

Evolving Grid

Update on Transmission Activities

May 16, 2024

Rates Hearing Room & Webex



Agenda

Time	Topic	
9:00 to 9:10	Opening Remarks & Safety Moment	Katie Sheckells
9:10 to 10:00	Transmission Business Model 5.0	Richard Shaheen, Jeff Cook & Michelle Manary
10:00 to 10:30	Evolving Grid Project Updates	Erich Orth
10:30 to 10:45 BREAK		
10:45 to 11:15	Maintaining the Grid: Overview of Transmission's Sustain Program	Jana Jusupovic
11:15 to 11:30	Queue Updates: GI/LLIR/TSR	Kevlyn Baker & Tasha Bryan
11:30 – 12	TSEP Cluster Study Update	Chris Gilbert & Tasha Bryan
12 to 1 LUNCH		
1:00 to 2:00	Bifurcation Process for Transmission Projects	Chris Gilbert
2:00 to 2:15	Regional Study on 2040 Decarbonization Milestones	Dmitry Kosterev
2:15 to 2:45	WestTEC Update	Sarah Edmonds (WPP) & Ravi Aggarwal
2:45 to 3	Closing Remarks & Next Steps	Katie Sheckells
End of Meeting		

The Objective of BPA's Evolving Grid Initiative

A variety of factors are creating a need for a transformational shift in the Transmission industry. Bonneville Transmission wants to raise awareness of recent efforts and initiatives, those underway and yet to come, and what customers and the region can expect in the future as we navigate the changing landscape.



Transmission Business Model

The Power of Change



Transmission Business Model 5.0

**Strategic
Connections**



Transmission's
Value

Long-Term
Sustainability

Infrastructure

Products and
Services

WELCOME!

Transmission Business Model 5.0

**Strategic
Connections**



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WE ENERGIZE THE PACIFIC NORTHWEST

Transmission Value Proposition

Operating a High Performing Grid	Enabling Economic Growth in the Region	Providing Access to Federal and Non- Federal Resources And Markets
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Through Excellence

Product Portfolio	Providing standardized options Value-based price profiles Drawing from integrated regional planning
Infrastructure	Advanced situational awareness Right-sized investments in assets Value and risk-based asset management
Long-Term Viability	Integrated and efficient processes Data-driven decision making Innovation and continuous improvement

**A Dependable and
Responsive Business Partner**

Significant Progress Since 2017

Adapting to Evolving Landscapes

Broadening Our Strategic Horizons

Transmission Business Model 5.0

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**Long-Term
Viability** Integrated and efficient processes
Data-driven decision making
Innovation and continuous improvement

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TOGETHER WE ENERGIZE THE PACIFIC NORTHWEST

Transmission Value Proposition

Operating a Safe,
Secure, and High
Performing Grid

Enabling
Economic Growth
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Supporting a Clean
Energy Future and
Evolving Grid

Through Safety and Excellence

**Long-Term
Sustainability** Empower people and value culture
Integrated and efficient processes
Innovation and continuous improvement

Infrastructure Implement operational improvements
Value and risk-based asset management
Advance investments and strengthen resilience

**Products and
Services** Support market evolution
Drive regional planning
Modernize products and services

**A Dependable and Responsive Partner,
Fostering a Safe and Positive Culture**

Transmission Business Model 5.0

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Long-Term Sustainability

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Infrastructure

Implement operational improvements
Value and risk-based asset management
Advance investments and strengthen resilience

Products and Services

Support market evolution
Drive regional planning
Modernize products and services

**A Dependable and Responsive Partner,
Fostering a Safe and Positive Culture**

Our collective mission to energize
and support the Pacific Northwest

Changes you should expect to see

Some things will endure

Transmission Business Model 5.0

**Strategic
Connections**



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**Enabling
Economic Growth
in the Region**

**Supporting a Clean
Energy Future and
Evolving Grid**

- Building resilience for high-impact events
- Enhancing performance and security through a proactive approach to operational excellence
- Underscoring a heightened focus on safety and security in grid operations

- Continue to integrate new resources and market initiatives
- Supporting customers through period of significant regulatory changes

Transmission Business Model 5.0

**Strategic
Connections**



Transmission's
Value

**Long-Term
Sustainability**

Empower people and value culture
Integrated and efficient processes
Innovation and continuous improvement

Long-Term
Sustainability

Infrastructure

Products and
Services

- Focus: Prioritize thriving
- Elevating our commitment to our people, ensuring adaptability in a changing world
- Reframing from maintaining to enhancing operational sustainability

Transmission Business Model 5.0

Strategic Connections



Transmission's Value

Long-Term Sustainability

Infrastructure

Products and Services

Empower People and Value Culture

- Creating a supportive environment where diversity drives innovation and equity is celebrated
- Attracting talent by exemplifying a community known for its inclusive and innovative culture

Required Changes

- Championing a culture of diversity, equity, and inclusion from recruitment through retirement
- Expand applicant outreach efforts

Examples of Success

- Employee retention and development
- Effective flexible policies
- Diverse and inclusive workforce
- Innovation driven by diversity

Transmission Business Model 5.0

**Strategic
Connections**



Transmission's
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Sustainability

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Services

Implement Operational Improvements

- A broader focus on the transmission system's overall efficiency and reliability
- Utilizing advanced tools, analytics to improve operations
- In support of a robust and reliable energy system

Required Changes

- Cybersecurity and incident response capabilities
- Visualization and operational tools to streamline data management

Examples of Success

- Active role with NERC/WECC standards
- Advance cybersecurity incident detection & response
- Visualization and operations automation
- Develop improved generation and load forecasts

Transmission Business Model 5.0

Strategic Connections



Transmission's Value

Long-Term Sustainability

Infrastructure

Products and Services

Advance Investments and Strengthen Resilience

- Enhance transmission's infrastructure to support resource integration and withstand severe events and threats
- Invest in system upgrades that benefit reliability and flexibility

Required Changes

- Cybersecurity resilience
- Infrastructure investment
- Drive economies of scale, taking advantage of flexibility and resilience

Examples of Success

- Improved grid reliability and resilience
- Cybersecurity incident response time
- Infrastructure upgrade completion

Transmission Business Model 5.0

**Strategic
Connections**



Products



Finances



Operations



Systems

Transmission's
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Sustainability

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Products and
Services

Support Market Evolution

- Directly engaging developing markets
- Support customers' transition to renewable energy and policy objectives
- Participate in development of standards

Required Changes

- Continuous value capture
- Coordinated planning
- Market management
- Products and services expansion

Examples of Success

- Revenue focused tools
- Revised pricing schedules

Transmission Business Model 5.0

**Strategic
Connections**



Products



Finances



Operations



Systems



Transmission's
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Modernize Products and Services

- Rapidly changing customer needs require innovative and flexible solutions
- Diverse scheduling and resource mixes
- Collaborative engagement throughout improvement process

Required Changes

- Collaborate with region around sustainability challenges
- Enhanced demand and capacity forecasting capabilities

Examples of Success

- Harmonized customer needs

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Infrastructure

Implement operational improvements
Value and risk-based asset management
Advance investments and strengthen resilience

Products and Services

Support market evolution
Drive regional planning
Modernize products and services

**A Dependable and Responsive Partner,
Fostering a Safe and Positive Culture**

A dependable and
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Questions

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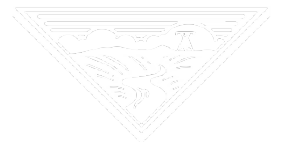
Implement operational improvements
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Products and Services

Support market evolution
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**A Dependable and Responsive Partner,
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Evolving Grid Projects Update



Project

Initiation

Scoping

Design

Construction

Closeout

Next Milestone

Cross-Cascades
North: Multiple
projects



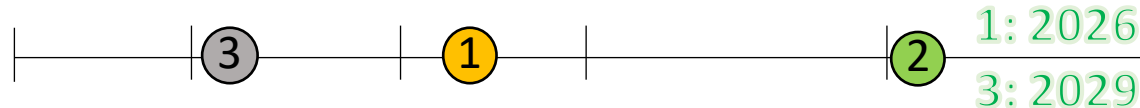
Project is moving into Scoping this quarter.
Estimated energization is 2030.

Cross-Cascades
South: Big Eddy –
Chemawa Rebuild



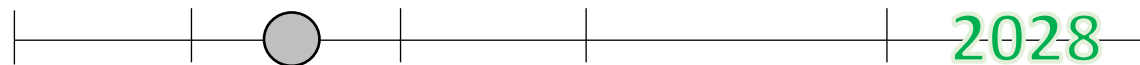
Project is moving into Scoping this quarter.
Estimated energization is 2032.

Portland Area:
Multiple projects



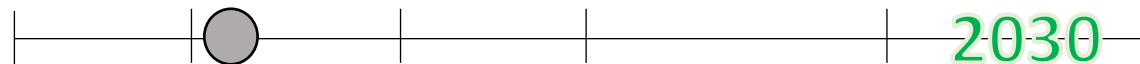
1. Pearl-Sherwood-Mcloughlin: Project is in Design.
Estimated energization is 2026.
2. Keeler-Horizon#2: Project is Energized.
3. Keeler Transformer Addition: Project is in Scoping.
Estimated energization is 2029.

Raver-Paul: 230 kV
Line Upgrade



Project has finished Scoping and starting Design
this quarter. Estimated energization is 2028.

Ross - Rivergate
230 kV Line
Upgrade



Project is moving into Scoping this quarter.
Estimated energization is 2030.

Rock Creek – John
Day 500 kV Line
Upgrade



Project is moving into Scoping this quarter.
Estimated energization is 2030.

Project



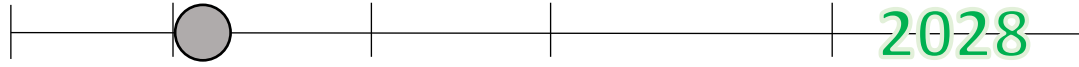
Next Milestone

West of Boardman
500/230 kV Sub



Project is in Scoping. A feasible site has been selected. Longest Lead Material has been placed on order. Estimated energization in 2027.

Bonanza
500/230 kV Sub



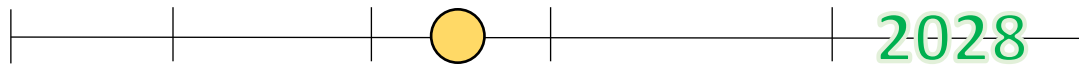
Plan of Service has been completed. Scoping set to kick off this quarter. Estimated energization is 2028.

La Pine – Bonanza
230 kV Line



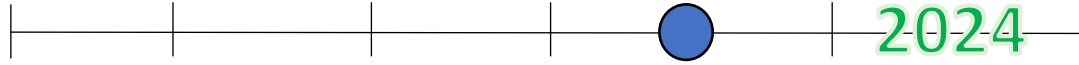
Plan of Service is in development. Estimated energization is 2030.

Buckley Sub
Rebuild



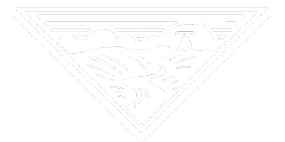
Project is in Design. Estimated energization is 2028.

Longhorn
500/230 kV Sub

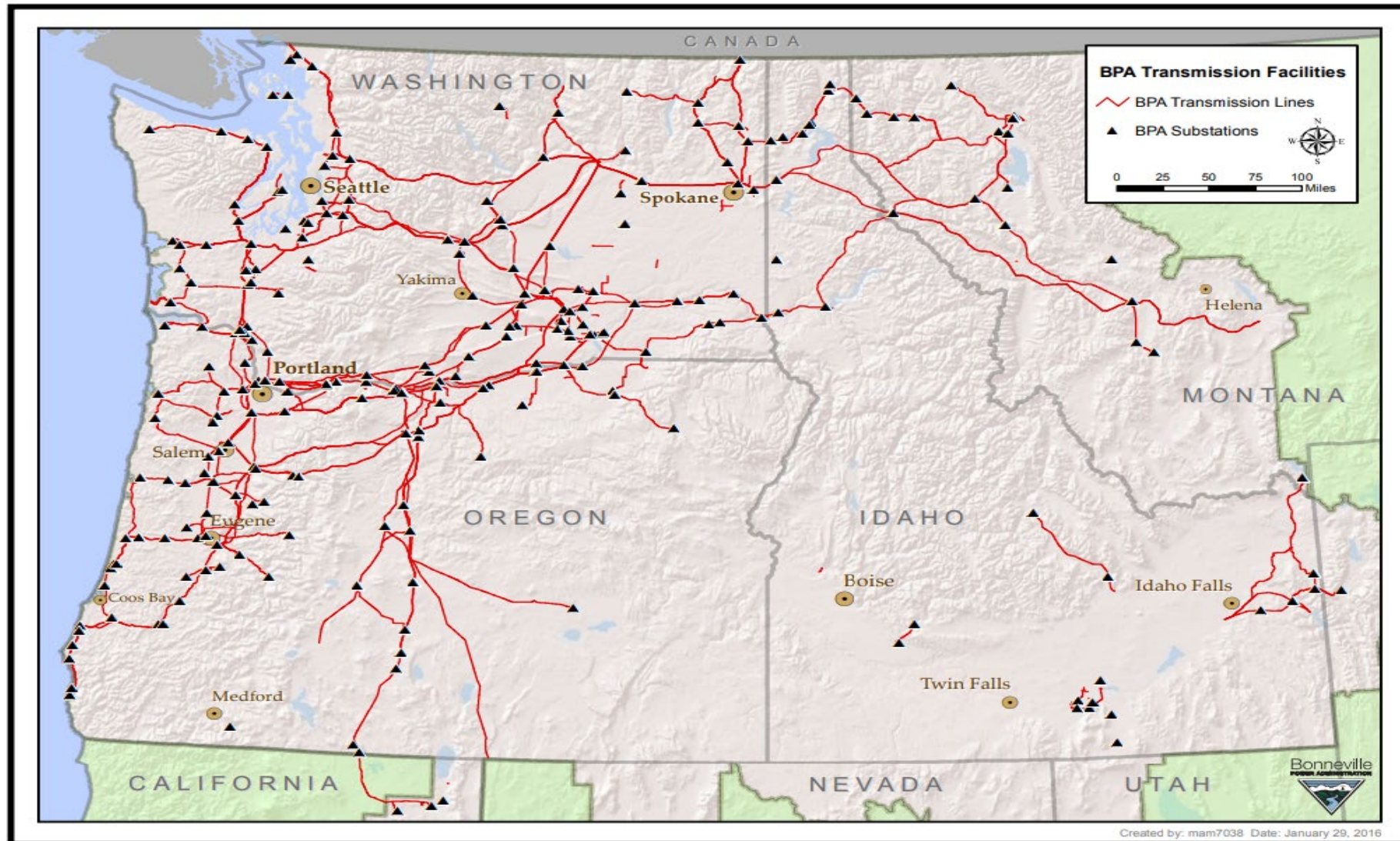


Ongoing construction activities. Initial energization planned for December 2024. Project on track with caution

Maintaining the Transmission Grid



BPA Infrastructure



Strategic Asset Management Overview

- Agency Strategic Goals
 - Mature Asset Management
 - Modernize business systems and procedures
- Transmission Business Model
 - Long term Sustainability
 - Infrastructure
 - Products and Services
- Asset Management Maturity Goals
 1. Asset Data
 2. Asset Management systems
 3. Asset Management processes
 4. Risk-based decision-making framework
 5. Resource Management capabilities

Asset Management Maturity Goals and Teams

AM Maturity Goals

1. Asset Data is effectively managed, accessible and structured to enable effective asset management
2. AM systems are appropriately integrated and relied on to automate and manage core processes
3. AM processes are documented, consistent and efficient.
4. Use standard risk-based decision-making framework to prioritize asset management lifecycle decisions.
5. Transmission's resource management capability is established, documented, and successfully relied on for work delivery.

AM Maturity Teams

1.Data and Systems Governance

- Objective: Transmission has accurate data and IT systems to support effective management of our asset portfolio

2.AM System (Policy, Process & Governance)

- Objective: Documented processes to support effective management of our asset portfolio

3.Decision Support

- Objective: Provide data, tools, and methodologies to support effective decision making.

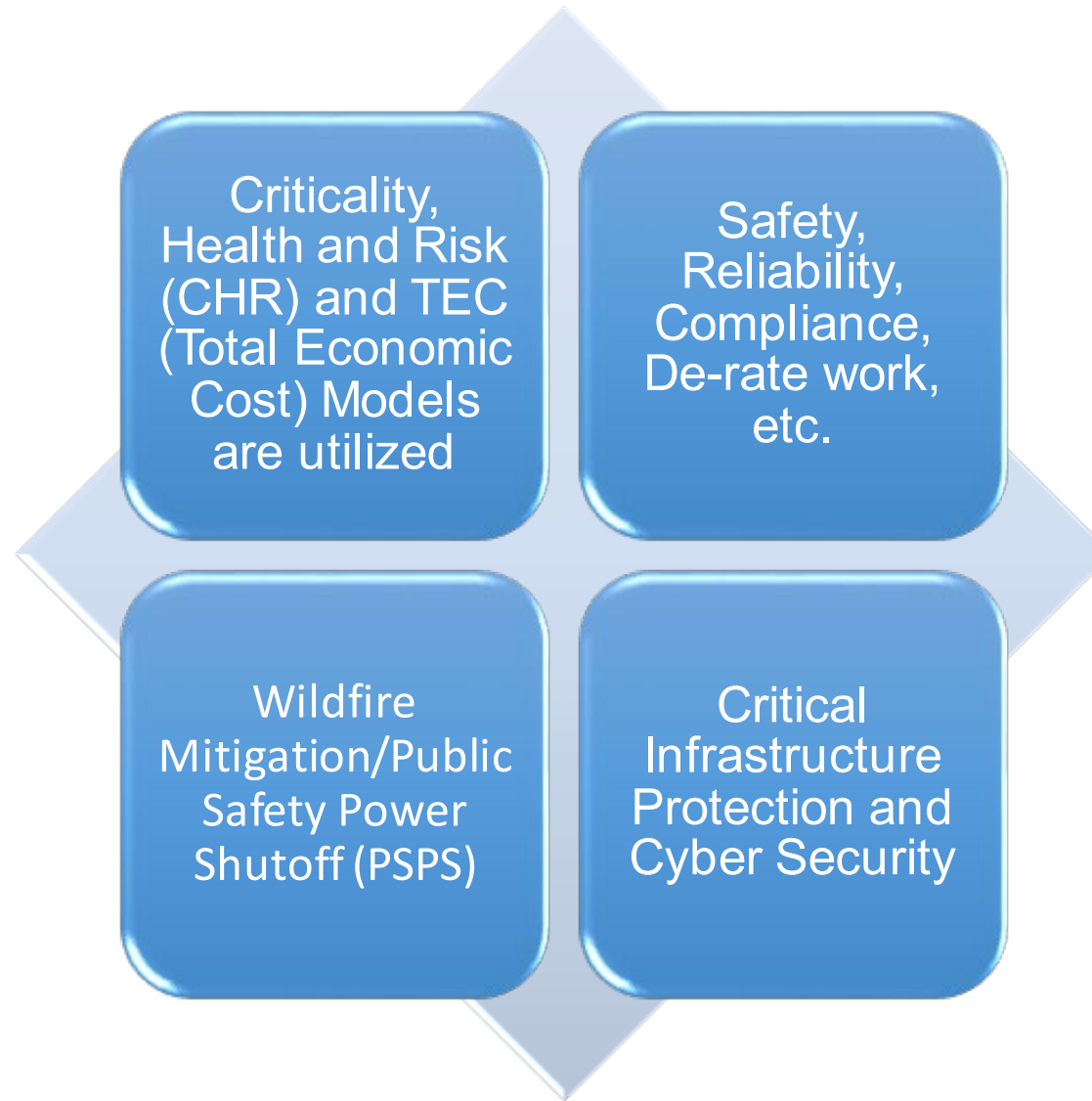
4.Demand Forecasting and Capacity Planning

- Objective: Create accurate demand forecasts to plan our work and support long-term investments to develop the capacity to meet the demand.

