3:00 p.m., Phoenix, AZ (SRP)
 - April 7, 9:00 a.m. to Noon (PPT), webinar/conference call
 - April 21, 9:00 a.m. to 3:00 p.m., Las Vegas, NV

Transmission Planning at the California ISO

Neil Millar

Executive Director, Infrastructure Development

Western Planning Region Coordination Stakeholder Meeting
Portland, Oregon
February 26, 2015

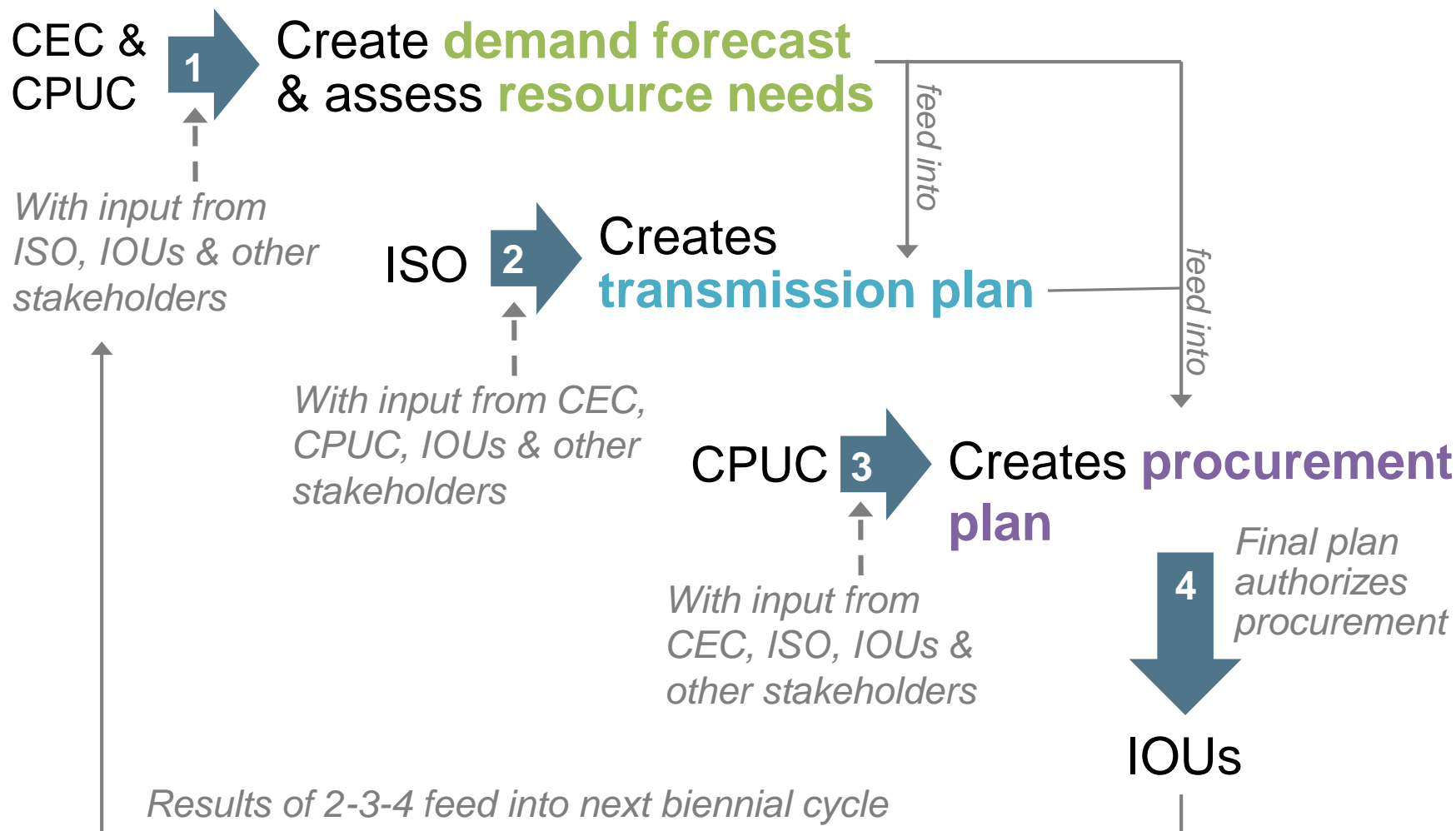


The California ISO service area:



- **58,698** MW of power plant capacity
- **50,270** MW record peak demand (July 24, 2006)
- **26,500** market transactions per day
- **25,627** circuit-miles of transmission lines
- **30 million** people served

Planning and procurement overview



What are the...

Demand forecast & resource needs

The **demand forecast (CEC)** projects peak-hour & annual energy demand 20 years forward, adjusted for energy efficiency, rooftop solar and demand response

Resource needs (CPUC) reflect RPS mandates, plus system adequacy, local area reliability and flexible capacity needs

Transmission plan

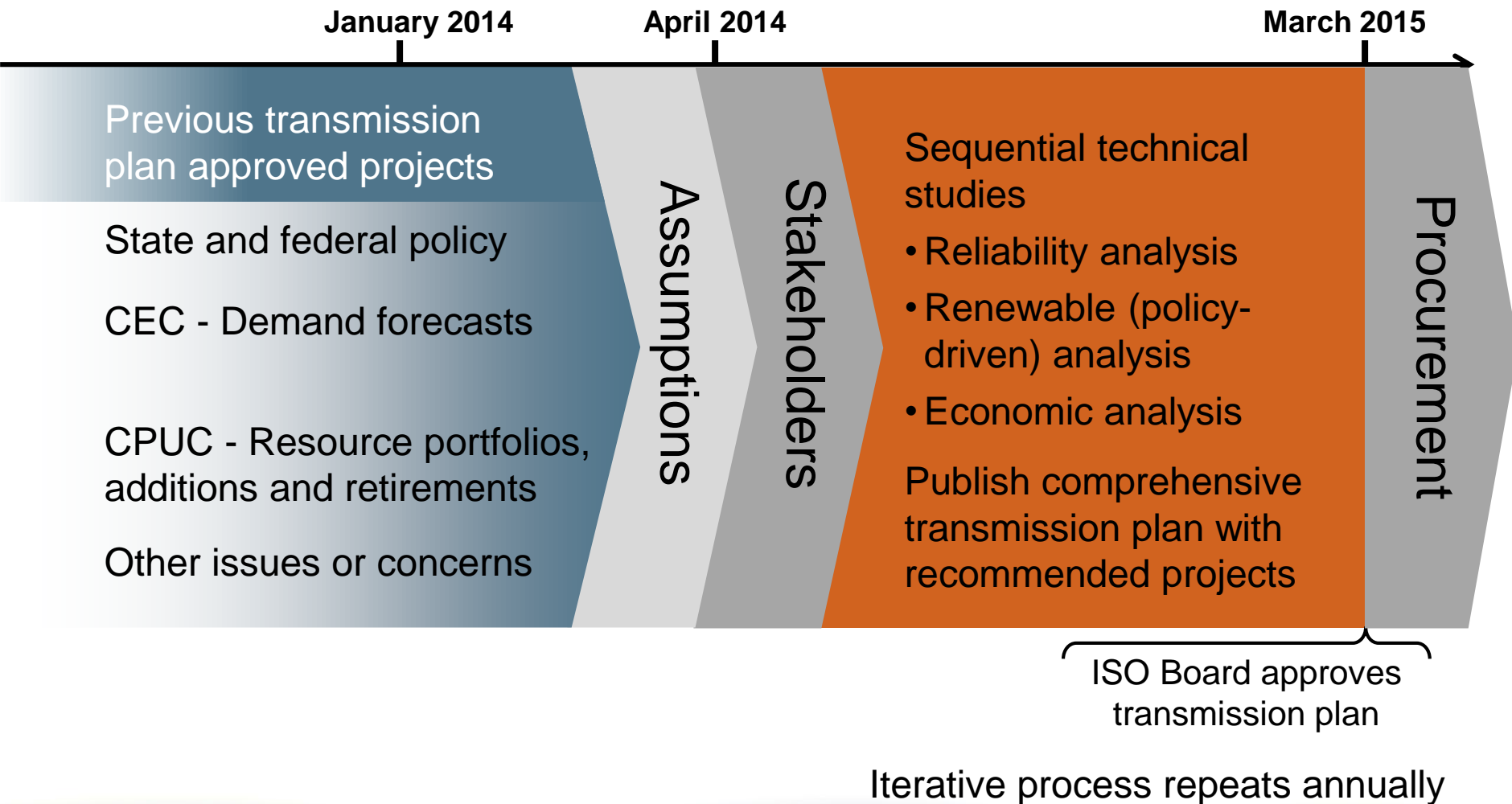
The **transmission plan (ISO)** specifies the set of new transmission lines, upgrades to existing lines or non-transmission alternatives needed to support the **resource needs** and **demand forecast**