T-Asset Categories: Capital Funding

- Sustain
 - Replacement of an asset
- Expand
 - An Investment that upgrades an existing asset or adds a new asset
- Project Funded In Advance (PFIA)
 - Project funded in advance; projects where customers fund and finance projects in return for transmission credits

Prioritization of Sustain work



Demand and Capacity

- The demand on our system
- What has been done thus far to identify the entire demand:
 - Consolidated Operational Technology portfolio with the rest of the T Portfolio
 - Standardized the capital demand (work) and capacity (resources) on one platform, MS Project
- How are we to meet the demand?
 - Standing up another Secondary Capacity Model (SCM)
 - Looking into leveraging existing contracts for small customer work
 - Leveraging internal resources

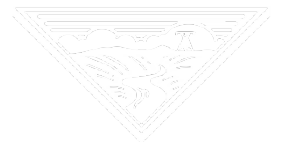
Significant Risks and Mitigation Plans

SIGNIFICANT RISKS	MITIGATION PLAN
Complex environment of aging assets	• Ramp up sustain spending for the next 5 to 10 years • Continue to mature AM capabilities to focus limited resources on most critical replacements • Continue to evaluate opportunities to change practices to maximize resources
Global supply chain issues with materials and resources	• Maintaining more equipment in stock • Developing, standing up and maturing our sparing strategy • Changed existing contracts and added new language into new contracts to allow earlier material procurement efforts for long-lead time items
Talent acquisition/retention	• Hiring additional resources and maximizing available HCM tools to remain competitive
Increase in costs for labor and materials	• Evaluating processes and inventory levels to mitigate for lead times
Increased physical and cyber security attacks	• Increasing cyber security focus to protect networks, discover and prevent changes to devices and protect data from unauthorized access or criminal use • BPA has increased its priority on its security project
EXTERNAL RISKS	MITIGATION PLAN
Regional and Global Impacts	• Build resiliency into system and programming decisions • Respond in a coordinated and collaborative way
Wildfire Risk	• Continue to mature the wildfire mitigation program, including supporting processes, tools and expertise • Continue to work with the cities, states and regionally on wildfire mitigation and preparation

In summary

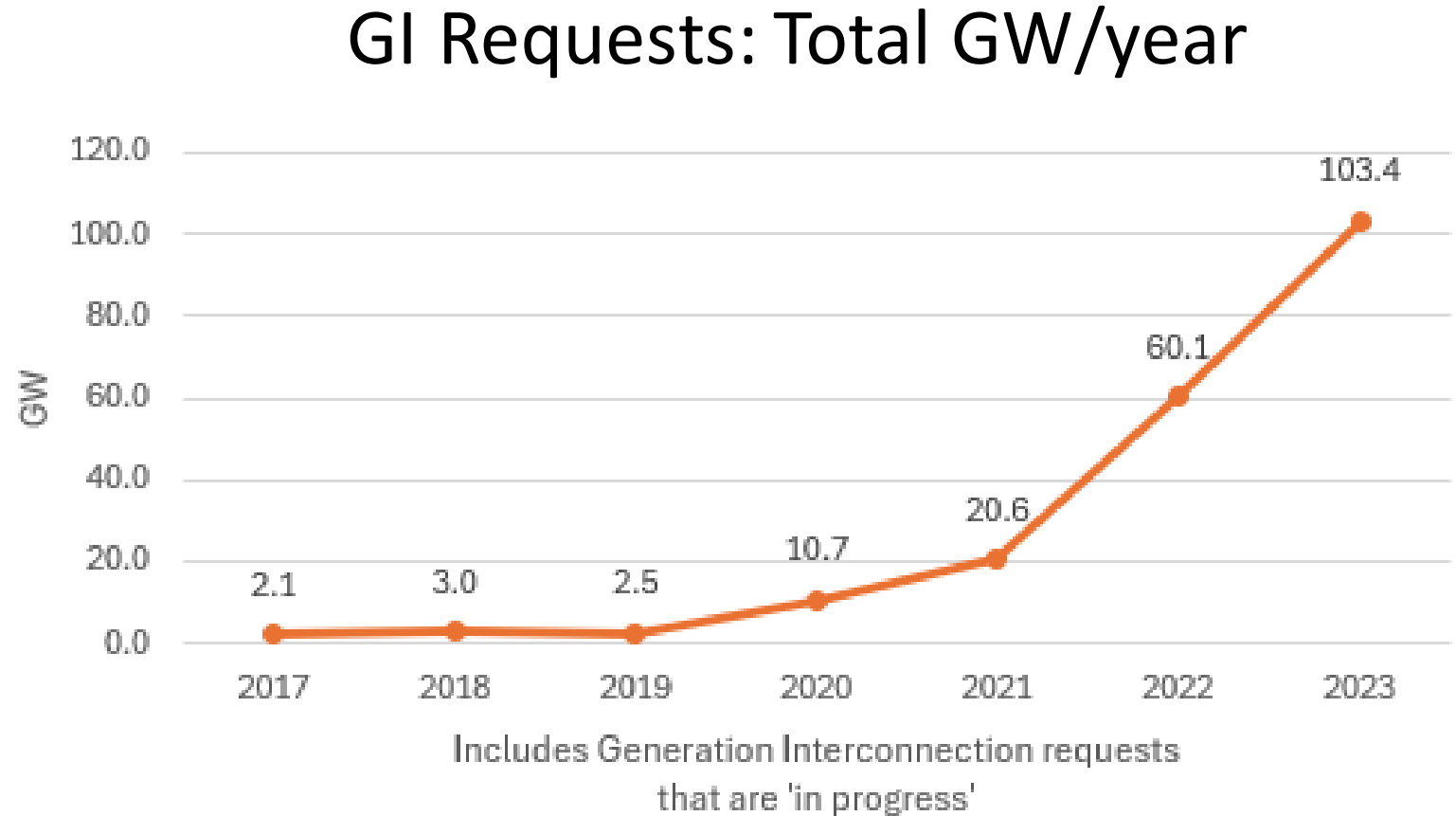
- BPA's Infrastructure
- Strategic Asset Management Overview
- AM Maturity Goals and Teams to achieve them
- T-Asset Categories
- Prioritization
- Demand and Capacity
- Significant Risks and Mitigation Plans
- Goal is to become more transparent and consistent on our communication, yet make sure to deliver on our word!

BPA Queue Update



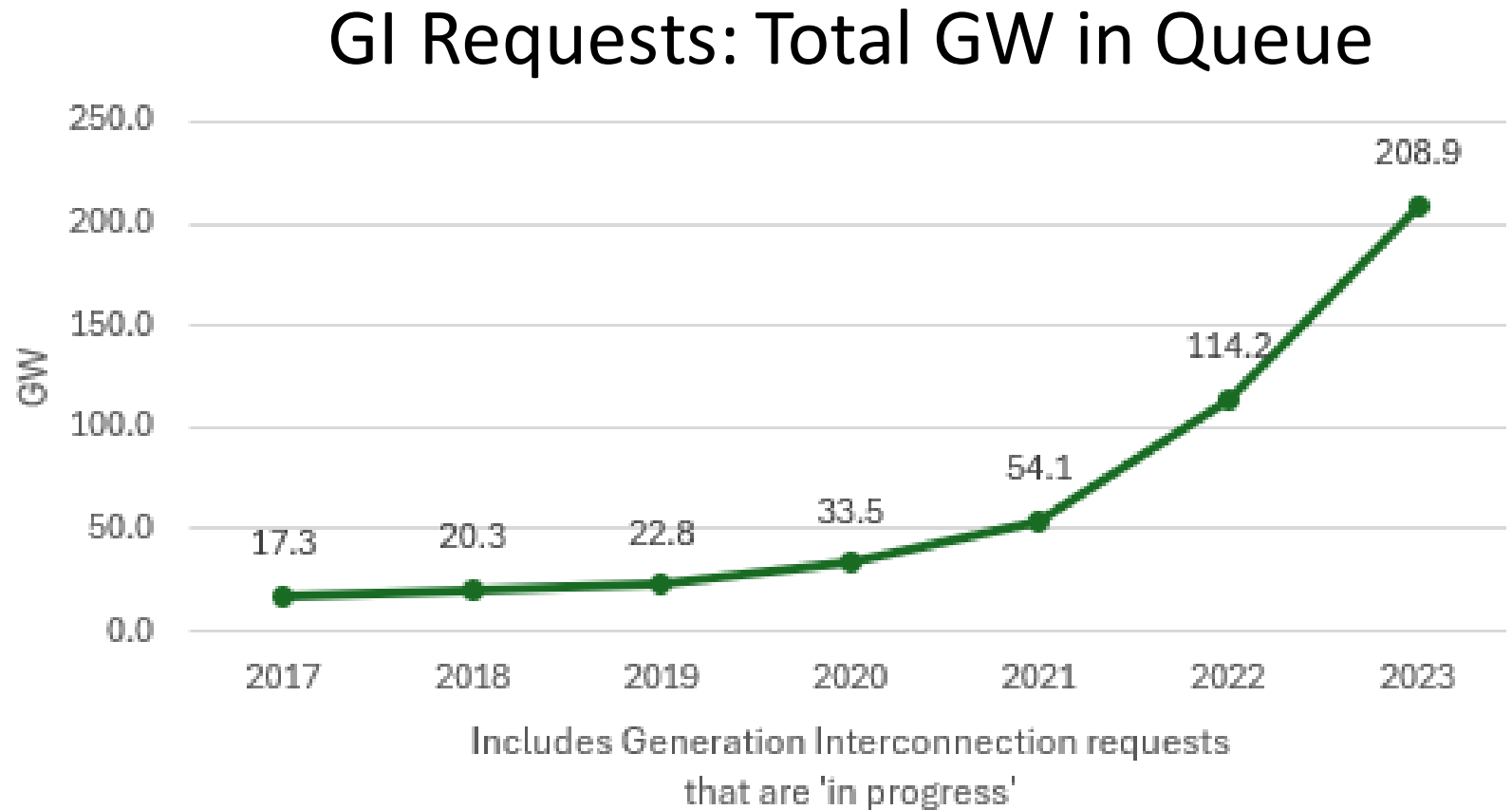
Generation Interconnection Queue Activity

- By the end of 2023, BPA had over 400 active requests to interconnect new generation resources to the FCRTS.



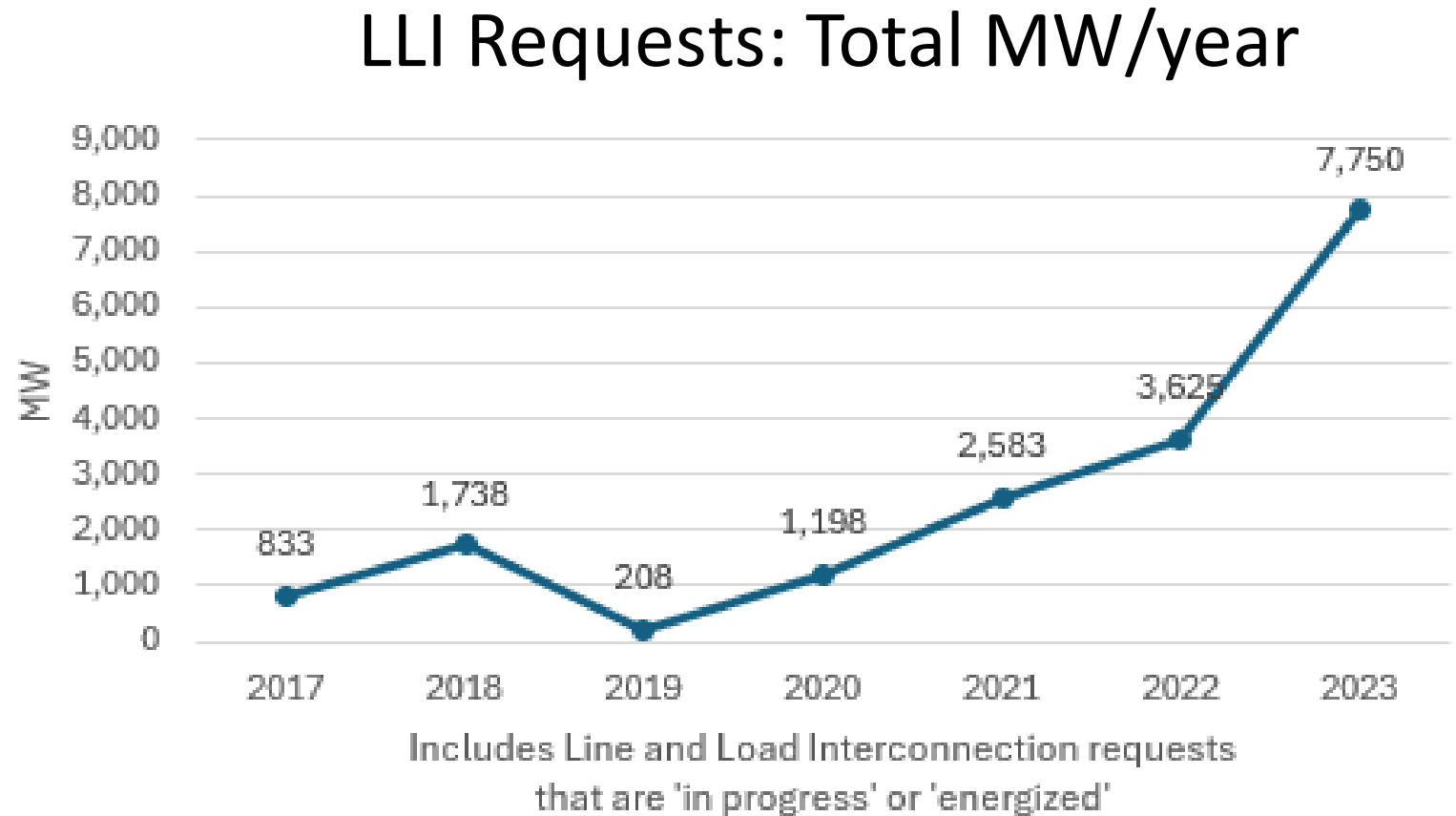
Generation Interconnection Queue Volume

- 208 GW represents all generation GW in the queue
- 166.5 GW of which is eligible for the Transition Cluster



Line & Load Interconnection Queue Activity

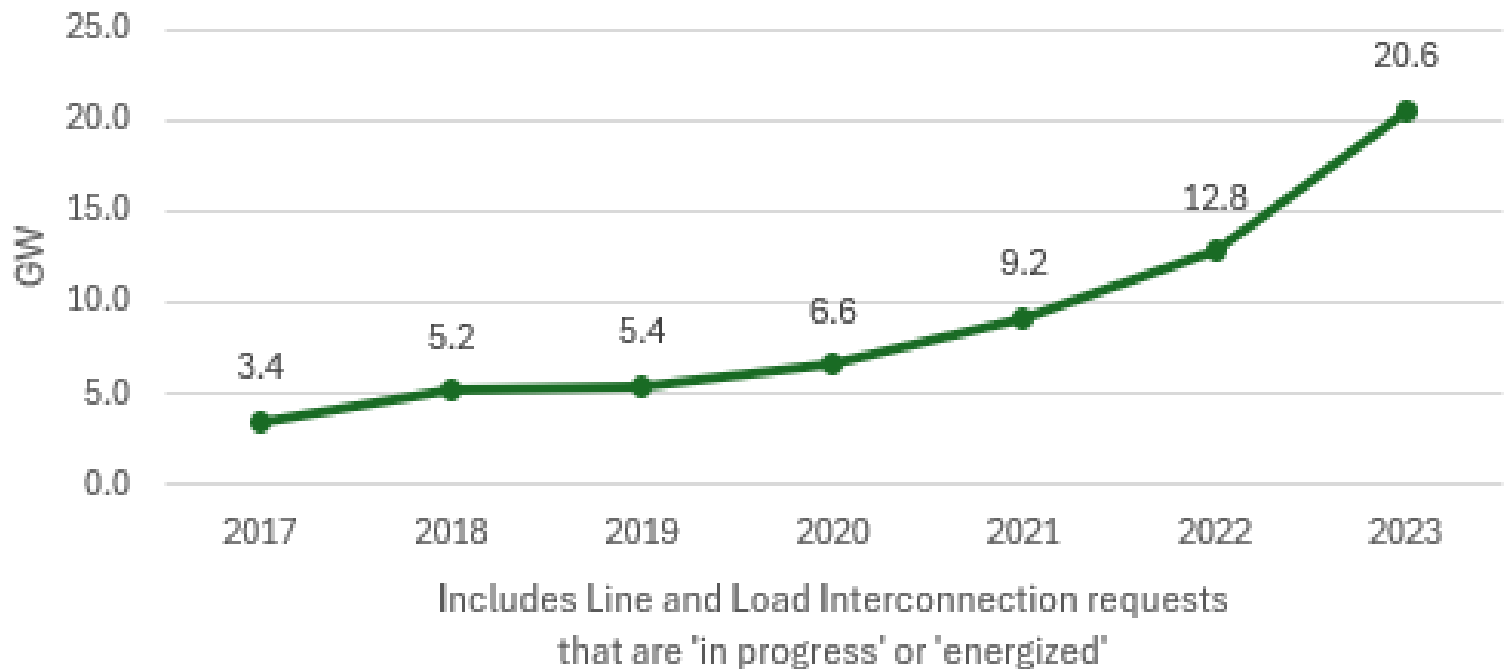
- Largest demand for growth around the system include Central Oregon, Umatilla, Pend Oreille, Hillsboro/Forest Grove, Longview/Cowlitz, Tri-Cities
- Five customers are forecasting 10-year load growth between 100% - 375%



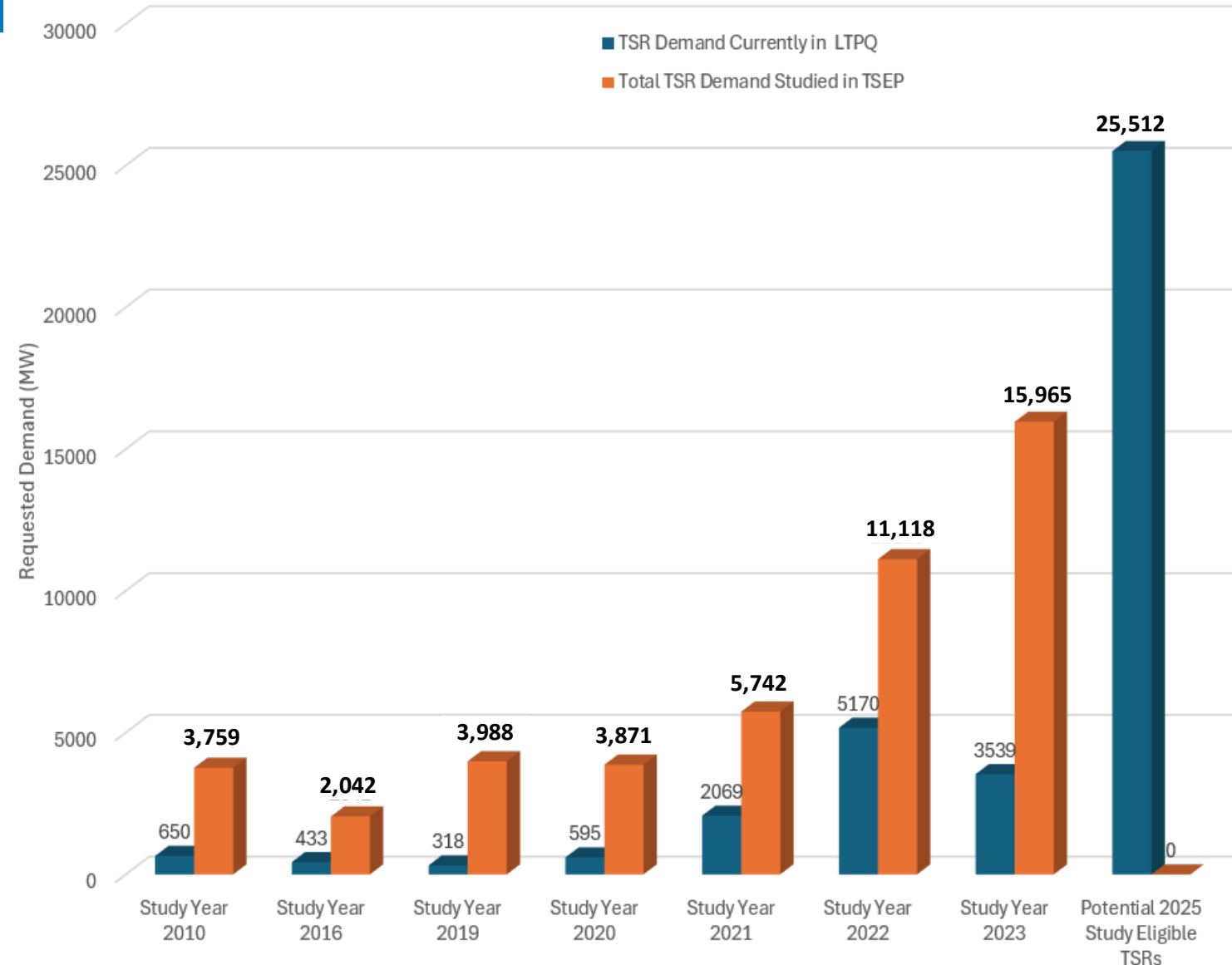
Line & Load Interconnection Queue Volume

- 20.6 GW represents all GW in LLI Queue
- Five customers representing approximately 10 GW of queue volume

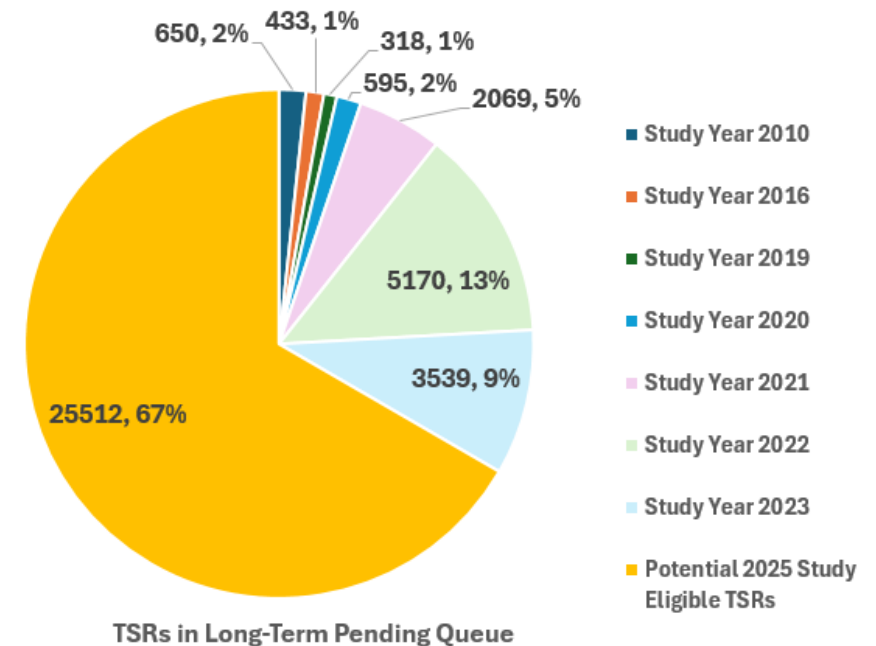
LLI Requests: Total GW in Queue



TSEP: TSR Demand & Study Overview



- TSR Demand currently in the LTPQ includes SIS TSRs for 450 MW
- Totals exclude AC, DC and Montana Intertie requests
- TSRs with Follow-on requests only counted once



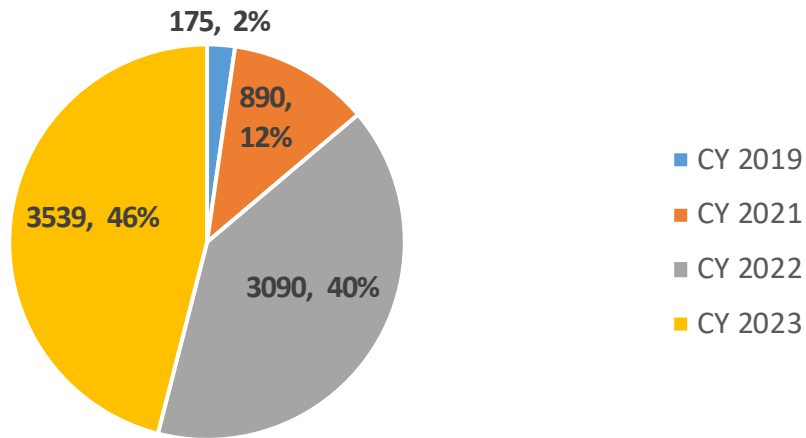
Transmission Service Request (TSR) Analysis & TSEP Cluster Study Update

Transmission Planning

5/3/24 Snapshot

2019-2023 Cluster Study TSRs

Demand (MW) Awaiting Plan of Service by Study Year

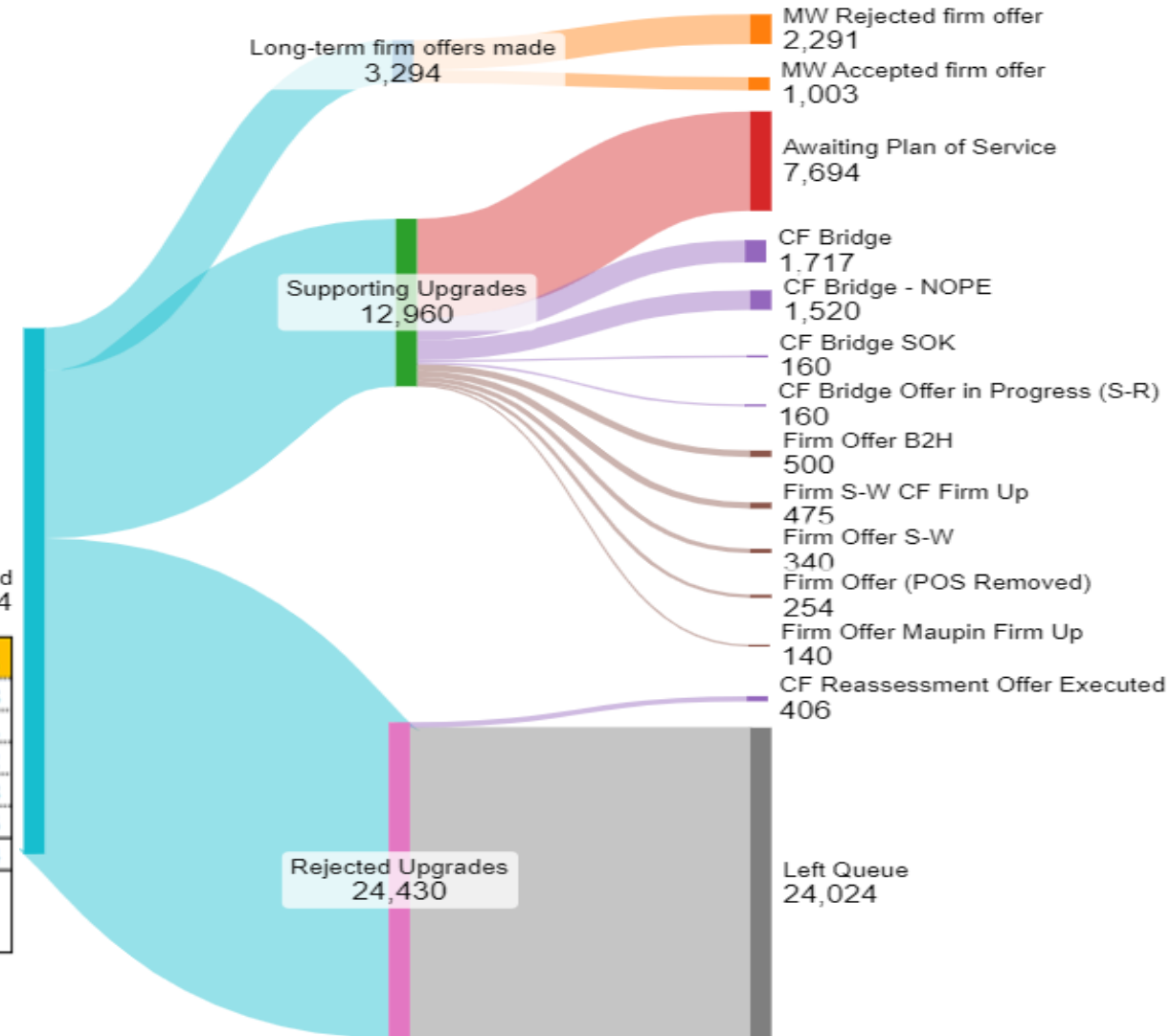


Of the 14,369MW that remain in the queue:

- 54% are Awaiting a Plan of Service (7,694 MW)
- 46% are taking or being offered Firm or Conditional Firm Service (6,675 MW)
 - 2,712 MW are taking Firm Service
 - 3,397 MW are taking Bridge Conditional Firm Service
 - 406 MW are taking CF Reassessment Conditional Firm Service
 - 160 MW have a Bridge Conditional Firm Service offer in progress

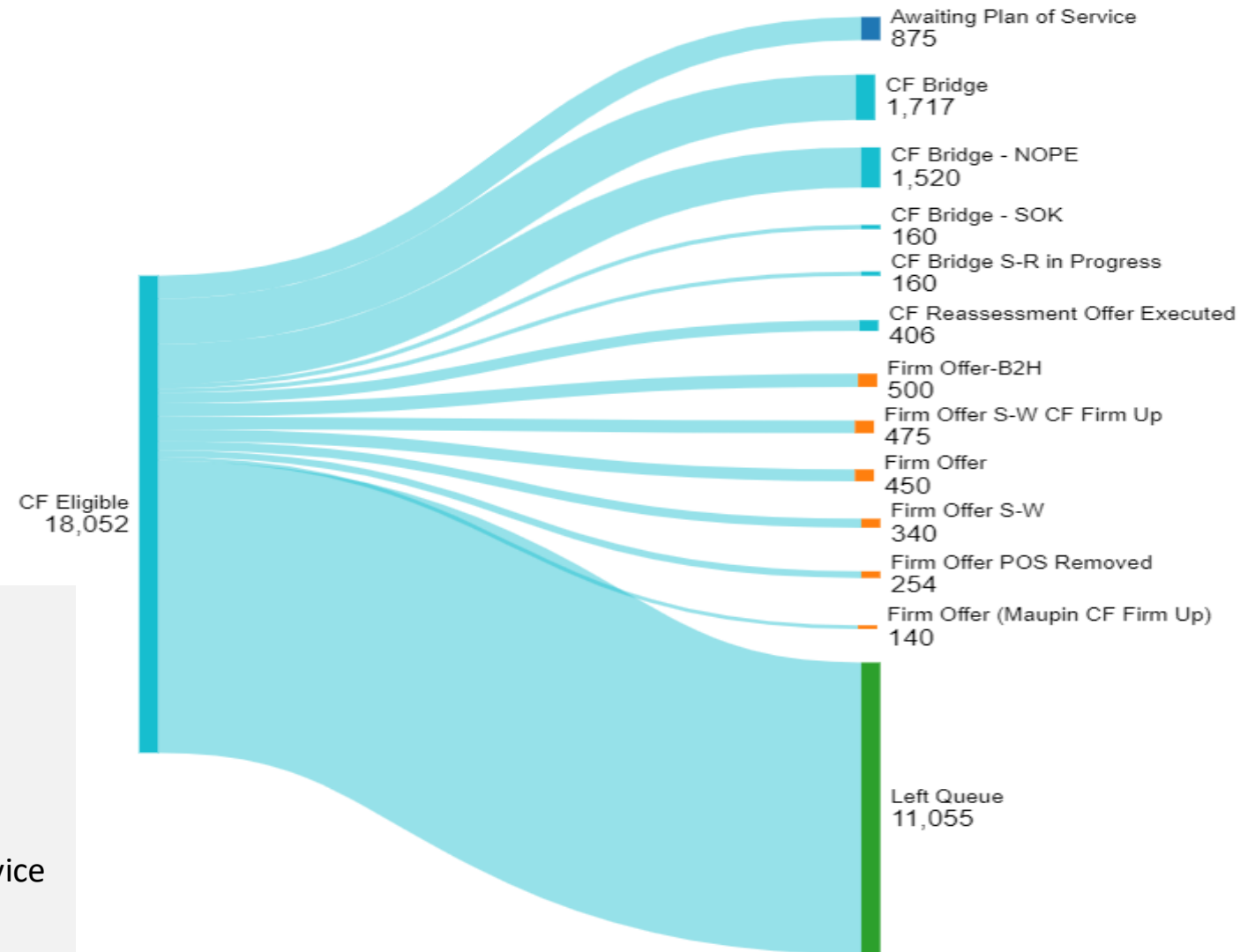
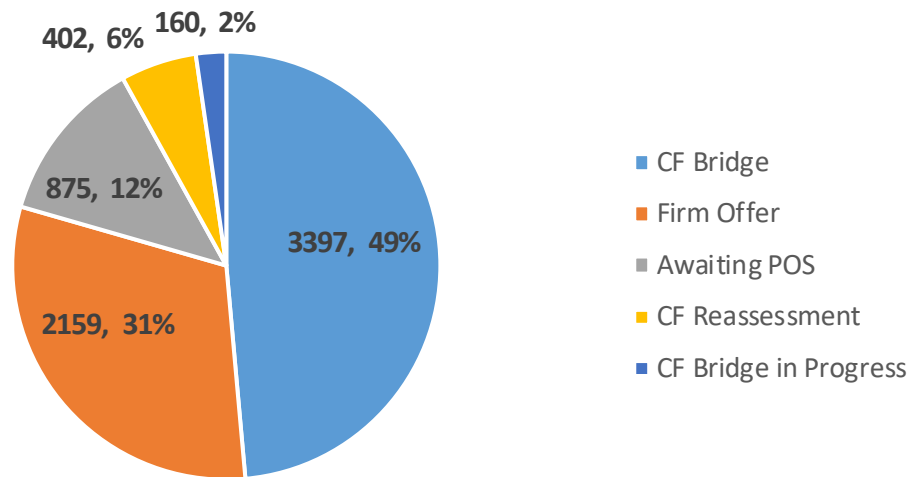
Total MW Studied
40,684

DEMAND BY YEAR	
2019	3,988
2020	3,871
2021	5,742
2022	11,118
2023	15,965
Total	40,684
* Note: 2021 MW Studied Reduced by 100MW, Restudied in 2022	