Procurement plan

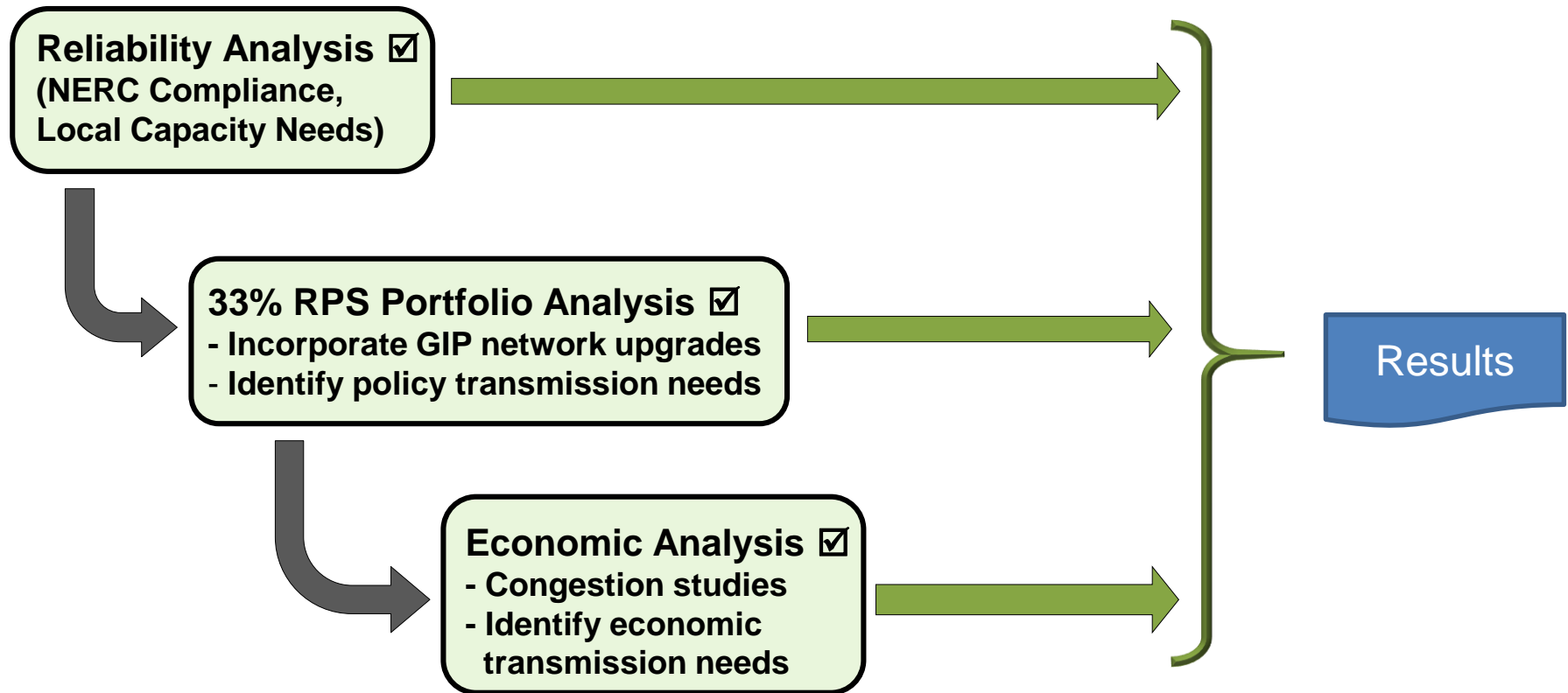
The **procurement plan (CPUC)** tells each IOU what it is authorized to procure to meet the **demand forecast** and **resource needs**, given the projects approved in the **transmission plan**

The **procurement plan** includes renewable & conventional resources, plus demand response, energy efficiency and distributed resources

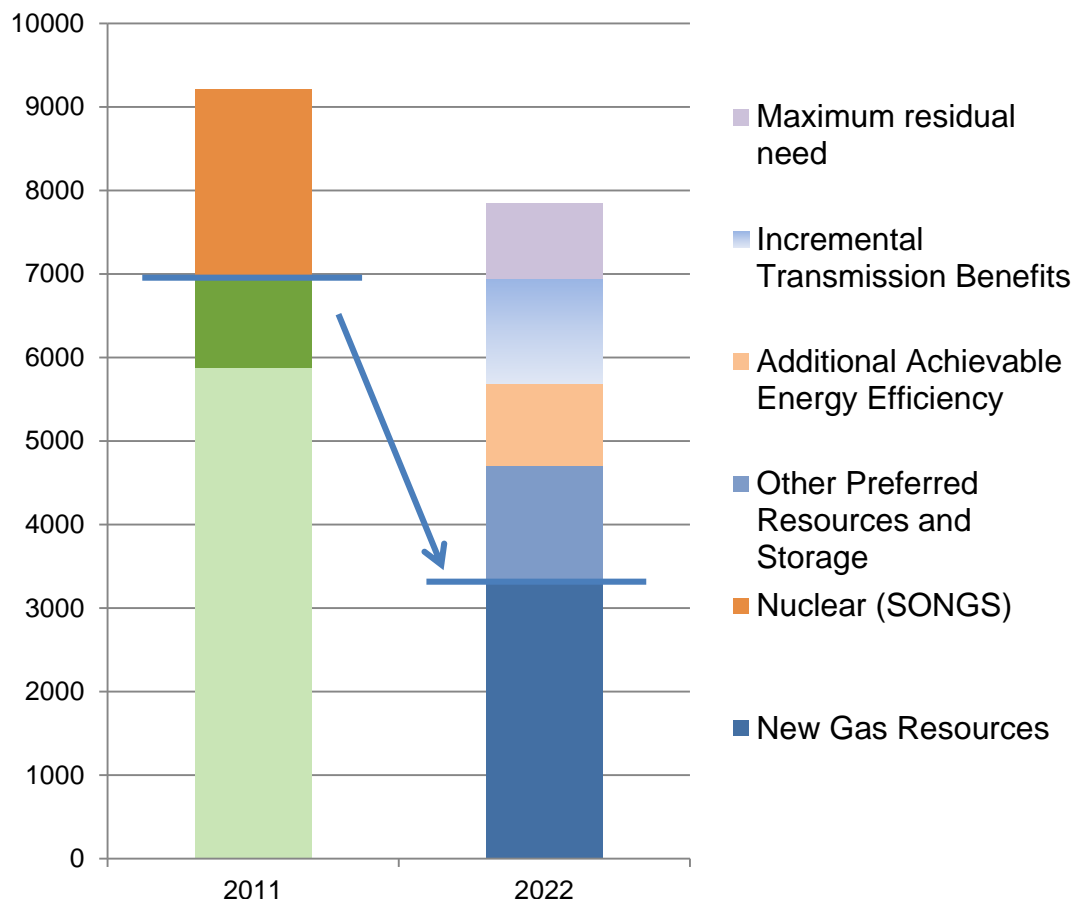
The ISO “regional” annual transmission planning process results in approval of necessary projects each March.



The ISO planning process considers all aspects of transmission system needs:



Less than half of the gas-fired generation retiring in the LA Basin / San Diego area is being replaced with new gas generation – despite 3,000 MW of projected net load growth* and SONGS retirement.



New Gas Generation

Walnut Creek	500
El Segundo Energy Center	550
Track 1 SCE - LA Basin Request	1200
Track 4 SCE - LA Basin (gas)	200
Track 1 SDG&E (Pio Pico/Escondido)	308
Track 4 SDG&E Request	550
Total	3308

Gas Retirements (2011-2022)

Encina	946
El Segundo #3	335
El Segundo #4	335
Alamitos	2011
Huntington Beach	904
Redondo	1342
Etiwanda	640
Long Beach	260
Cabrillo Power II	188
Total	6961

* The 2012 net load forecast growth in the LA Basin and San Diego already relies on approximately 2400 MW of incremental energy efficiency from approved programs and standards.