2019-2023 Conditional Firm TSR Status

CF Eligible TSRs that are Taking or Awaiting Service

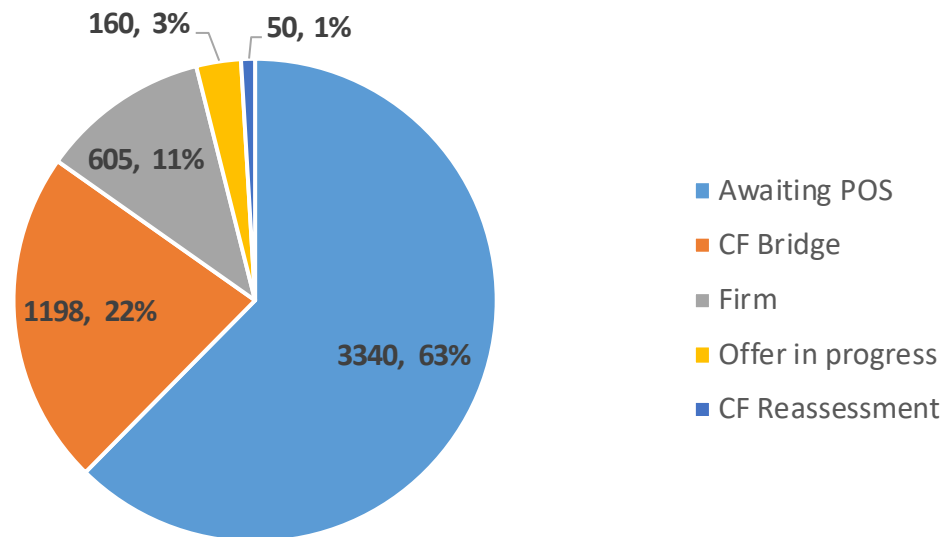


Of the 6,993 MW eligible for CF that did not leave the queue:

- 13% are Awaiting a Plan of Service (875 MW)
- 87% are taking or being offered Firm or Conditional Firm Service (6,118 MW)
 - 2,159 MW are taking Firm Service
 - 3,397 MW are taking Bridge Conditional Firm Service
 - 406 MW are taking CF Reassessment Conditional Firm Service
 - 160 MW have a Bridge Conditional Firm Service offer in progress

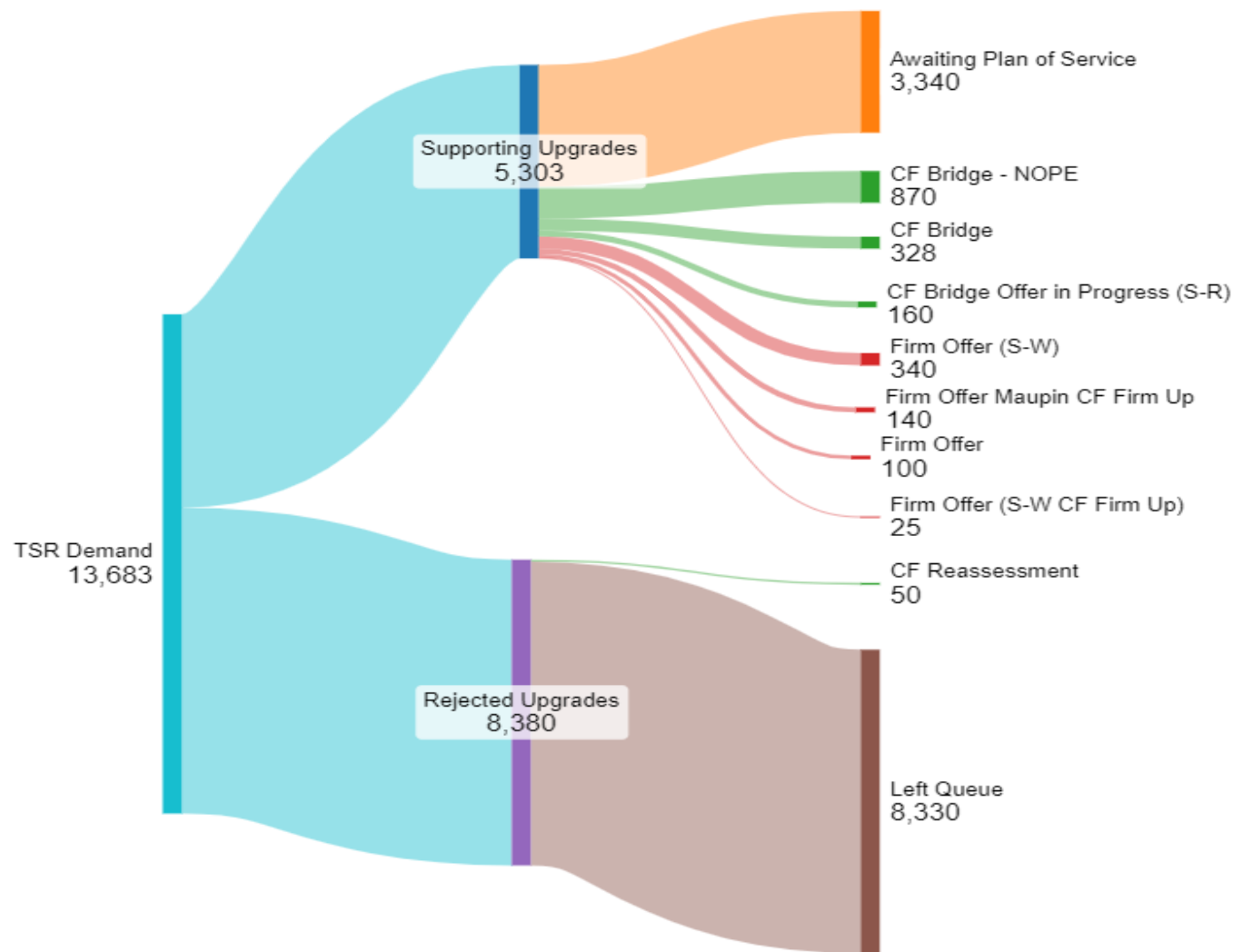
2019-2023 Cluster Study TSR Status to Portland Area Sinks

Active TSR Demand to Portland Area Sinks



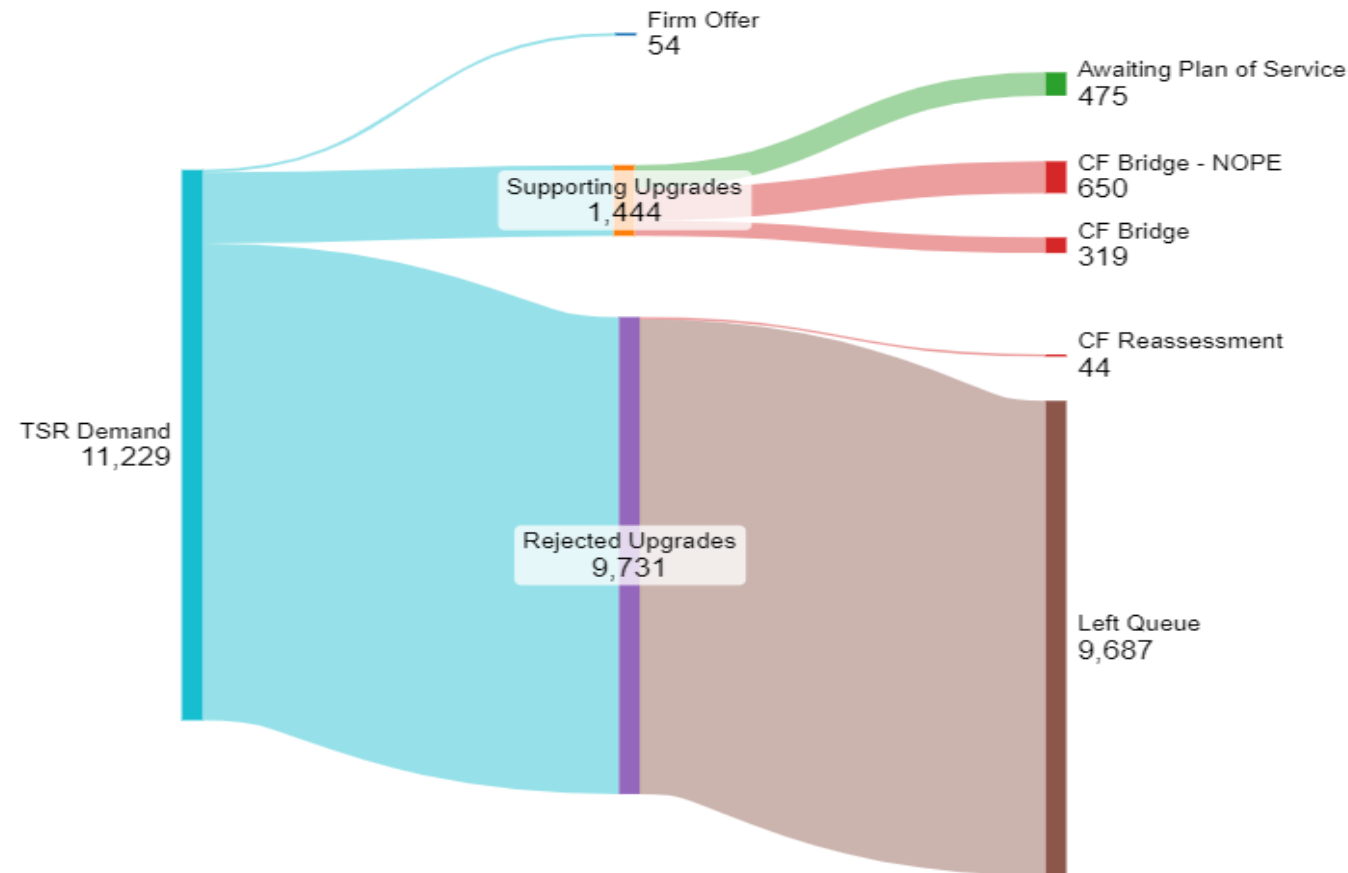
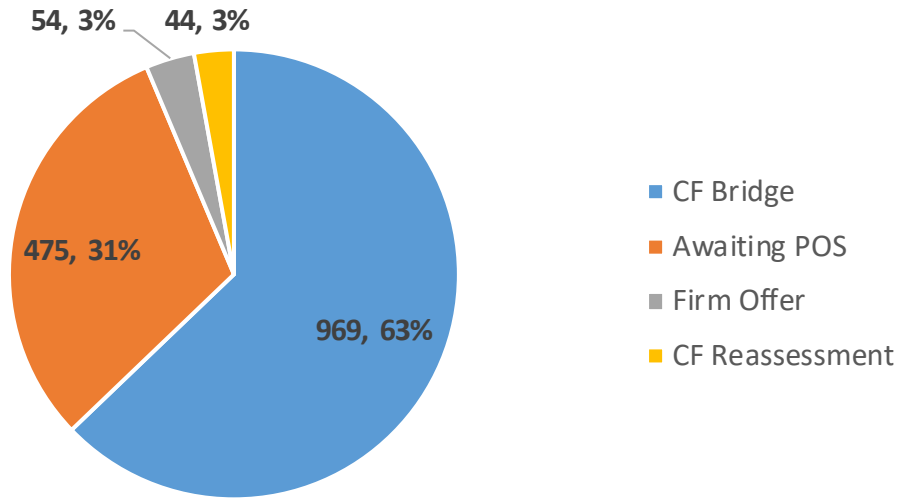
Of the 5,353 MW eligible for CF that did not leave the queue:

- 62% are Awaiting a Plan of Service (3340 MW)
- 38% are taking or being offered Firm or Conditional Firm Service (2,013 MW)
 - 605 MW are taking Firm Service
 - 1,198 MW are taking Bridge Conditional Firm Service
 - 50 MW are taking CF Reassessment Conditional Firm Service
 - 160 MW have a Bridge Conditional Firm Service offer in progress



2019-2023 Cluster Study TSR Status to Puget Sound Area Sinks

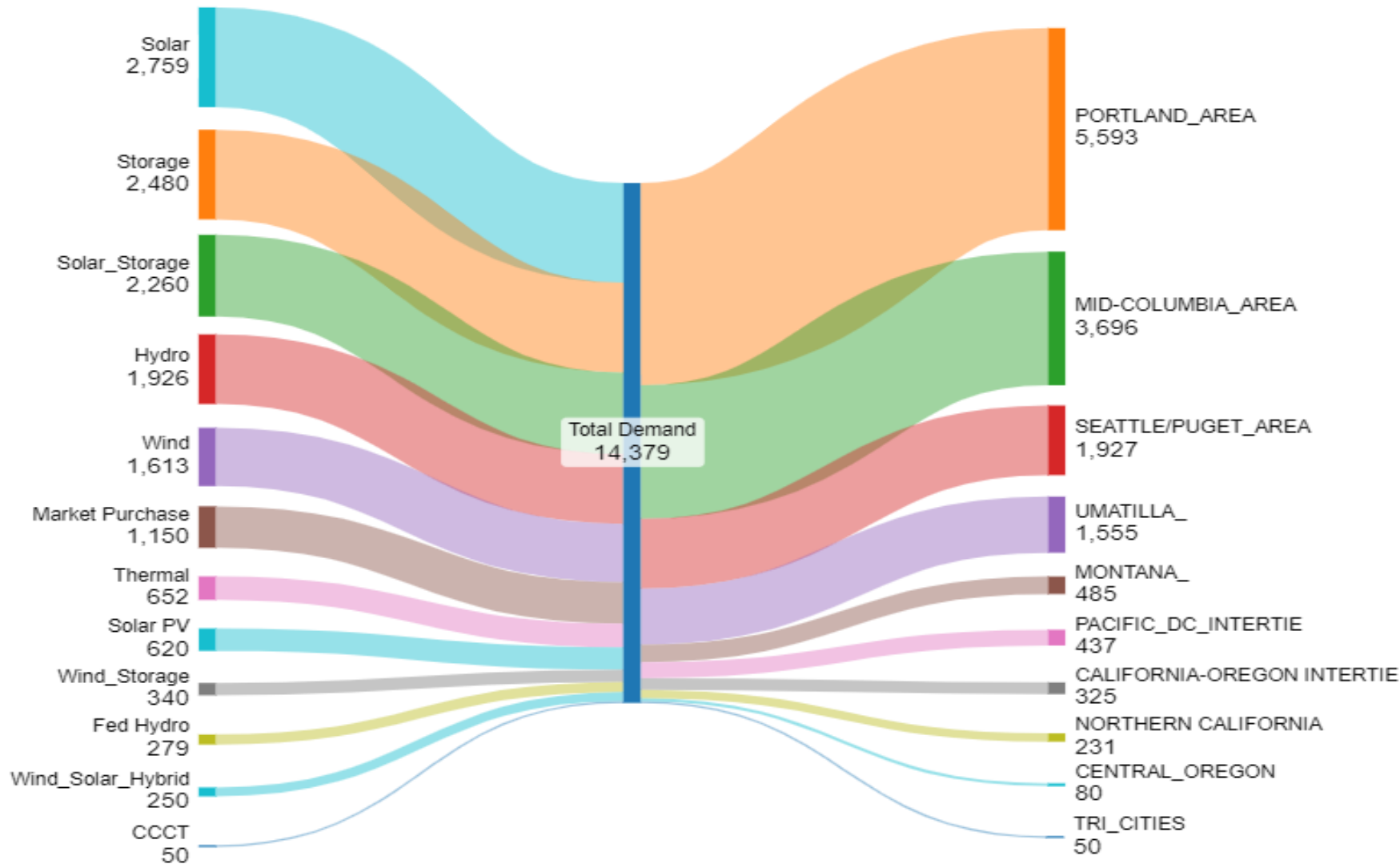
Active Demand to Puget Area Sinks



Of the 1,542 MW that did not leave the queue:

- 31% are Awaiting a Plan of Service (969 MW)
- 69% are taking Firm Conditional Firm Service (1,067 MW)
 - 969 MW are taking Bridge Conditional Firm Service
 - 54 MW are taking Firm Service
 - 44 MW are taking CF Reassessment Conditional Firm Service

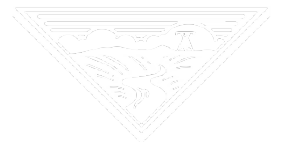
2019-2023 Cluster and Individual Study Demand of Resource Type to Geographic Sink



- Portland Area includes PGE Sink, Clark, and Forest Grove
- Seattle/Puget Area includes Puget Sinks, Seattle Sinks, and Snohomish Sink
- This includes TSRs that have elected Firm, CF, or Awaiting PoS in queue

2023 TSEP Cluster Study

Transmission Long-term Planning



2023 TSEP Cluster Study Results

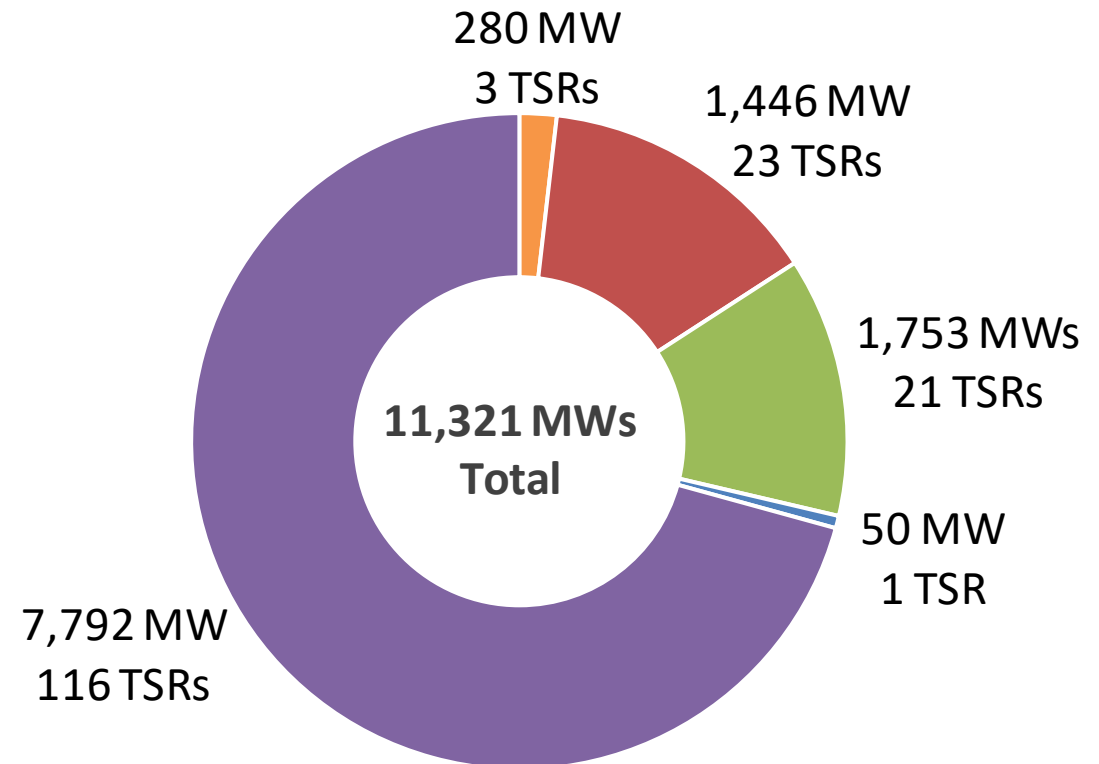
2023 Totals Advanced

164 TSRs
18 Customers
11,321 MWs

PEA Not Funded*		
# of Customers	# of TSRs	MWs
13	116	7792
ESAs in Progress		
# of Customers	# of TSRs	MWs
1	3	280
Hold for Hood River		
# of Customers	# of TSRs	MWs
4	23	1446
PEA Executed and Funded		
# of Customers	# of TSRs	MWs
5	21	1753
Reassessment Offer		
# of Customers	# of TSRs	MWs
1	1	50