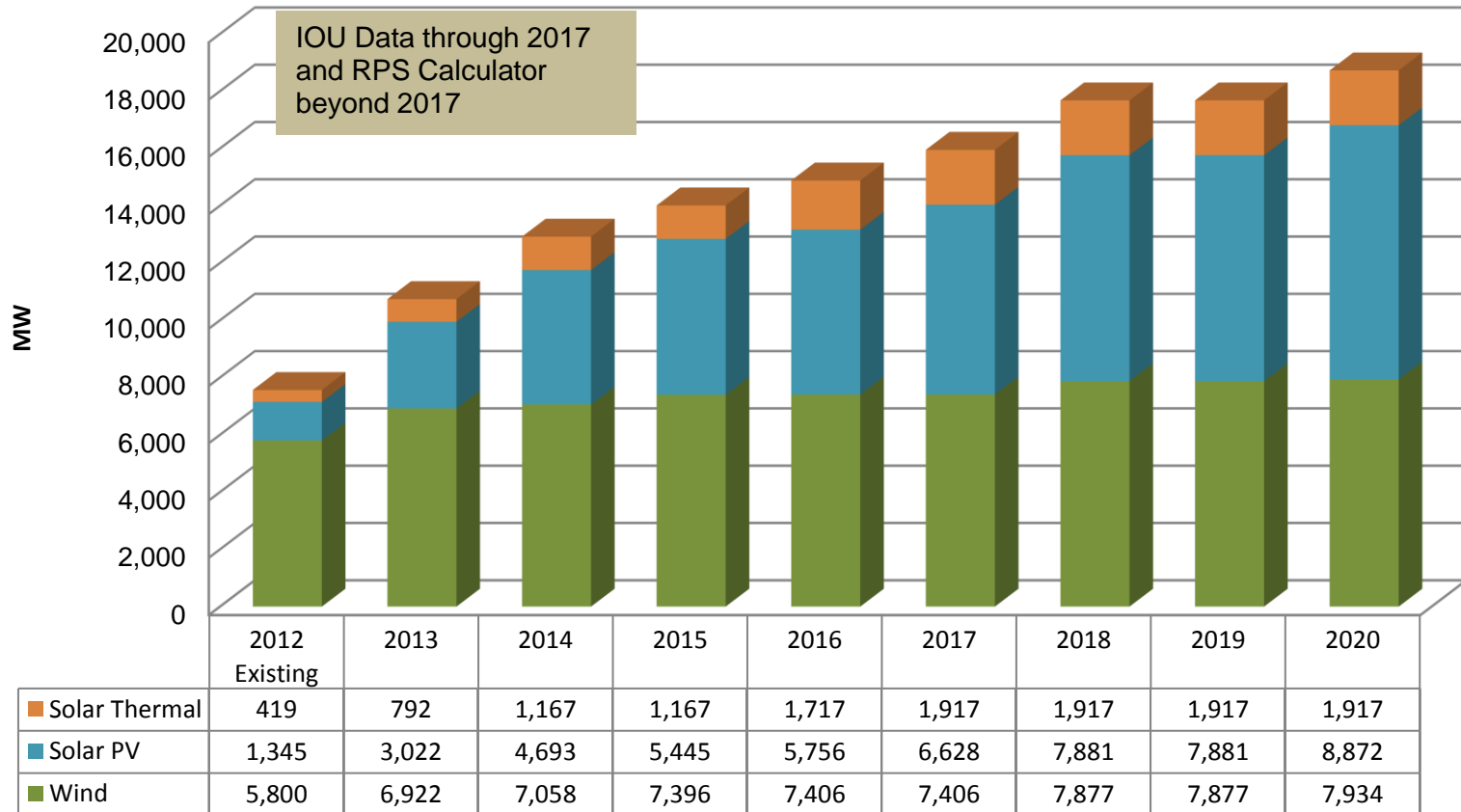
Transmission underway to meet 33% RPS in 2020



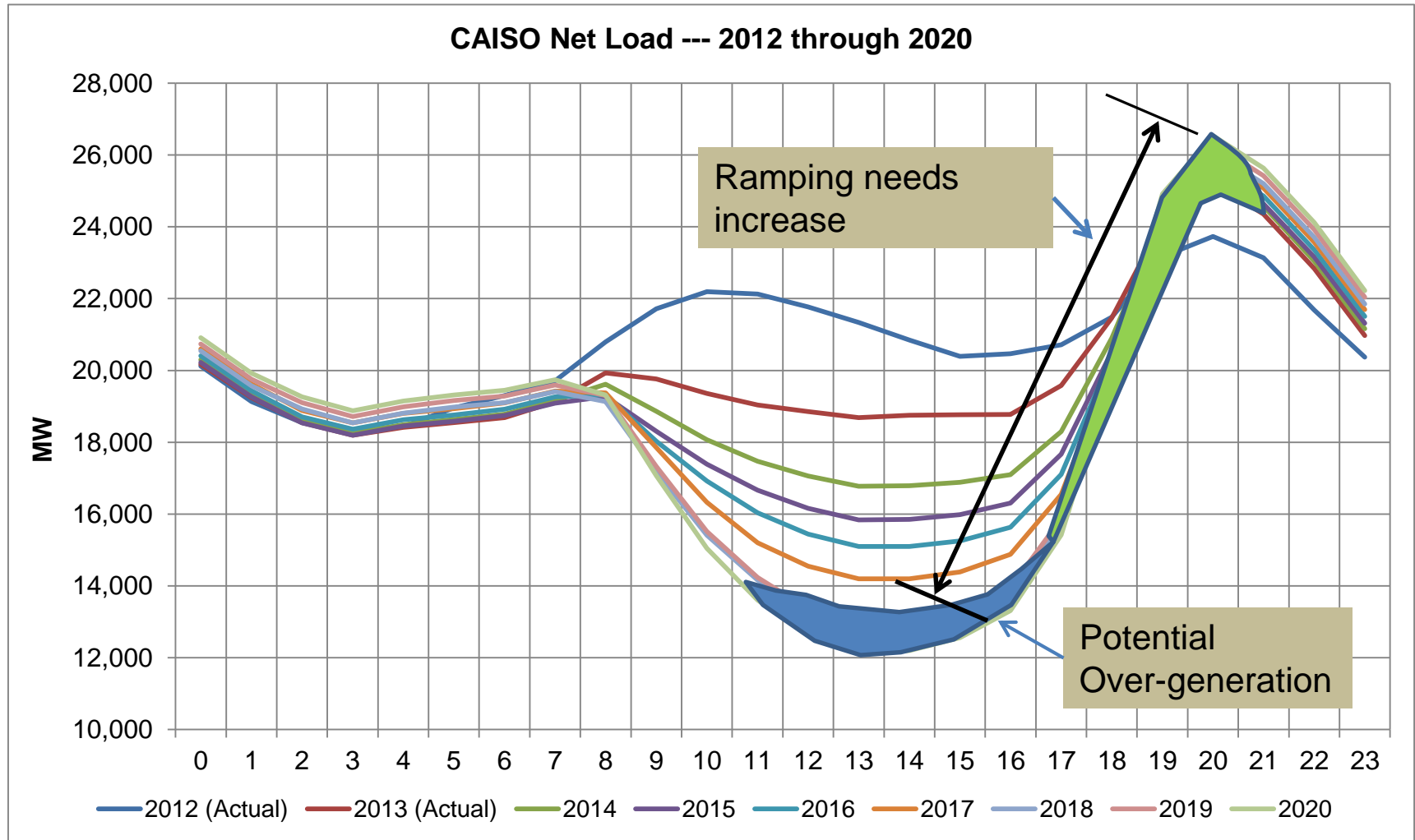
Transmission upgrade	Approval status		Online
	ISO	CPUC	
1 Carrizo-Midway	LGIA	NOC effective	energized
Sunrise Powerlink	Approved	Approved	energized
2 Suncrest dynamic reactive	Approved	Approval not required	2017
3 Eldorado-Ivanpah	LGIA	Approved	energized
4 Valley-Colorado River	Approved	Approved	energized
5 West of Devers	LGIA	Pending	2019
6 Tehachapi (segments 1, 2 & 3a of 11 completed)	Approved	Approved	2015
7 Cool Water-Lugo	LGIA	Pending	2018
8 South Contra Costa	LGIA	Not yet filed	2015
9 Borden-Gregg	LGIA	Not yet filed	2015
10 Path 42 reconductoring	Approved	Approval not required	2014
Imperial Valley C Station	Approved	Approval not required	2015
11 Sycamore-Penasquitos	Approved	Not yet filed	2017
12 Lugo-Eldorado line reroute	Approved	Not yet filed	2015
13 Lugo-Eldorado and Lugo-Mohave series caps	Approved	Approval not required	2016
14 Warnerville-Bellota recon.	Approved	Not yet filed	2017
15 Wilson-Le Grand recon	Approved	Not yet filed	2020

Future Challenge – impact of 33% Renewable Portfolio Standard build-out through 2020

33% RPS --- Variable Resources Expected Build-out Through 2020



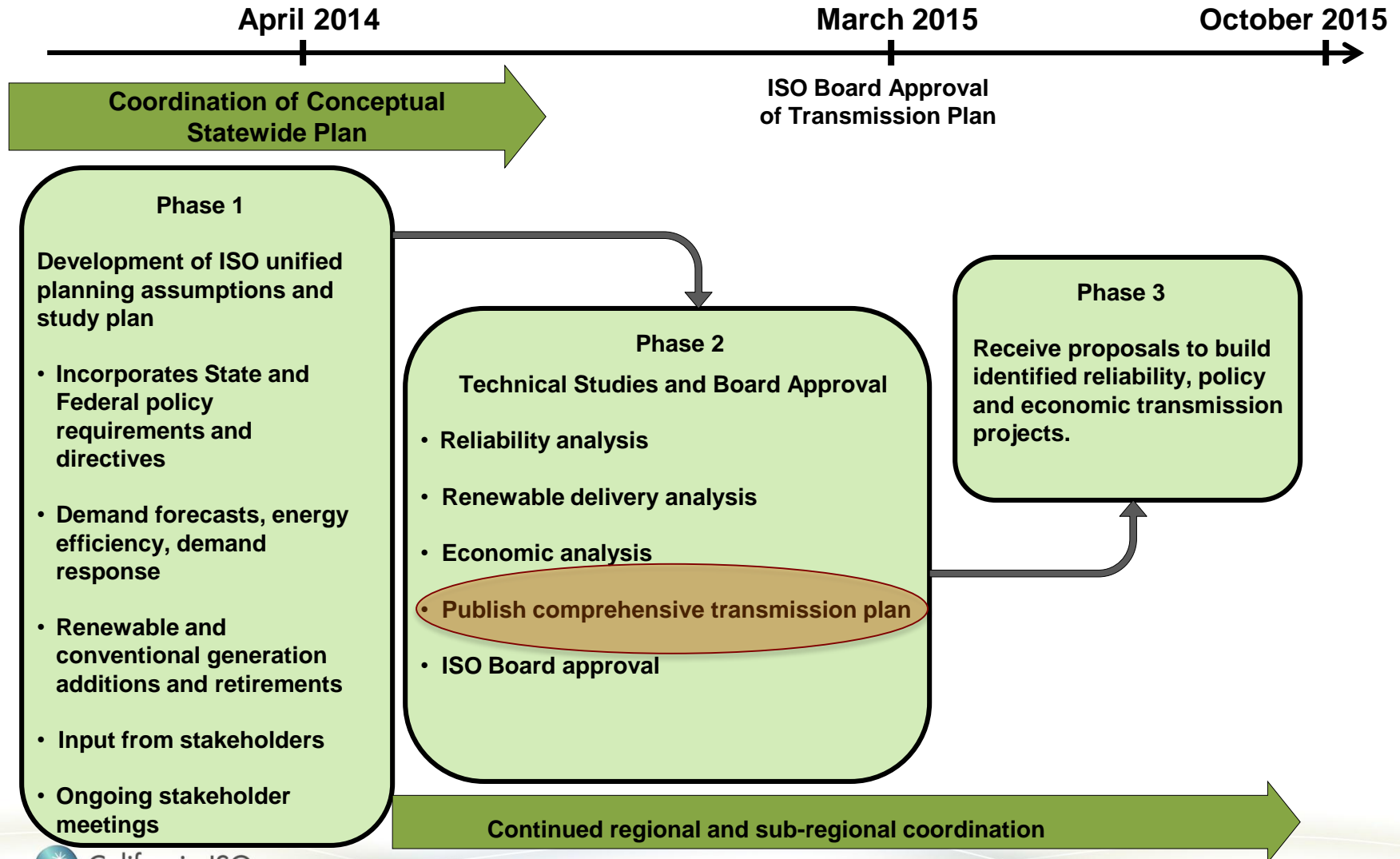
New tools and new approaches will be needed to address potential over generation and ramping challenges



The 2014-2015 planning cycle has been challenging:

- Further enhancements to the coordination with state energy agencies
- Continued emphasis on preferred resources, and increased maturity of study processes
- Continued analysis and contingency planning in the LA Basin and San Diego area
- Restoration of deliverability in Imperial area to pre-SONGS retirement levels
- Sensitivity analysis of Imperial area deliverability and the interaction with LA Basin/San Diego reliability needs.
- San Francisco Peninsula extreme event analysis
- “Over Generation” frequency response assessment
- Finalizing projects in the 2013-2014 cycle requiring further study :
 - Delany-Colorado River
 - Harry Allen –Eldorado (2013-2014 further study)

Phase 2 of the 2014-2015 transmission planning cycle is nearing completion



Summary of Needed Reliability Driven Transmission Projects

Service Territory	Number of Projects	Cost (in millions)
Pacific Gas & Electric (PG&E)	2	\$254
Southern California Edison Co. (SCE)	1	\$5
San Diego Gas & Electric Co. (SDG&E)	4	\$93
Valley Electric Association (VEA)	0	0
Total	7	\$352

Policy and Economic driven solutions:

- There were no policy-driven solutions identified
- One economically driven element has been identified:
 - Lodi-Eight Mile 230 kV Line
- Note that the Harry Allen-Eldorado and Delaney-Colorado River Projects were approved during 2014 based on further study in the 2013-2014 planning process

The CAISO's 2015-2016 transmission planning process is currently underway

- 2015-2016 Transmission Planning Process Unified Planning Assumptions and Study Plan is currently posted for stakeholder review
 - Comment period is February 23 – March 9
- Study plan will be finalized on March 31
- Study plan can be found at:

<http://www.caiso.com/Documents/StakeholderInputfor2015-2016UnifiedPlanningAssumptions.htm>

Governor Brown's announcement of a 50% renewable energy goal for California:

- The 50% renewable energy goal target date is 2030
- Considerable detail about the goal and how it will be assessed remains to be resolved
- It is not yet a formal state approved policy requirement, so in accordance with the ISO tariff, the ISO cannot use it as a basis for approving policy-driven transmission
- The ISO and the state energy agencies want to explore informational analysis to understand potential transmission implications of increased grid connected renewable generation – to the extent the goal ultimately calls for such generation

The ISO is therefore coordinating with the CPUC to perform a special study in the 2015-2016 TPP:

- The special study will:
 - be for information purposes only - will not be used to support a need for policy-driven transmission in the 2015-2016 planning cycle;
 - provide information regarding the potential need for public policy-driven transmission additions or upgrades to support a state 50% renewable energy goal; and
 - will help inform the state's procurement processes about the cost impacts of achieving 50% renewable energy goal
- The CPUC raised this study and discussed underlying issues in the recent February 10th and 11th RPS Calculator workshop

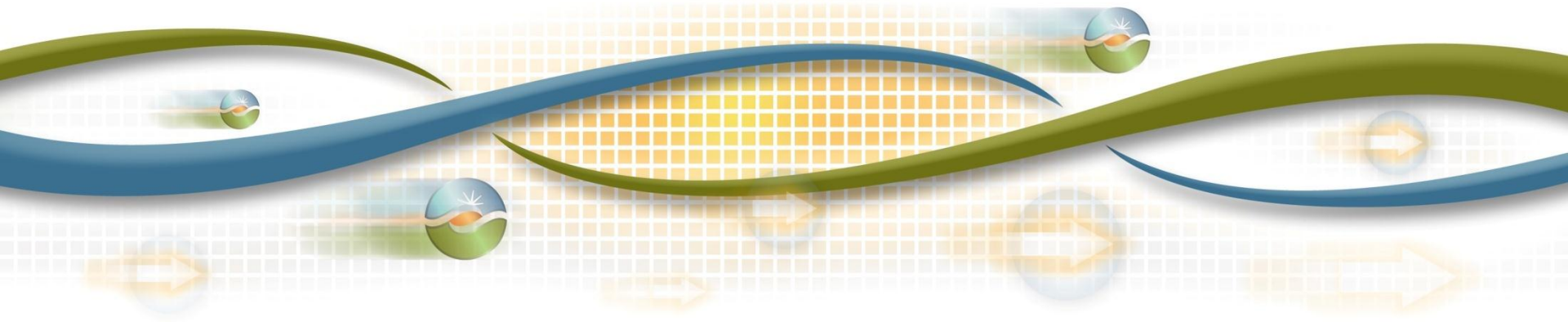
The Special Study will build on the 33% RPS work, but explore different approaches:

- Purely as a “boundary” study assumption, the ISO anticipates receiving a sensitivity portfolio based on a 50% RPS
- Transmission needs for 33% RPS have been based on providing full capacity deliverability status, which reduced but did not preclude possible curtailment
- In going beyond 33%, the special study will explore a new approach and assume the incremental renewable generation to be energy-only.
 - The study will estimate the expected amount of congestion-related curtailment of renewables that would likely result.
 - The study will also consider what transmission could then be rationalized based on cost effectively reducing renewables curtailment (from a customer perspective)

Thank you

Neil Millar
Executive Director
California ISO

February 26, 2015





ColumbiaGrid Planning Updates

Western Planning Region Meeting

February 26, 2015

Topics

- 2014 Planning Cycle
 - Completion of 2015 Biennial Plan
- 2015 Planning Cycle
 - Starting of a new planning cycle under PEFA/Order 1000 compliance