*Includes PEAs Not Funded, PEA Not Funded and ESA not due, and Withdrawn categories

Total MW and TSRs count



Projects Advancing/Funding Levels

Projects with Funding to Advance in TSEP				
Project	Scoping Cost	MWs Funded	Funding Received	Amount Under Funded
Schultz-Olympia #1 500 kV	\$9,000,000	250	\$629,018	\$8,371,000
North of Pearl 500 kV Upgrade	\$5,219,000	450	\$372,785	\$4,846,000
North of Marion Upgrade #1	\$10,000,000	450	\$673,452	\$9,327,000
North of Marion Upgrade #2	\$25,000	450	\$1,967	\$23,000
Reno-Alturas Reactive Addition	\$300,000	153	\$300,000	\$0
North of Grizzly 500 kV (S>N)	\$10,000,000	300	\$1,683,501	\$8,316,000
Central Oregon 500 kV Dynamic Reactive Upgrades	\$5,000,000	550	\$2,291,669	\$2,708,000
Total	\$39,544,000	2,603	\$5,952,390	\$33,591,000

Projects NOT Funded to Advance in TSEP	
Project	Scoping Cost
Coulee-Columbia-Schultz 500 kV	\$7,000,000
McNary-Stanfield-La Grande 230 kV line*	\$7,500,000
Big Eddy-Redmond 230 kV Upgrade*	\$7,500,000
Southern Oregon Coast 500kV Upgrade #2	\$7,500,000
Garrison-Ashe (GASH)	\$120,500,000
Total	\$150,000,000

*Customers withdrew prior to offering PEAs

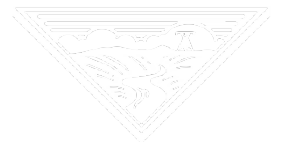
BPA Funded Projects
Pearl – Marion #1 500 kV (replace 2.5” EXP conductor)
Pearl-Keeler #1 500 kV Reconductor
Ostrander – Pearl #1 500kV (replace 2.5” EXP conductor)
Hood River Upgrade
Ostrander – Pearl #1 500kV (replace 2.5” EXP conductor)
Covington 500/230 Bank Addition
Vantage-Schultz 500kV reconductor

Next Steps

- Evaluate projects to determine which are needed for the benefit of the region. (See Bifurcated Commercial Model presentation)
- Plan for the 2025 TSEP Cluster Study
 - Team is developing a strategy to run a 2025 TSEP CS
 - The queue is already at 25 GW

Bifurcated Commercial Model

How a Commercial Upgrade Becomes an Evolving Grid Project (EGP)



Disclaimers

- Construction of transmission and transmission expansion projects is subject to the Administrators discretion and completion of environmental compliance.
 - This includes commercially driven projects in the TSR Study and Expansion Process (TSEP)
- This discussion is to share as much information as possible without placing limits on the ability of the administrator to respond to the needs of the region and the dynamic industry landscape.
- This is the process, decisions, and timelines BPA envisions but any of these could change as needs arise.

In-flight TSEP Projects (Prior to the 2023 TSEP CS)

Customer Needed Projects			
Projects	# of Cust.	TSRs	MW
CCN: Schultz-Raver Caps	11	74	2,604
Montana to Washington	2	4	320
SOC: WS-RAS	1	4	300
Subgrid: 2nd Transformer at Central Ferry	1	1	51
Subgrid: Central Or Reinforcement 500 kV	1	8	800
Subgrid: Central Or South 230	1	8	800
Subgrid: LaPine Shunt Caps	1	8	99
Subgrid: LaPine Transformer	1	2	14
Subgrid: Monroe-Novelty	1	6	600
Subgrid: Southern Oregon Coast	1	12	1,600

Regionally Needed Projects			
Projects	# of Cust.	TSRs	MW
CCN: Schultz-Raver Reinforcement	6	31	3,140
CCS: Big Eddy-Chemawa 500kV Rebuild	6	31	3,140
R-P: Covington-Chehalis 230kV Rebuild	4	16	1,790
SOA: Ross-Rivergate 230kV Rebuild	5	36	3,570
Subgrid: Rock Creek-John Day	2	14	630
Subgrid: Pearl-Sherwood-McLoughlin	13	91	5,504
Reliability Projects			
NOEL: PSAST (aka PSANI)	6	47	1,294
SOA: Schultz-Wautoma	14	69	5,229

Characteristics that may Differentiate Projects

Regionally Needed Projects (RNP)

1. Necessary main grid reinforcement regardless of specific generator locations
2. Critical for load service
3. Excellent economics (supports BPA financial ability to support other activities)
4. Provides transmission service for substantial MW of “mature” generation
5. Supports critical regional BAA resource diversity
6. Also necessary for NT load growth, LLI, or GI needs
7. Avoids future (within 10-year horizon) reliability need/costs
8. Supports adjacent transmission provider systems
9. Regional level support of public policy

Customer Needed Projects(CNP)

1. Needed only by one or a few customers
 - a. Not likely a main grid expansion
 - b. Withdrawal of TSR(s) creates risk of stranded asset to BPA
 - c. Limited potential for hop-on TSRs
2. Project economics require substantial customer commitment (MWs or terms) to avoid potential incremental rate
3. GI projects requiring transmission service associated with the project not very mature
4. Does not meet characteristics of a RNP

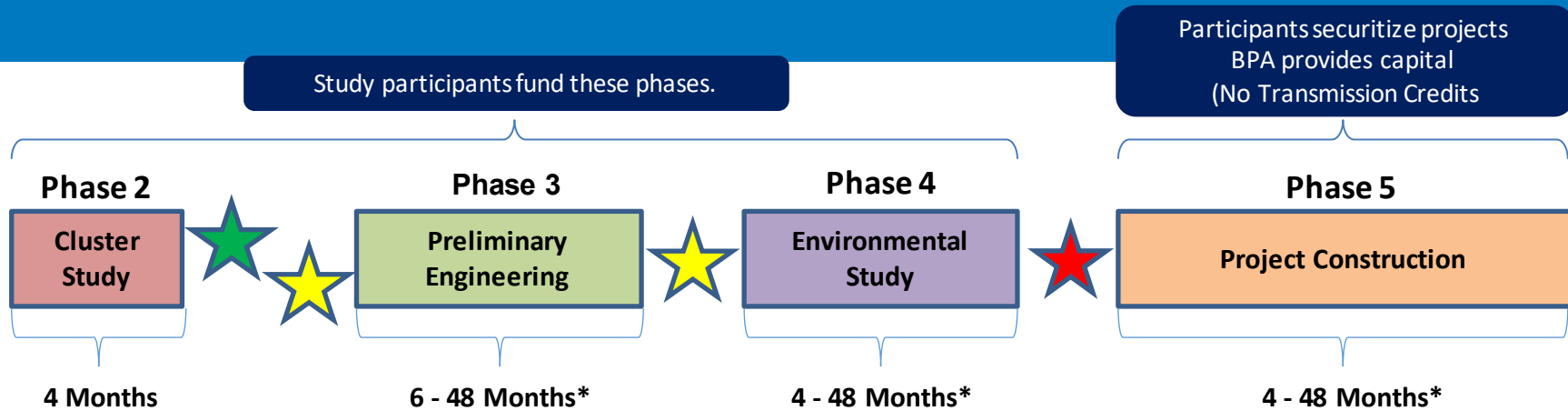
Project Decisions

- Extent of customer funding for Preliminary Engineering/Scoping (0 – 100%)
- Extent of customer funding for Environmental Study and Design (0 – 100%)
- Extent of required securitization (0 – 100% of direct project costs, assigned to TSRs on a per MW share basis)
- Announcing an initial intention to make BPA capital funding available, subject to environmental compliance can be done early, or at point up to post-completion of NEPA, must be done prior to offer of contracts.
- Embed project costs for the initial rate proposal

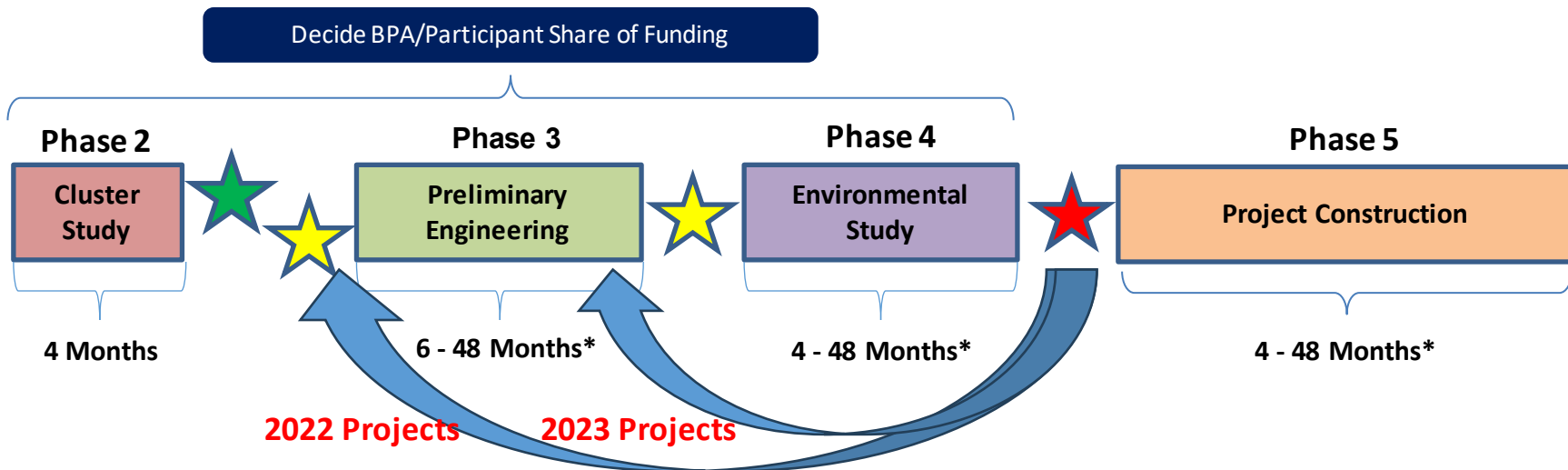
2022 TSEP CS Regional Need Project Decisions	
Item	Decision
Preliminary Engineering Costs	Customer Pay's 100%
Environmental Review	Customer Pay's 100%
Securitization	Not Required
BPA Capital Funding	Early Capital if Needed
Embed Costs for Initial Proposal	Yes

Decision Timing

Track A Customer Needed Expansion Projects (TSEP Status Quo)



Track B Regionally Needed Expansion Projects

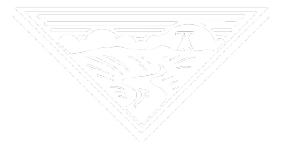


Key Takeaway: Decisions of critical importance to regional stakeholders for the 2023 TSEP CS Regionally Needed Projects will occur late in the Preliminary Engineering Phase.

Next Steps

- In the previous presentation we shared the projects that are advancing in the TSEP Process
- BPA will begin evaluating the projects to see if any fit our characteristics of a Regionally Needed Project.
 - BPA anticipates making project decisions late in the PEA phase of TSEP.
 - Decisions about projects will be communicated to customers and used to guide customer engagement.
- There will be continued use of the historical customer-driven TSEP process for Customer Needs Projects.
- All decisions for transmission and system expansion are at the sole discretion of BPA's Administrator.

Regional Study on 2040 Decarbonization Milestones

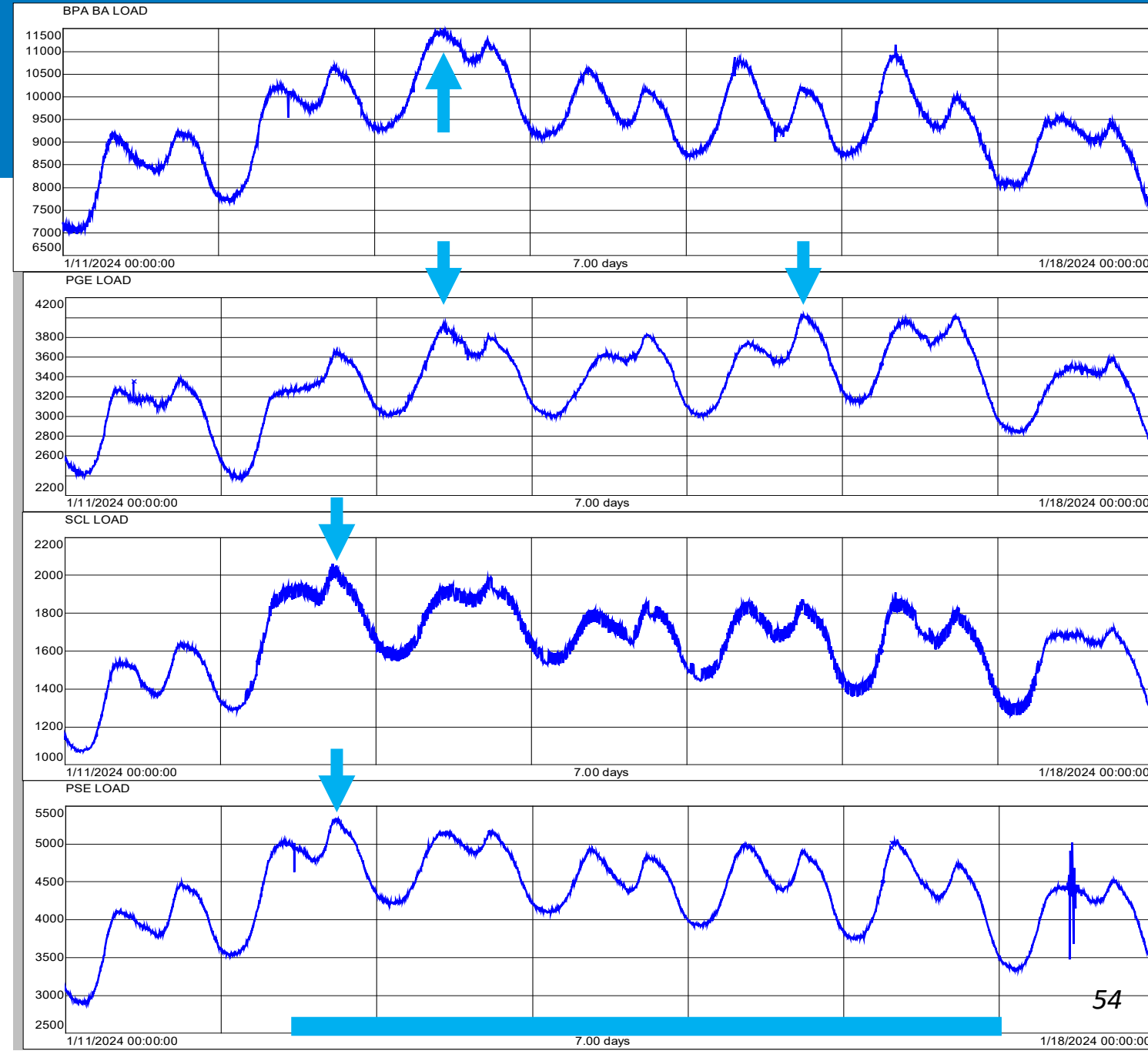


January 12-17 Winter Storm in Pacific Northwest

Extreme cold temperatures were observed in the Pacific Northwest from January 12 to 16, 2024

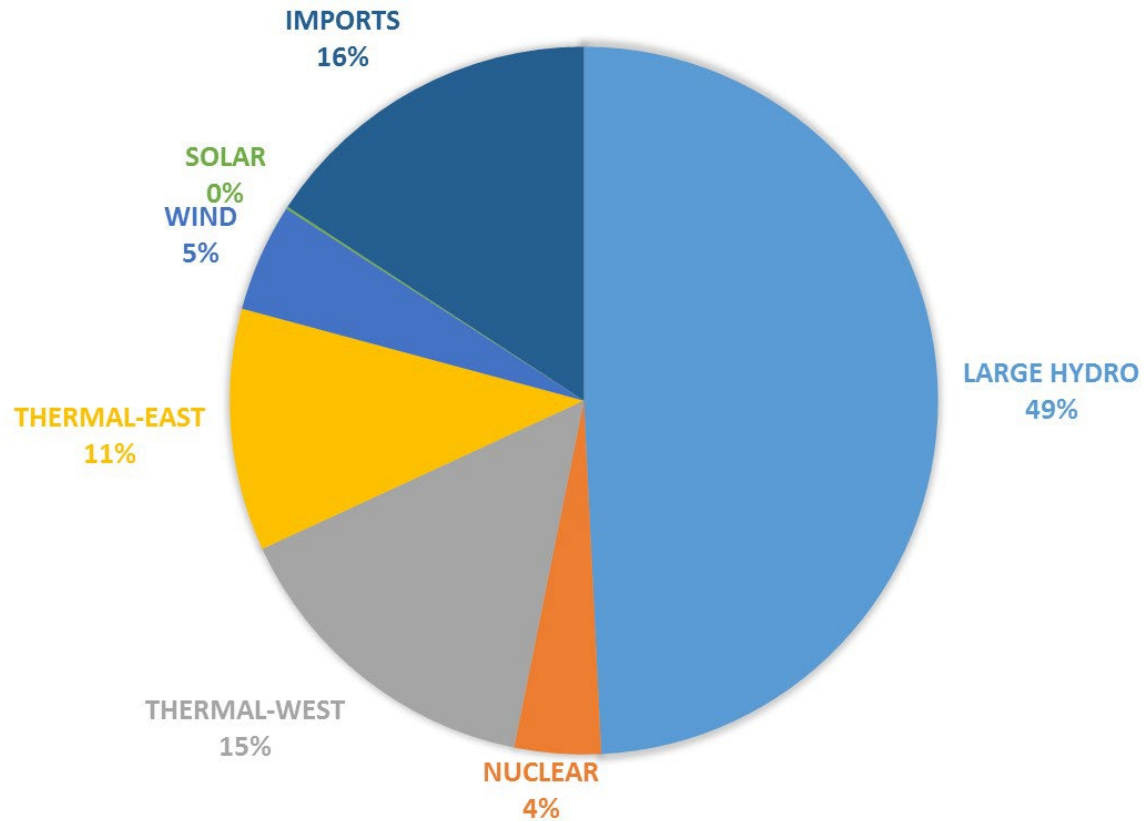
BPA, PSE and SCL experienced record loads, fortunately at different times (pointed by arrows)