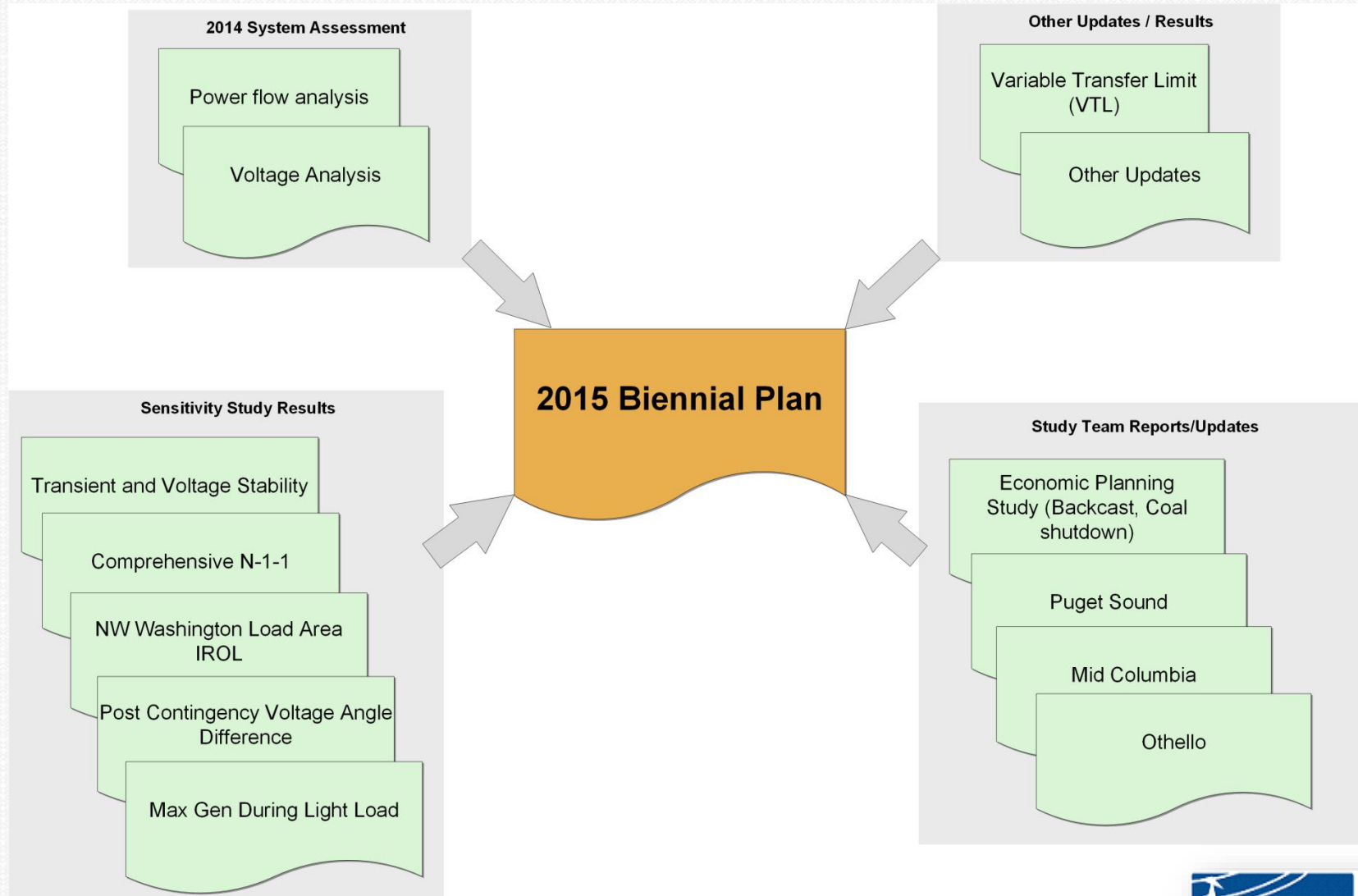
2014 Planning Cycle: Status

- Main product: ColumbiaGrid 2015 Biennial Plan
 - Results from activities in 2014
 - Include more than 50 new projects with the total costs more than \$2.5B
 - Developed through open, coordinated process
- The plan was adopted by the board on Feb 18, 2015
- The final 2015 Biennial Plan is available at:
<http://www.columbiagrid.org/planning-expansion-overview.cfm>

2014 Planning Cycle: Timeline

- **2015 Biennial Plan Development timeline**
 - Jul 3, 2014: 2014 System Assessment (SA) finalized
 - Aug–Oct 2014: Staff conducted Sensitivity Studies
 - Sep 16, 2014: Planning meeting
 - Oct 16, 2014: Planning meeting
 - Nov 2014: Staff issued 1st draft 2015 Biennial Plan
 - Dec 4, 2014: Planning meeting
 - Dec 23, 2014: Draft 2015 Biennial Plan posted
 - Feb 5, 2015: Discussion/Updates in Planning Meeting
 - Feb 18, 2015: Biennial Plan finalized

2014 Planning Cycle: 2015 Biennial Plan



2014 Planning cycle: Biennial Plan components

- **System Assessment Studies**
 - Power flow, voltage excursion, and stability analyses
 - Evaluate impacts on the grid 115 kV and above
 - 10 years planning horizon, 8 scenarios

Scenario	Descriptions
1	2015 Heavy Summer
2	2015-2016 Heavy Winter
3	2015 Light Summer
4	2019 Heavy Summer
5	2019-2020 Heavy Winter
6	2022 Light Autumn
7	2024 Heavy Summer
8	2023-2024 Heavy Winter

2014 Planning cycle: Biennial Plan components

- **System Assessment Studies (Cont)**
 - 17 areas of concerns (non-single system) were identified (14 recurring and 3 new)
 - Thermal overloads and voltage issues
 - Mitigation plans were also evaluated
 - Will be reevaluated again as part of 2015 System Assessment

2014 Planning cycle: Biennial Plan components

- **Sensitivity Studies**
 - Transient and Voltage Stability
 - Comprehensive N-1-1 Outages: Use new feature (linear analysis) as screening tool
 - NW Washington Load Area Interconnection Reliability Operating Limit (IROL): Review the identified limits
 - Post Contingency Voltage Angle Difference: Evaluate potential reclosing problems
 - Maximum Generation During Light Load Conditions: Follow-up issued identified in 2014 SA

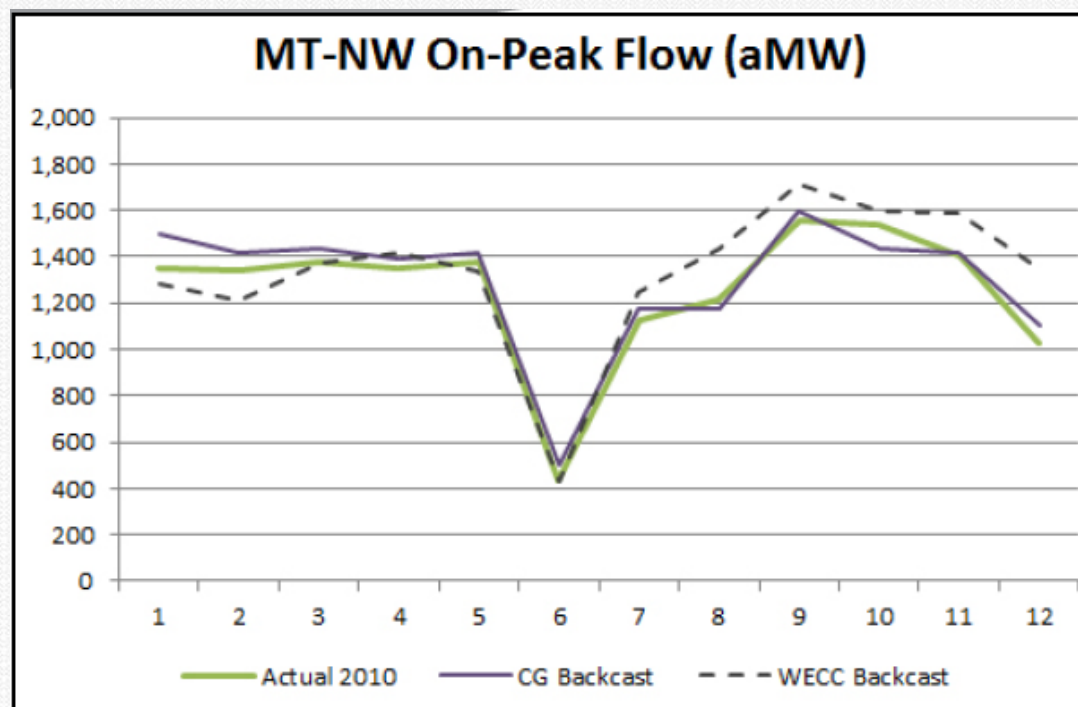
2014 Planning cycle: Biennial Plan components

- **Study Team Reports/Updates**
 - Puget Sound: Identified 8 projects to effectively accommodate South to North and North to South transfers
 - Mid Columbia: Determine plan of service, perform cost allocation to resolve issues in Mid C area
 - Othello Areas: New and ongoing

2014 Planning cycle: Biennial Plan components

- Study Team Reports/Updates (Cont)
 - Economic Planning Studies (EPS): Two rounds of studies

EPS Round 1 study: Example of Backcast results



2014 Planning cycle: Biennial Plan components

EPS Round 2 study: Summary of Study Scenarios

Base Case	Centralia	No of SEA	Stanfield
Centralia Opt 1	1,320	0	0
Centralia Opt 2	990	330	0
Centralia Opt 3	660	0	660

Sensitivity	Centralia	No of SEA	Stanfield
Colstrip Opt 1	1,650	0	330
Colstrip Opt 2	990	660	330
Colstrip Opt 3	660	0	1,320
MT Wind Opt 2	990	660	330
MT Wind Opt 3	660	0	1,320

For more details of EPS: <http://www.columbiagrid.org/CGEPS-documents.cfm>

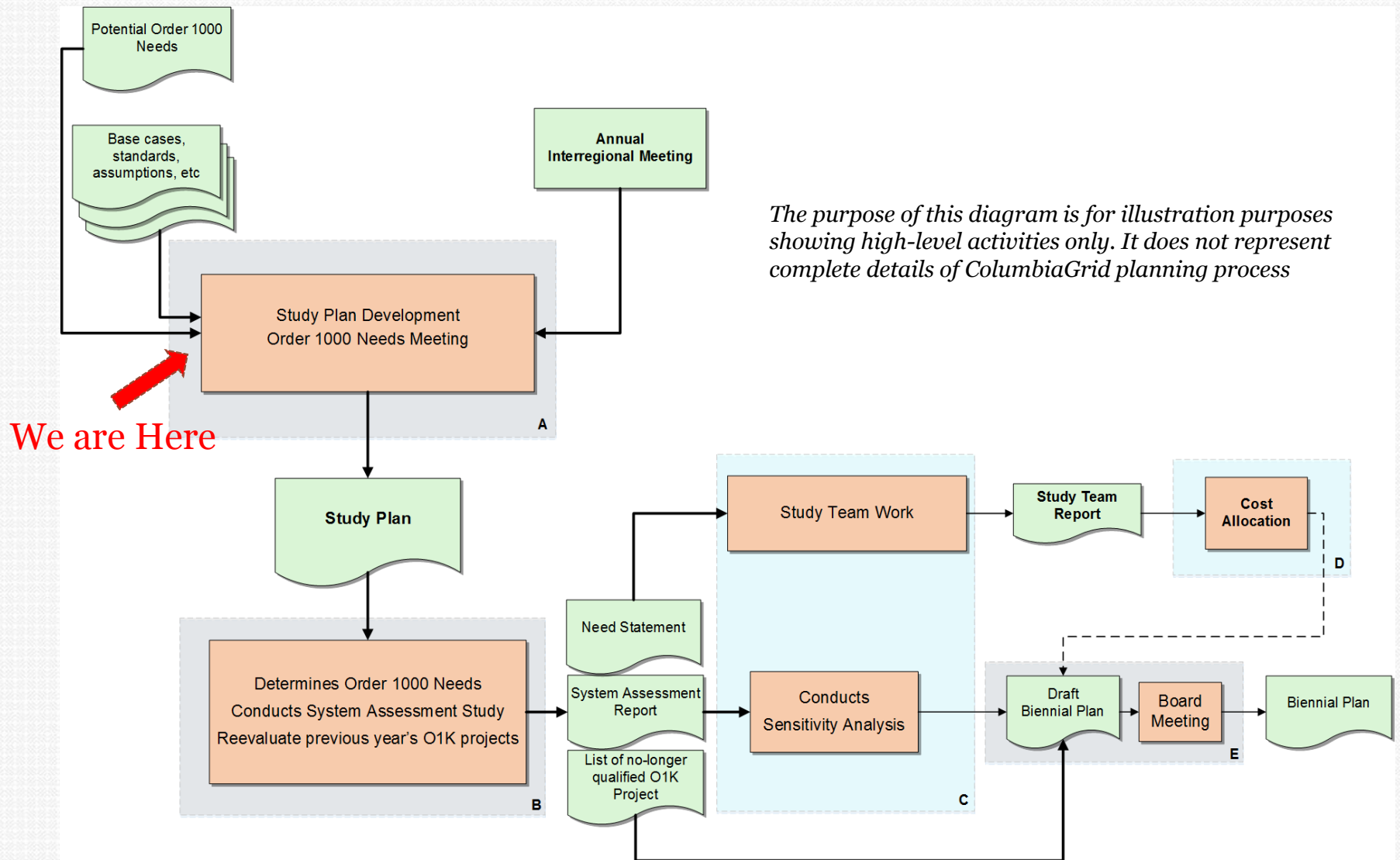
2014 Planning cycle: Biennial Plan components

- **Other Updates**
 - Regional Activities, etc.
- **Variable Transfer Limits (VTL)**
 - Currently focus on California Oregon Intertie (COI)
 - Evaluate system capability to handle fluctuation
 - Studies performed using hourly State Estimator cases
 - Determined by the lowest of 3 major factors
 - Customer impacts: Voltage change
 - Equipment impacts: RAS operation capability
 - Reliability impacts: Reliability limits

2015 Planning Cycle

- ColumbiaGrid has started a new Planning Cycle
 - Compliance with Order 1000 requirements
 - Single process, combined PEFA/Order 1000 (O1K)
- Currently, we're in the first stage of the process
 - Collect input and ideas
 - Develop the study plan
- First meeting was held on Feb 5, 2015
 - “Planning/Order 1000 Needs” - Public Meeting
 - Planning-related discussion & information session

2015 Planning Cycle: Process Overview



2015 Planning Cycle: Key Activities

- 2015 System Assessment
 - Reliability Assessment (power flow, stability)
- Economic Planning Study
- Study Teams Activities
- Sensitivity Studies
 - Scope being discussed, in brainstorm sessions
 - Normally start in August
- Order 1000-related activities

2015 Planning Cycle: System Assessment

- Annual studies
 - Focus on reliability
 - Normally conducted between March - June
- Draft Study Plan is available on CG's website (<http://www.columbiagrid.org/event-details.cfm?EventID=995&fromcalendar=1>)
 - Lots of discussion during the Feb 5 meeting
- Final Study Plan will be finalized in March

2015 Planning Cycle: Study Team Works

- **Ongoing Study Teams**
 - Puget Sound
 - Northern Mid Columbia
 - Economic Planning Study
 - Othello (recently formed)
- **New Study Team**
 - Mid C VAR Loop Flow

2015 Planning Cycle: Sensitivity Studies

- To be conducted after the completion of SA
 - Approximately between July - October
- Continue brainstorm the study scope
 - Regular discussion in planning meeting
 - Transient Stability, different study scenarios, uses of PCM etc.
- More discussion will continue

2015 Planning Cycle: Major Milestones

- **Major Milestones**

- Planning / Order 1000 Needs Meeting Feb 5
- Order 1000 Interregional Meeting Feb 26
- Final Study Plan March
- Draft System Assessment Report & Need Statement June- July
- Final System Assessment Report & Need Statement July-August
- Study Team Work & Cost Allocation TBD
- Draft Biennial Plan (Update) December
- Final Biennial Plan February 2015
- Planning meetings Every 2 months (approx.)



Question:

Paul Didsayabutra, paul@columbiagrid.org



California ISO
Shaping a Renewed Future



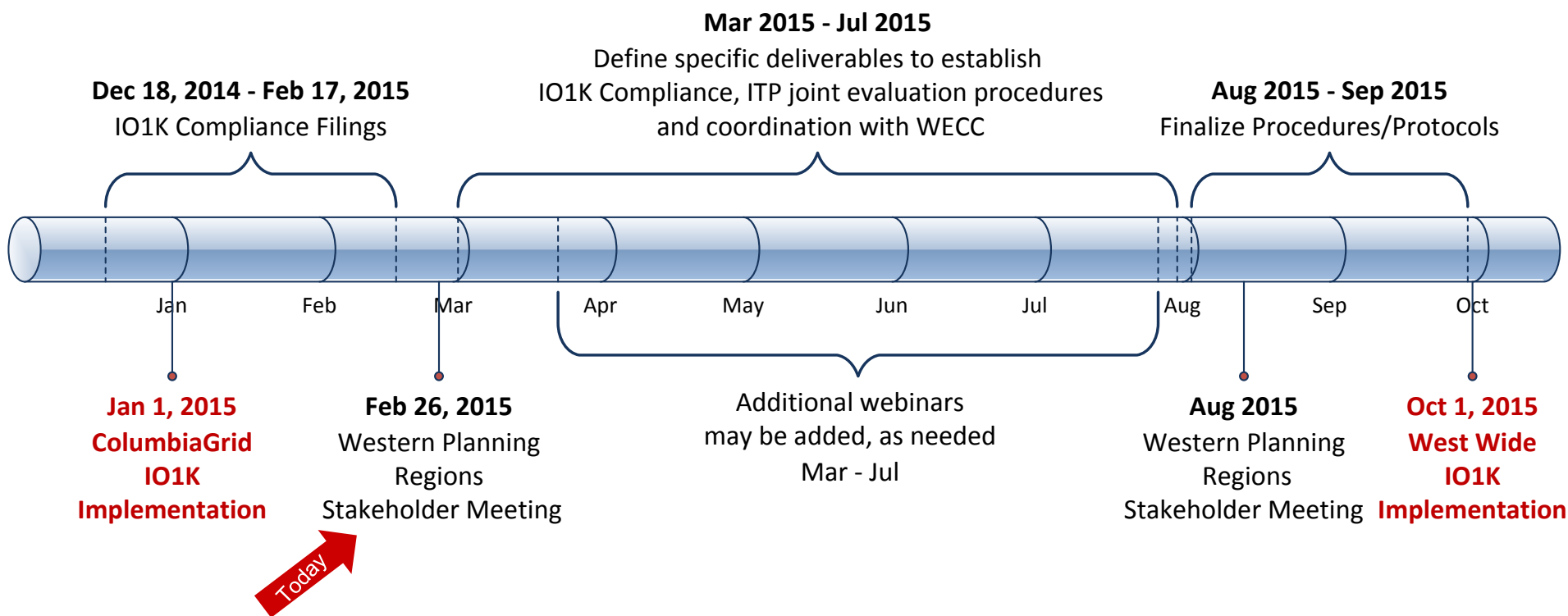
WEST
CONNECT

Western Planning Regions Coordination

Discussion of Interregional Coordination Procedures and Options

February 26, 2015

Interregional Order No. 1000 Implementation and Stakeholder Input



Order No. 1000 Fundamental Requirements

1. A process to coordinate and share the results of each region's regional transmission plans to identify possible interregional transmission facilities that could address regional transmission needs more efficiently or cost effectively than separate regional transmission facilities
2. A formal procedure to identify and jointly evaluate transmission facilities that are proposed to be located in both transmission planning regions
3. An agreement to exchange, at least annually, planning data and information
4. A website or e-mail list for the communication of information related to the coordinated planning process

Interregional Coordination Opportunities

- Annual Interregional Coordination Meeting
- Annual Information Exchange
- Ongoing interregional data sharing at discrete points in each Regional process
- Additional coordination meetings, as needed
- Joint Evaluation of Interregional Transmission Projects (“ITPs”)

Annual Interregional Coordination Meetings

- Generally held in February
- Host Region will be responsible for meeting facilitation, proposed meeting format, and meeting notes
 - Regions will work collectively to develop all meeting material
- Open stakeholder meeting
- Topics may include:
 - Annual Interregional Information
 - Identification and preliminary discussion of interregional and conceptual solutions that may meet transmission needs in two or more Planning Regions more cost effectively or efficiently
 - Status updates of ITPs being evaluated or previously included in a Region's regional transmission plan

Annual Interregional Information (1/2)

- Information will be exchanged as provided by the regional processes
- Planning regions will exchange information throughout their established planning processes on an annual basis
- The most current Annual Interregional Information will be provided to stakeholders at least one week prior to the Annual Interregional Coordination Meeting
- Examples of information
 - Study plan (e.g., identification of base cases, study assumptions and study methodologies)
 - Initial study reports (or system assessments)
 - Previous year's Regional Transmission Plan
 - Previously identified or potential new ITPs

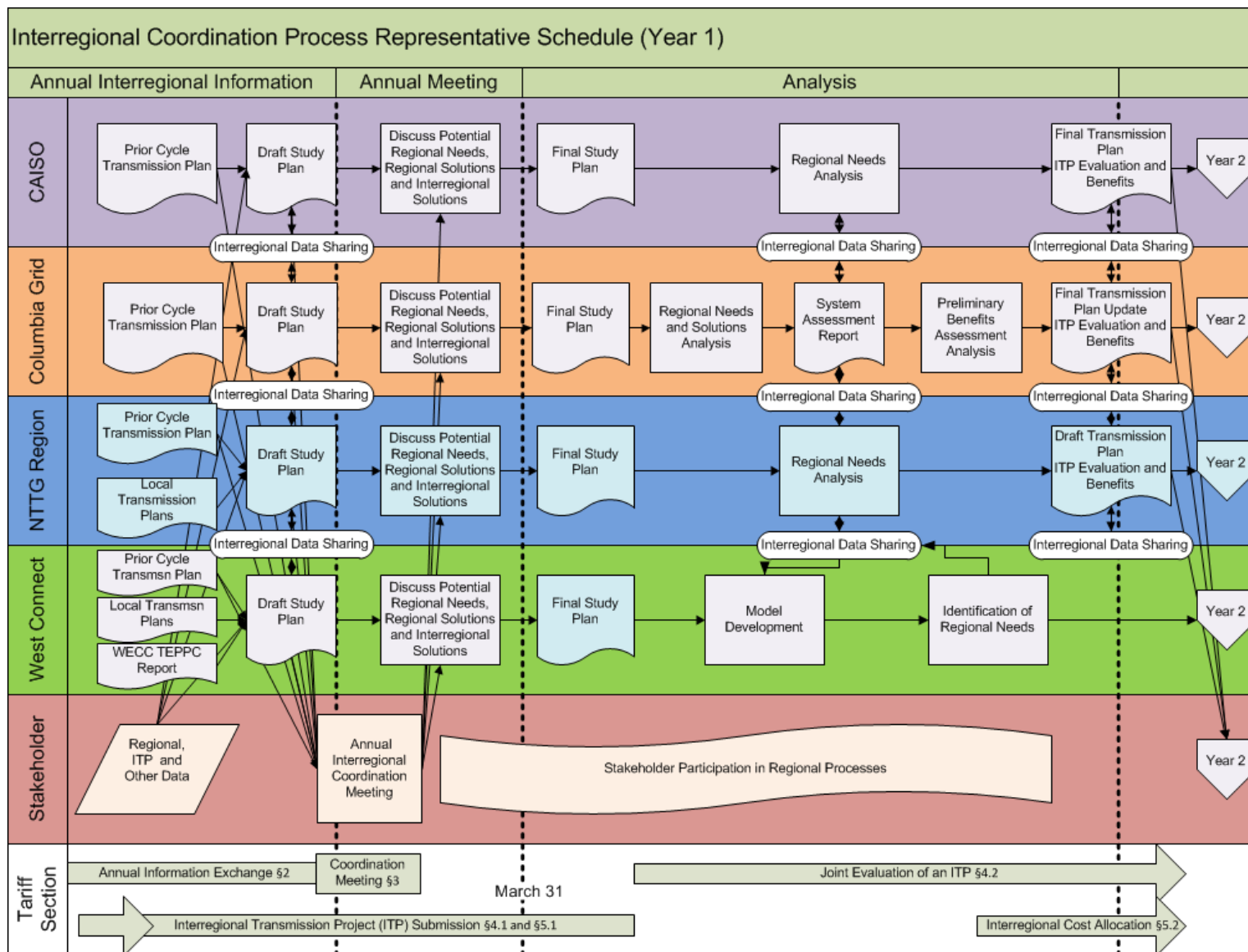
Annual Interregional Information (2/2)

- Opportunities for interregional data sharing exist throughout the year
- Data sharing will occur at discrete points during the individual planning processes
 - Based on the regional process milestones and timelines
 - It may be possible to establish a collective milestone/timeline schedule
- Stakeholder input is desired