Most of cold snap occurred over the weekend, which helped with net demand

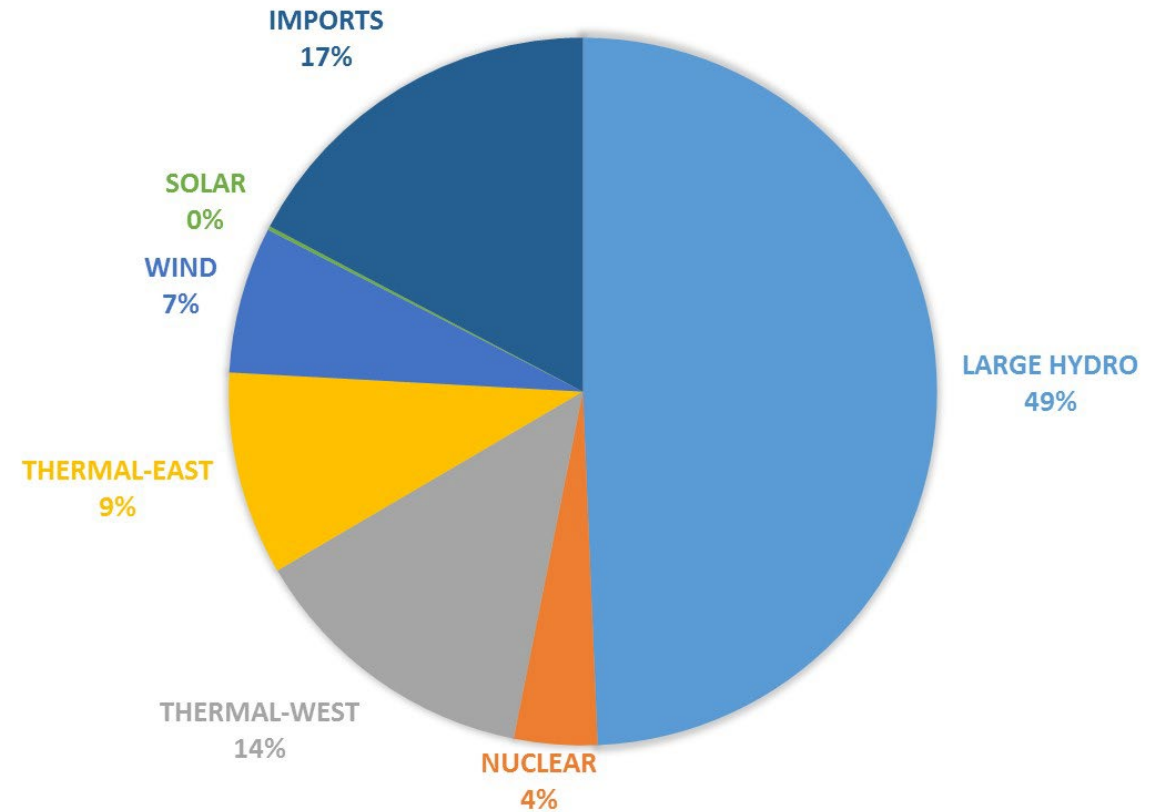


Generation Mix During Peak Hours (1 of 2)

1/12/2024 17:30



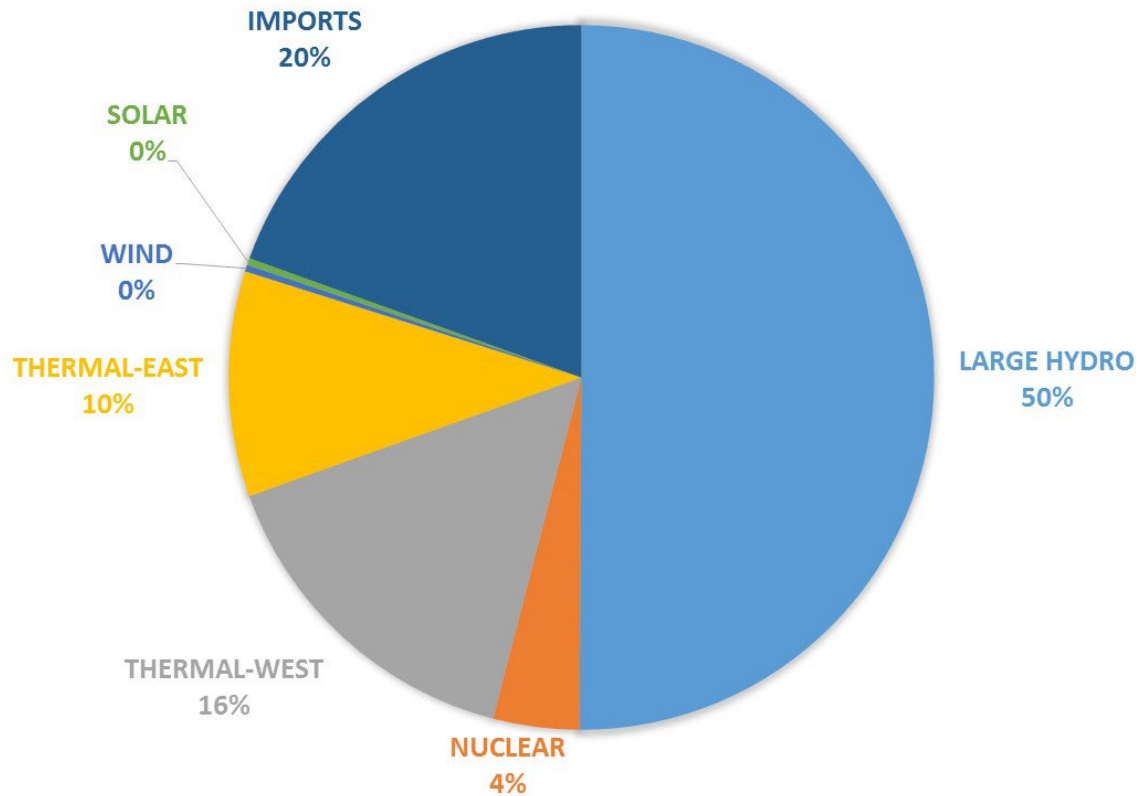
1/13/2024 10:30



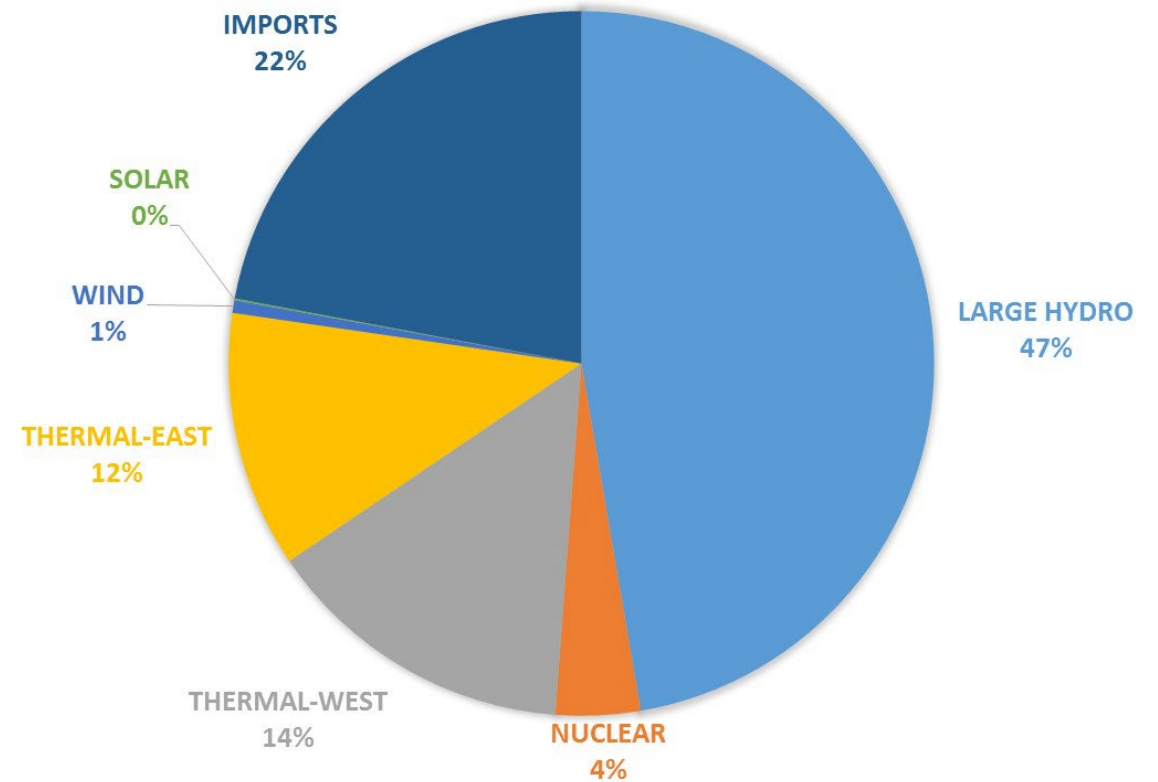
Low NW and NW solar generation and high imports during peak load hours

Generation Mix During Peak Hours (2 of 2)

1/15/2024 8:30



1/16/2024 8:00

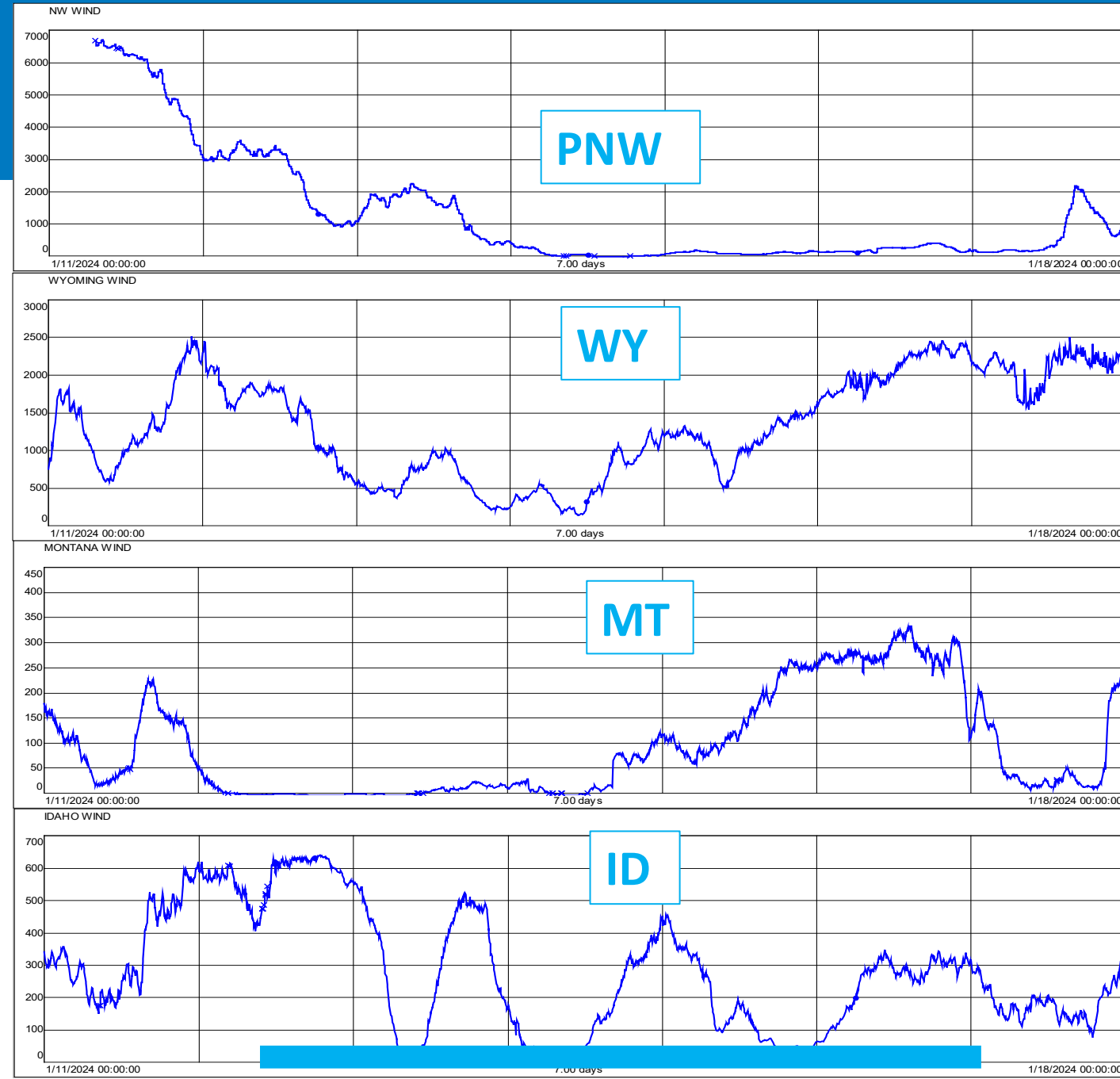


Low NW and NW solar generation and high imports during peak load hours

Wind

Northwest land-based wind generation reduced to zero as extreme cold progressed

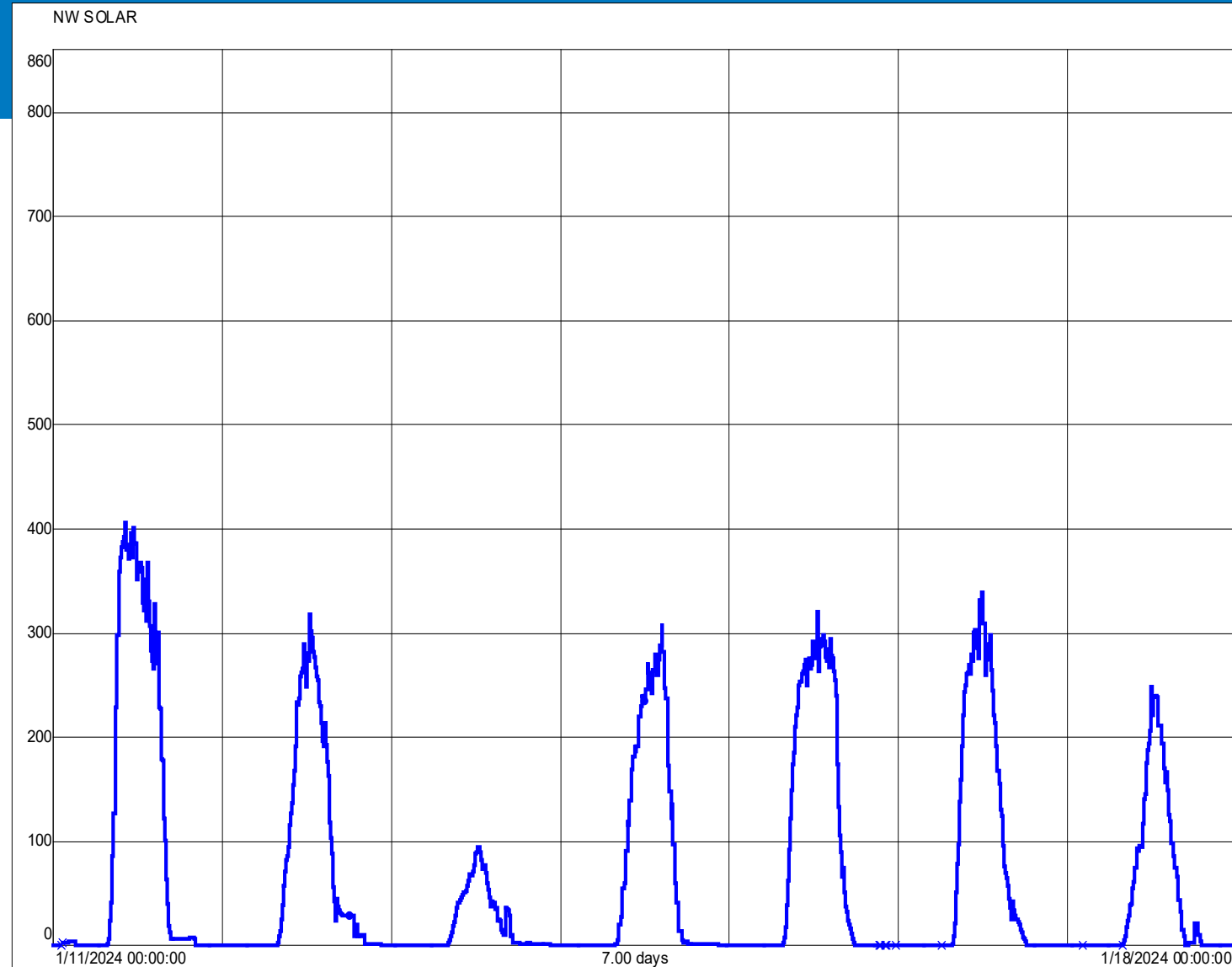
There was some diversity in wind across Western states, but there were periods of very low wind generation across the wider area