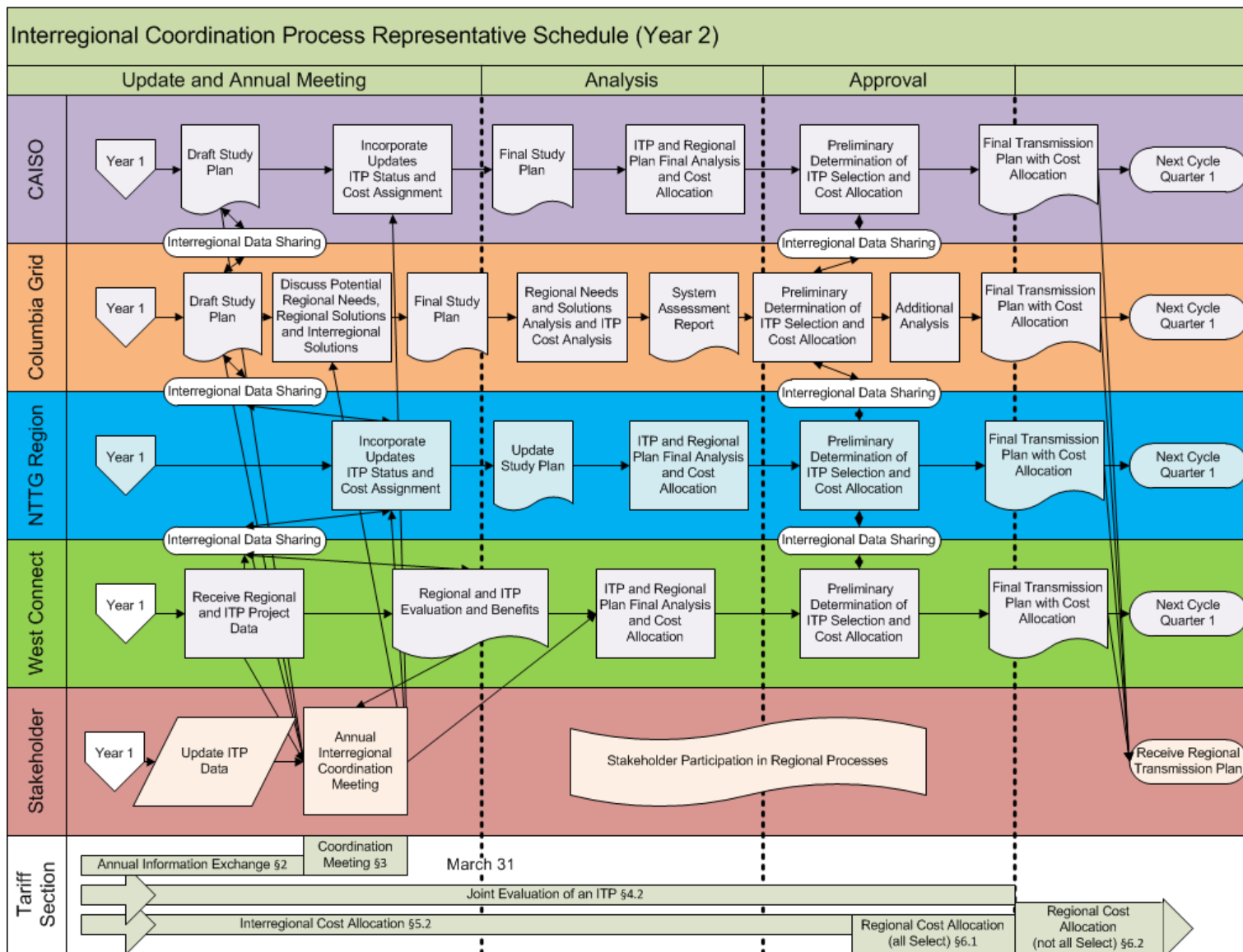
Interregional Data Sharing Occurs at Discrete Points in Time

- Development of Regional Study Plans
- Collecting of modeling data
 - Development of base case definitions
- Results from initial modeling runs
- Identification of regional needs
- ITP submittals
- Regional and ITP project evaluations
- Initial cost allocation results
- Draft Regional Plans

Year 1 Swim Lanes



Year 2 Swim Lanes



Data Sharing Options

- A. Send/post notice of regional planning activity
- B. Option A plus request input from all or Relevant Planning Region(s)
- C. Option B plus schedule all or Relevant Planning Region(s) coordination meeting
- **Stakeholder input is desired**
 - Can Regions individually select amongst options for each regional planning activity?
 - Is there a need for a common Interregional distribution list or website?

Joint Evaluation of Interregional Transmission Projects (ITP) (1/2)

- An ITP proponent may seek to have its ITP jointly evaluated by submitting its ITP into the regional transmission planning of each Relevant Planning Regions (RPR) regional planning process by March 31 of the even numbered calendar years
- A proponent of such ITP may also request Interregional Cost Allocation by requesting such cost allocation from each RPR in accordance with its regional transmission planning process
- RPR are to confer with other RPRs on
 - ITP data and cost
 - Evaluation study assumptions and methodologies

Joint evaluation of Interregional Transmission Projects (ITP) (2/2)

- For each ITP that meets the submission requirements the Relevant Planning Region (RPR) will
 - Seek to resolve any difference with other RPR(s) relating to the ITP or to information specific to other RPRs if these differences affect the study
 - Each RPR will provide stakeholders an opportunity to participate in its activities in accordance its regional transmission planning process
 - Notify other RPRs if ITP will not meet any of its regional transmission needs
 - Determine under its regional transmission planning process if such ITP is a more cost effective or efficient solution to one or more of the regional transmission needs
- Planning regions are working to further define the mechanics of the joint evaluation process



California ISO
Shaping a Renewed Future



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Western Planning Regions Coordination

***Discussion of the
Western Electric Coordinating Council's (WECC)
coordination with the Western Planning Regions***

February 26, 2015

Discussion Topics

- Background
- Stakeholder feedback on how regions can implement synergistic, symbiotic, non-duplicative, effective, clear inter-regional “planning”
- Request for Regions to participate in Interconnection wide discussions to clarify duties of WECC, PEAK, WIRAB, Regions

WECC Mission & 4.9 Org Review (1/2)

- WECC's Proposed New Mission: Integrated Reliability Assurance Model (IRAM)
 - Impartial, independent Board & Organization 501(c)4
 - Reliability Analysis & Assessment of the Western Interconnection
 - Independent internal expert analytical staff with integrated analysis & models
 - Business as Usual until 4.9 recommendations
 - Addition of Focus Issue Area Analysis (FIA) with Technical Advisory Groups
 - Short & Long term "Planning" for Reliability

WECC Mission & 4.9 Org Review (2/2)

- Traditional Reliability Entity responsibilities remain
 - Reliability standards & enforcement, compliance
 - Reliability Assessment & Performance Analysis of WI by WECC
 - Subject Area Experts to build & improve physical models of WI
 - Repository for system modeling data & WI base case development
- Up for discussion in 4.9 review:
 - WECC funding and dues
 - Organization structure
 - Overlap on coordinating planning & modeling
 - TEPPC studies, & requirement to produce WI “Plan”
 - Resource Adequacy assessment as Reliability “Challenge”
 - Division of responsibilities between PEAK, WECC, WIRAB, Regions

Regions Responsibilities

- Order 1000 Planning Process
- Regional & Inter-Regional Plans
 - Identify the most efficient or cost effective plan
 - Meet regional transmission needs
- Planning must consider
 - Stakeholder involvement
 - Transparency
 - Efficiency
 - Economics
 - Adequacy
 - Cost Allocation
 - Reliability
 - Public Policy

WECC's Proposal

- Western Interconnection wide reliability
 - Standards & compliance
 - Assessment
 - Analysis
- Planning for reliability
 - Production Cost Model studies to estimate future operation
 - Future scenarios
 - Risk analysis
- Focused issue, area studies

Note: ARRA funding for the following activities has ended

- Interconnection wide “plan”
- TEPPC diverse stakeholder process

WIRAB

- Created by Western Governors under Section 215 of the Federal Power Act to advise WECC, the ERO and FERC on whether proposed reliability standards and the governance and budgets of the ERO and WECC are in the public interest.
 - FERC may request that WIRAB provide advice on other topics.
- Desires independent analysis under WIRAB direction
- Analysis can include:
 - Reliability
 - Production Cost modeling
 - Benchmarking and scenario analysis
- Analysis costs are spread by 501(c)4

Possible Areas of Improvement

- Coordination of data & assumptions with Regions
 - Consistency, transparency, confidentiality, applicability
- Accuracy of data & models
 - Improved mapping & model topology across platforms
- Eliminate duplication, increase efficiency of efforts
 - Avoid unnecessary conflicting results
- Increase usefulness of results & reports
 - Decrease reporting burden
- Timeliness of data preparation & interconnection-wide scenario cases
 - Priority of base case prep and analysis

Possible Symbiosis

- Regions can provide
 - “Common Case” data & assumptions to WECC
 - Rolled up from Local O1K Plans then further developed by Regions & IR
 - “Existing” System with change decks identifying “Plan” projects to create 10 year base
- WECC can provide
 - Interconnection wide base case data sets (PF, Stability, PCM)
 - Rolled up from Region’s cases, combined, validated, tested
 - Data preparation & study timing aligned with Regions tariff Order 1000 requirements
 - Interconnection wide scenario cases
 - Specialized data sets from Subject Area Experts (current membership committees)
 - IHDB, Flex analysis, Risk analysis, Short Circuit

Possible Symbiosis

- Regions can provide:
 - Review and validation of WECC results and changes made to Common Case and assumptions
 - Representation on PCC, TEPPC, MAC (or their successors)
 - Participation in Focused Issue Area Analysis (FIAA) & Technical Review Committees affecting them
 - Analysis of FIAA affecting the Regions

Structure

- Regions assimilate duties (and costs) into present structure & Inter-regional O1K processes
- Regions determine:
 - Structure to form Regional consensus (at periodic O1K meetings, rotating Chairs, etc.)
 - Method to represent the Regions' collation in WECC
- Regions to jointly align and develop processes and timing with WECC to meet Regions' obligations

Summary

- Planning regions continue to discuss implementation of coordination requirements to meet compliance obligations
 - Regions' coordination with WECC
 - Defining specific deliverables that will be needed to implement compliance
 - Further definition of process for Joint Evaluation of ITPs

Stakeholder Comment

- Open discussion