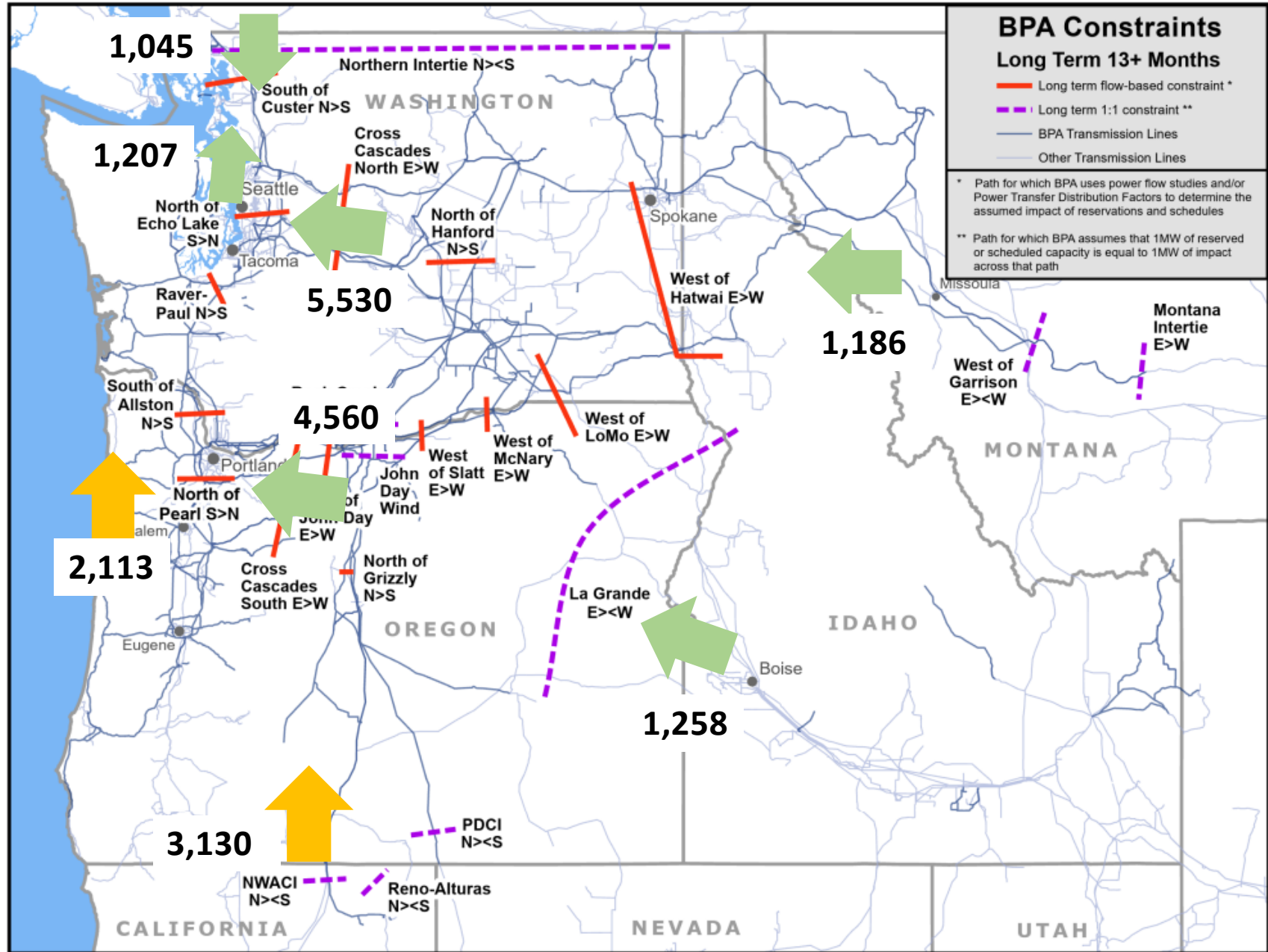


NW Solar

Northwest solar power plants operated at very low capacity factor during the winter storm

- Y-axis scale is maximum generation observed in June 2023
- This plot is sum of solar generation in Avista, Avangrid, BPA, PacifiCorp West and PSE Balancing Authorities

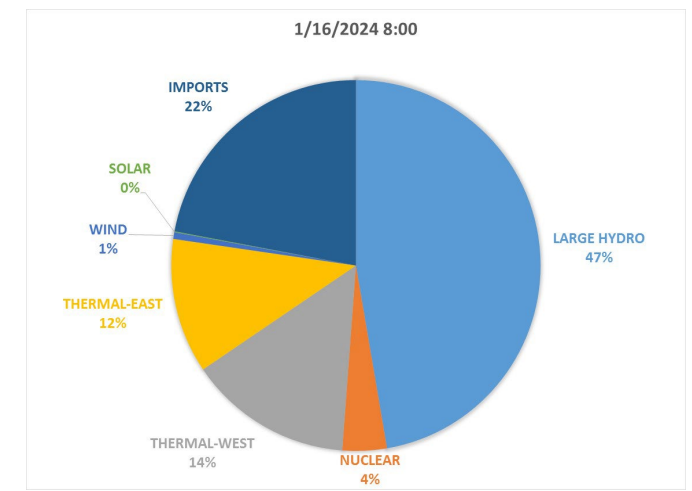


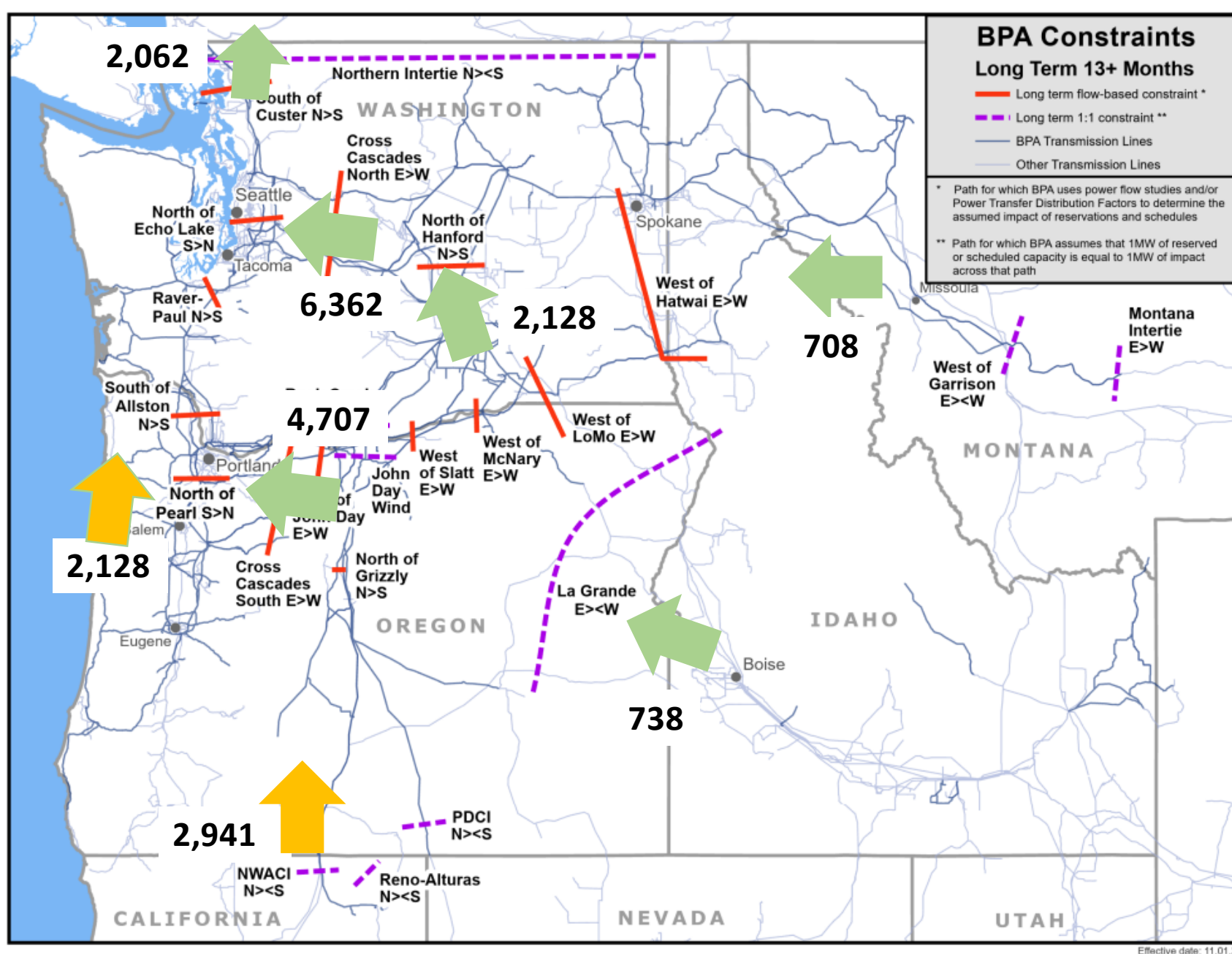


WINTER

Snapshot at 8:00 on January 16

- High imports from California, Idaho, Montana and BC
- High South to North flows on the I5 corridor



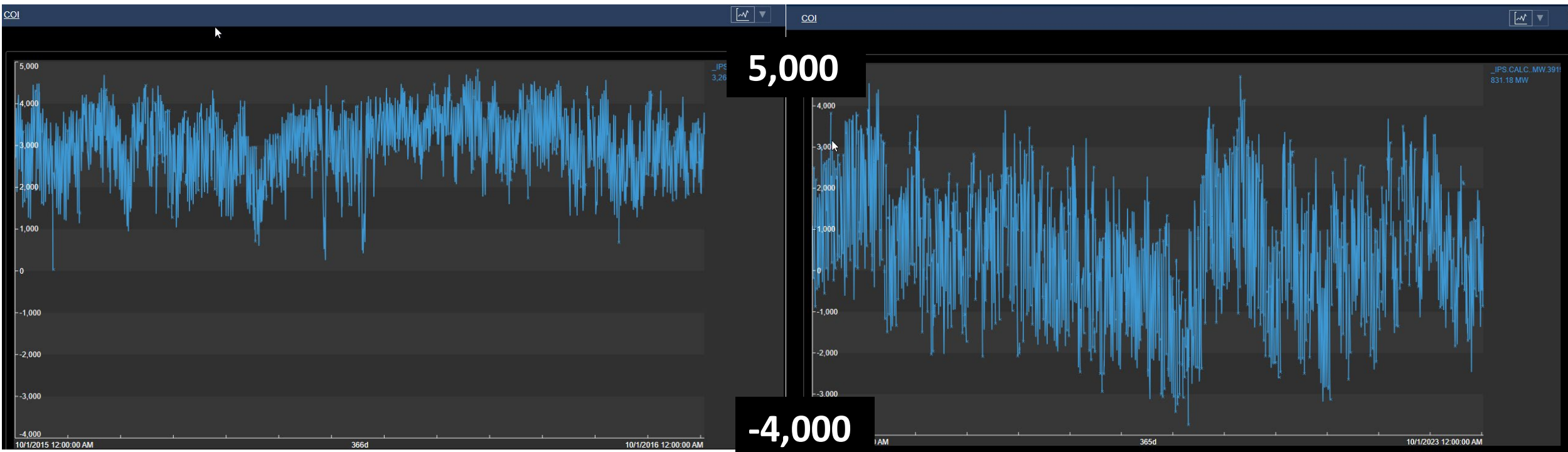


SUMMER

Snapshot at 14:00 on July 5, 2023

- PNW overall remains winter peaking by about 4 GW, but increasingly more areas become summer peaking
- The region's transmission is more constrained in summer

Increase in South to North Flows

2016**NWACI Flows****2023**

State of California had a total of 46,874 MW of solar capacity installed at the end of 2023 (including rooftop)

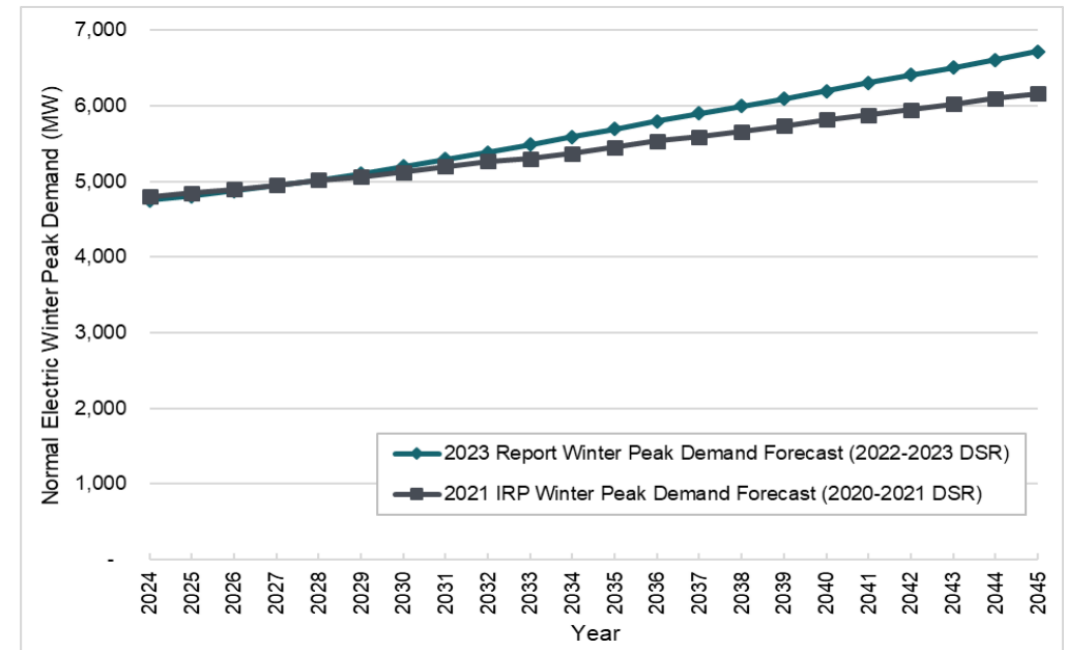
BPA – PacifiCorp – PGE South to North Studies

- Studies to determine import capabilities and interactions with internal flow-based paths
- Near-term horizon (2- and 5- year)
- Long-term horizon (10+ years)
- Expected completion Q4 2024

State of OR and WA Decarbonization Study

- Joint study including major TPs in OR and WA
- High level transmission assessment of the region's ability to meet 2045 decarbonization milestones
- Use IRPs as a starting point for load, resource forecasts, planned projects
- Develop scenarios with updated load forecasts – peak loads, high renewables, etc...
- Develop reliability powerflow base case
- Perform contingency analysis

Figure 6.6: Winter Electric Peak Demand Forecast before Additional DSR
2023 Electric Report versus 2021 IRP Base Demand Forecast Hourly Annual Peak (MW)

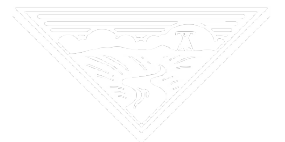


Source: PSE IRP

Other Load Serving Entities are experiencing similar upward revisions in load forecasts

Inter-regional Updates

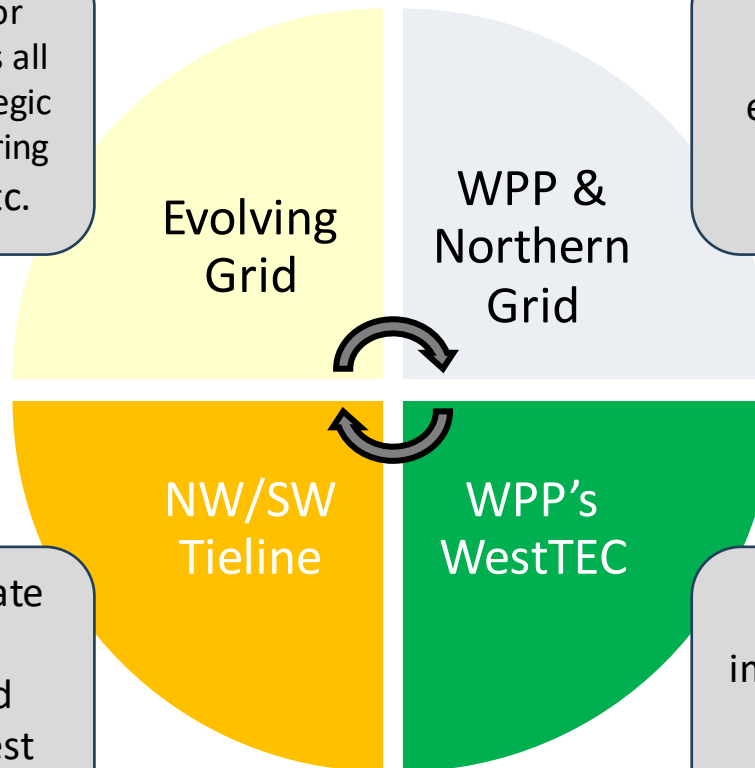
Transmission Planning for the Western Interconnect



It's All Connected

- TSEP
- BP-26
- TC-26
- GIQ
- LLIR

Evolving Grid is NOT a function or process but an umbrella that pulls all BPA-led efforts together in a strategic view to optimize information sharing with stakeholders, customers, etc.



Third party regional planning entity for affected systems and members

Inter-regional effort to evaluate feasibility of transmission expansion between affected regions (DOE National Interest Electric Transmission Corridors)

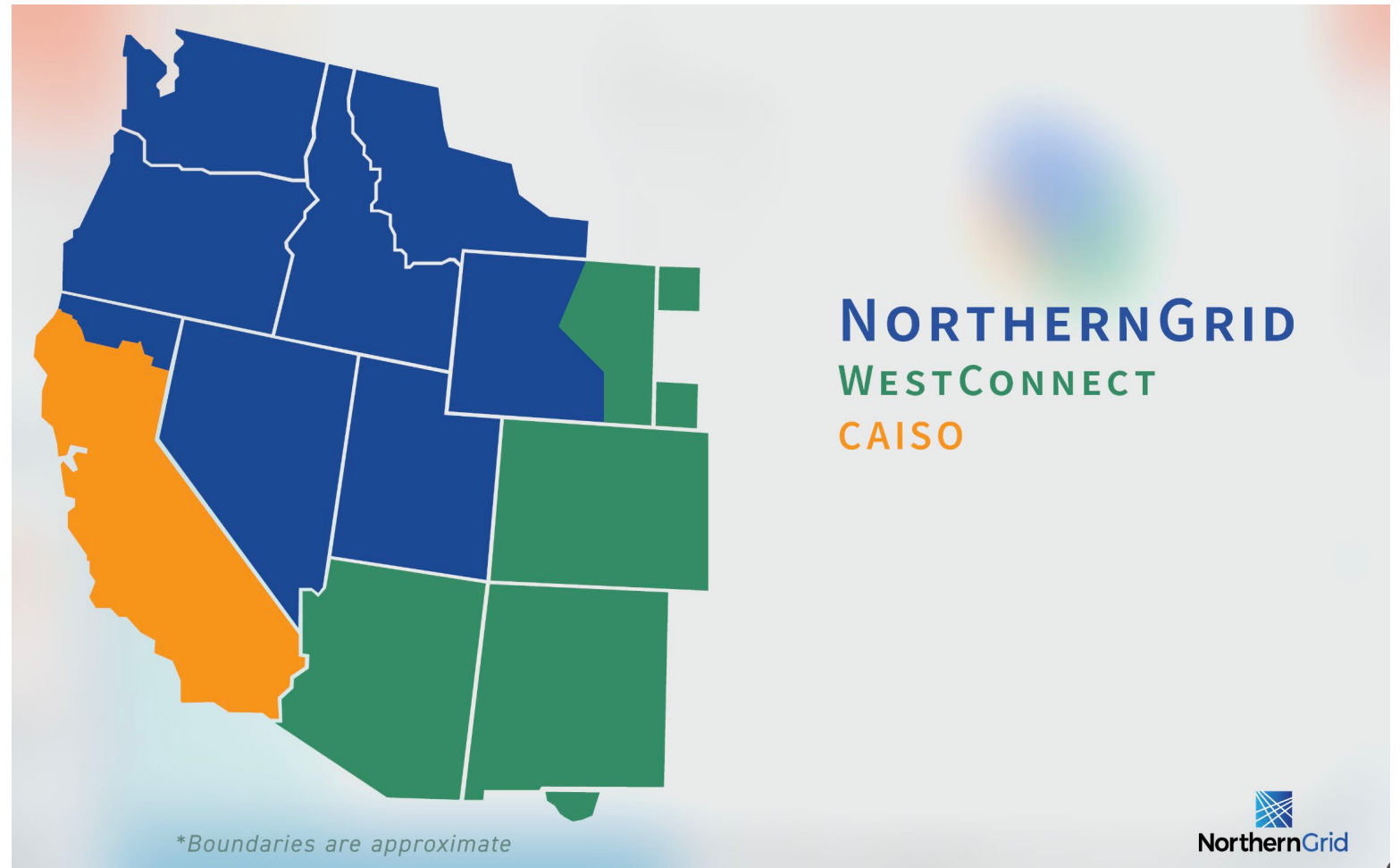
New initiative to consider impacts and benefits beyond the BPA BA/service area westwide (WECC footprint)

Western Power Pool: Update on WestTEC

BPA Evolving Grid Public Workshop

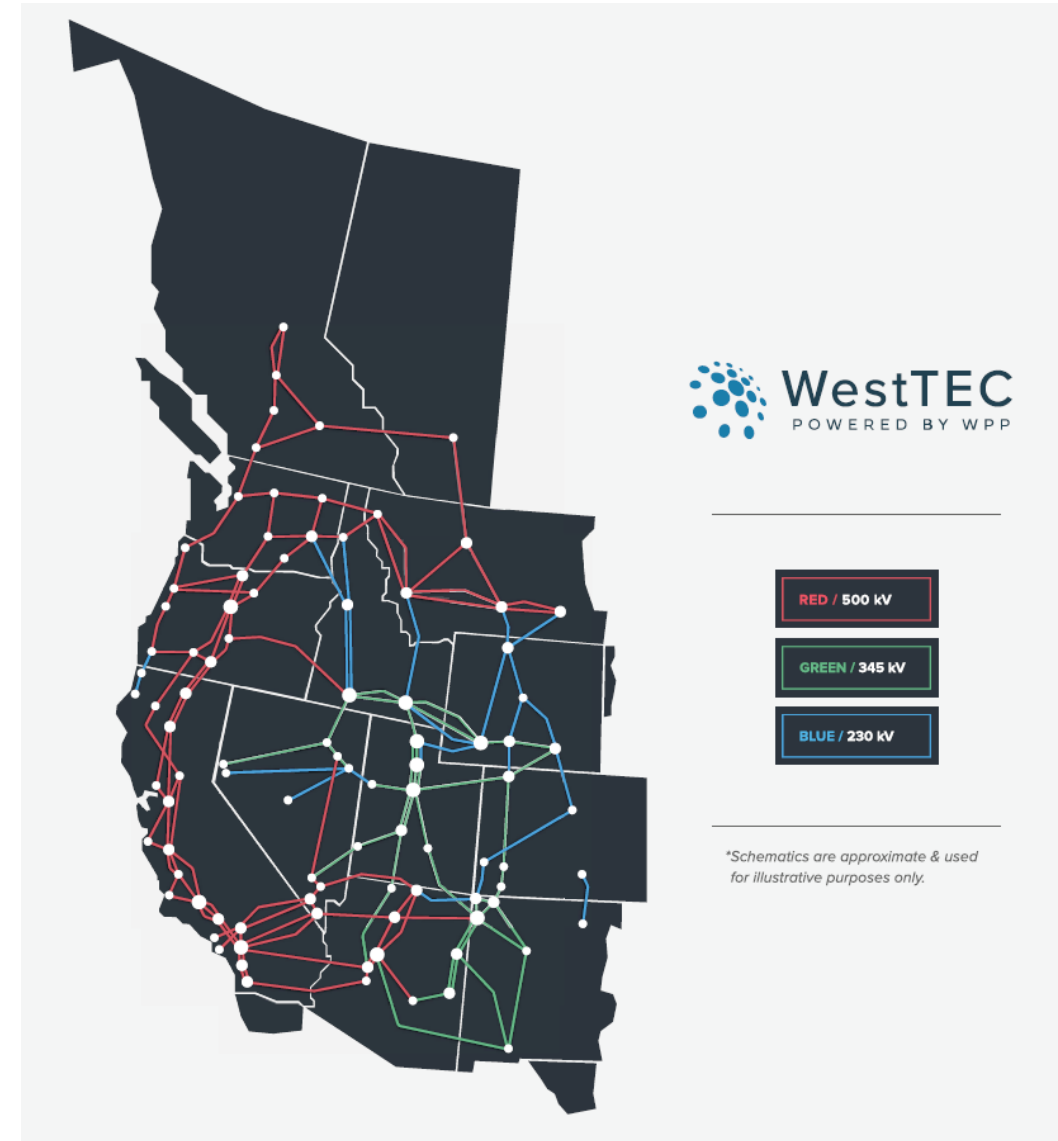
May 16, 2024

Regional Transmission Planning in the West

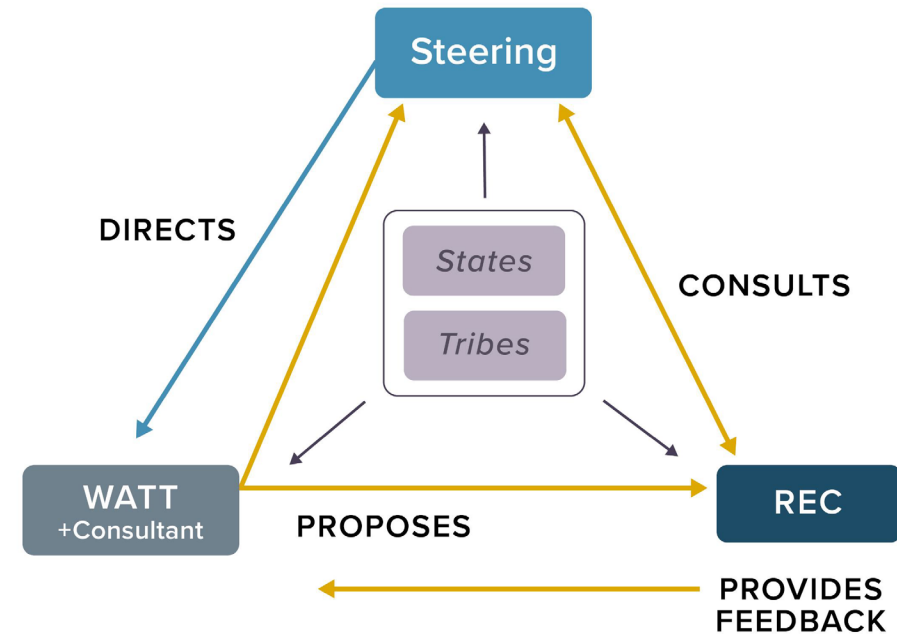


What is the Western Transmission Expansion Coalition?

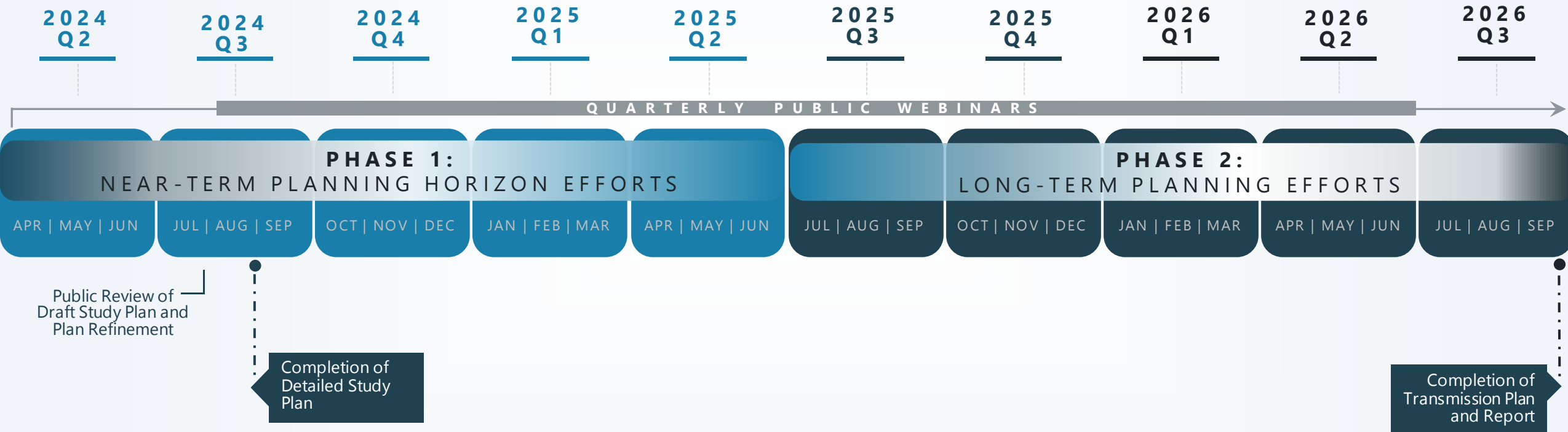
- » *“WestTEC”*
- » *West-wide 20-year transmission study (10-year look)*
- » *Industry-led with unprecedented stakeholder inclusion*
- » *Goal is to produce an actionable transmission study*



Committees and Governance



WestTEC Project Timeline



Upcoming Event and Other Links

» **WestTEC Public Webinar:** Thursday, June 6, 2024: 1-3pm Pacific

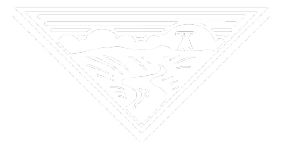
- » To attend the meeting and receive the meeting invite, please use the following registration link:
https://zoom.us/webinar/register/WN_xYww9ZSzS4CP4pLHgc-McQ
- » The WPP event page is here: <https://www.westernpowerpool.org/events/294>

» **WestTEC Committee Rosters**

- » Steering Committee; Technical Task Force (WATT); Regional Engagement Committee (REC):
 - » https://www.westernpowerpool.org/private-media/documents/WestTEC_Committees_4.21.24.pdf

Strategic Updates and Next Steps

Transmission Services



Strategic Alignment



TOGETHER WE ENERGIZE THE PACIFIC NORTHWEST

Transmission Value Proposition

Operating a Safe, Secure, and High Performing Grid

Enabling Economic Growth in the Region

Supporting a Clean Energy Future and Evolving Grid

Through Safety and Excellence

Long-Term Sustainability

Empower people and value culture
Integrated and efficient processes
Innovation and continuous improvement

Infrastructure

Implement operational improvements
Value and risk-based asset management
Advance investments and strengthen resilience

Products and Services

Support market evolution
Drive regional planning
Modernize products and services

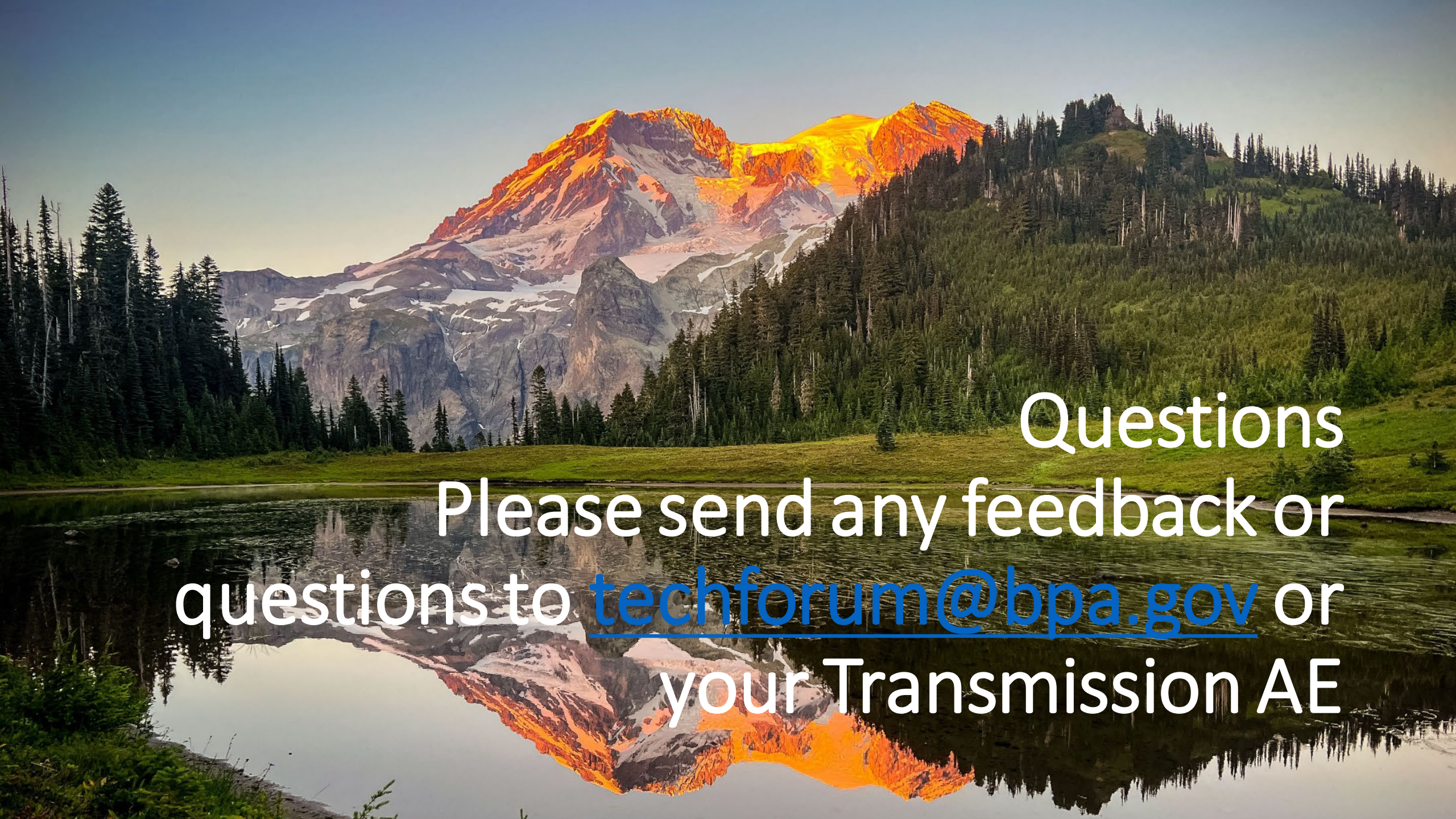
A Dependable and Responsive Partner, Fostering a Safe and Positive Culture

Looking Ahead

Following is a list of BPA and non-BPA-led efforts across transmission:

- BPA-led
 - TSEP Cluster Study
 - Automatic Generation Control (AGC) Upgrade
 - Generator Interconnection Queue Reform & Cluster Study
 - BP/TC-26
 - Integrated Program Review (IPR)
 - Day-Ahead Market
 - Evolving Grid: BPA expects to hold the next Evolving Grid workshop in the fall of 2024
- Other
 - WestTEC (update today)
 - NEITC: Northwest to Southwest Tieline
 - PNUCC 2024 Northwest Regional Forecast
 - FERC Order 881: Managing Transmission Line Ratings (TC-26 update coming soon)
 - FERC Order 1920: Building for the Future Through Electric Regional Transmission Planning and Cost Allocation*
 - FERC Order 1977: Applications for Permits to Site Interstate Electric Transmission Facilities*

** Released 5/13/24, currently under staff review*



Questions
Please send any feedback or
questions to techforum@bpa.gov or
your Transmission AE

Helpful BPA Links

BPA Transmission Plan: <https://www.bpa.gov/-/media/Aep/transmission/attachment-k/2022-bpa-transmission-plan.pdf>

Transmission Availability : <https://www.bpa.gov/energy-and-services/transmission/transmission-availability>

Becoming a BPA Customer: <https://www.bpa.gov/energy-and-services/transmission/becoming-a-transmission-services-customer>

- *For assistance in the BPA application process, call BPA Transmission Sales (360) 619-6016 and request the assignment of a BPA Transmission Services Account Executive.*

Interconnection: <https://www.bpa.gov/energy-and-services/transmission/interconnection>

Transmission Service Request Study: <https://www.bpa.gov/energy-and-services/transmission/acquiring-transmission/tsep>