

# Resource Planning Advisory Group Meeting

## 2027 Integrated System Plan

June 23, 2026



# Welcome to the meeting!

PSE

Use the **React** feature to raise your hand or respond to content with emojis



RPAG members and PSE staff are welcome to use the **Chat** feature\*

Click **Show Captions** to see real-time closed captioning

# Facilitator requests

- ◆ Engage constructively and courteously towards all participants
- ◆ Respect the role of the facilitator to guide the group process
- ◆ Avoid use of acronyms and explain technical questions
- ◆ Use the feedback form or email [isp@pse.com](mailto:isp@pse.com) for additional input to PSE
- ◆ Aim to focus on the webinar topic
- ◆ Public comments will occur after PSE's presentations
- ◆ To ensure members of the public can see the RPAG chat, please select "Everyone" from the chat dropdown menu

# Safety moment – grilling safety

- ◆ Always supervise a barbecue grill when in use
- ◆ Don't add lighter fluid once coals have been ignited
- ◆ Never grill indoors
- ◆ Keep kids and pets away from the grill
- ◆ Keep water or a fire extinguisher nearby



# Today's speakers

The logo for PSE (Pacific States Energy) is located in the top right corner. It consists of a teal diamond shape containing the letters 'PSE' in white, which is partially overlaid by a red triangle pointing downwards from the top right corner of the slide.

- ◆ Hilary Wilkinson, Facilitator, Maul Foster & Alongi (MFA)
- ◆ Jennifer Coulson, Director, Resource Planning Analytics
- ◆ David Landers, Director, Planning, PSE
- ◆ Shaun Foster, Director, Electric Transmission, PSE

# Agenda

Time	Agenda Item	Presenter / Facilitator
1:00 p.m. – 1:05 p.m.	Welcome and introductions	Hilary Wilkinson, MFA
1:05 p.m. – 1:25 p.m.	Recap and next steps	Jennifer Coulson, PSE
1:25 p.m. – 1:55 p.m.	Electric distribution system planning reference case	David Landers, PSE
1:55 p.m. – 2:45 p.m.	Electric transmission reference case: Local and regional transmission	Shaun Foster, PSE
2:45 p.m. – 3:00 p.m.	Next steps and public comment opportunity	Hilary Wilkinson, MFA
3:00 p.m.	Adjourn	All

# Meeting purpose

- ◆ Provide an overview of feedback from the May 28, 2026 RPAG meeting
- ◆ Continue discussion of the 2027 Integrated System Plan reference case
- ◆ Discuss electric distribution system planning reference case
- ◆ Discuss electric transmission (regional and local) reference case

# What we need from you

- ◆ Share your questions, reflections, and advice on today's topics
- ◆ Let us know if anything is missing or unclear
- ◆ Flag areas where deeper discussion is needed
- ◆ Help us identify risks, tensions, or points of misalignment early



# Recap and next steps

**Jennifer Coulson**

Director, Resource Planning Analytics

June 23, 2026



# Recapping our May RPAG – discussed why the initial electric supply reference case did not have a solution.

The AURORA model is working to solve for three different requirements

## Effective peak capacity

- Physical peak need refers to the resources required to ensure reliable operation of the system. It is an operational requirement that includes three components: customer peak demand (demand forecast), planning margin (resource adequacy modeling), and operating reserves.

## CETA renewable and nonemitting resources

- Washington State's Clean Energy Transformation Act (CETA) requires PSE to meet specific percentages of our load with renewable or non-emitting resources or renewable energy credits (RECs) by specific dates; 80% renewable or non-emitting target by 2030-2033; 100% renewable or non-emitting target by 2045.

## Energy demand

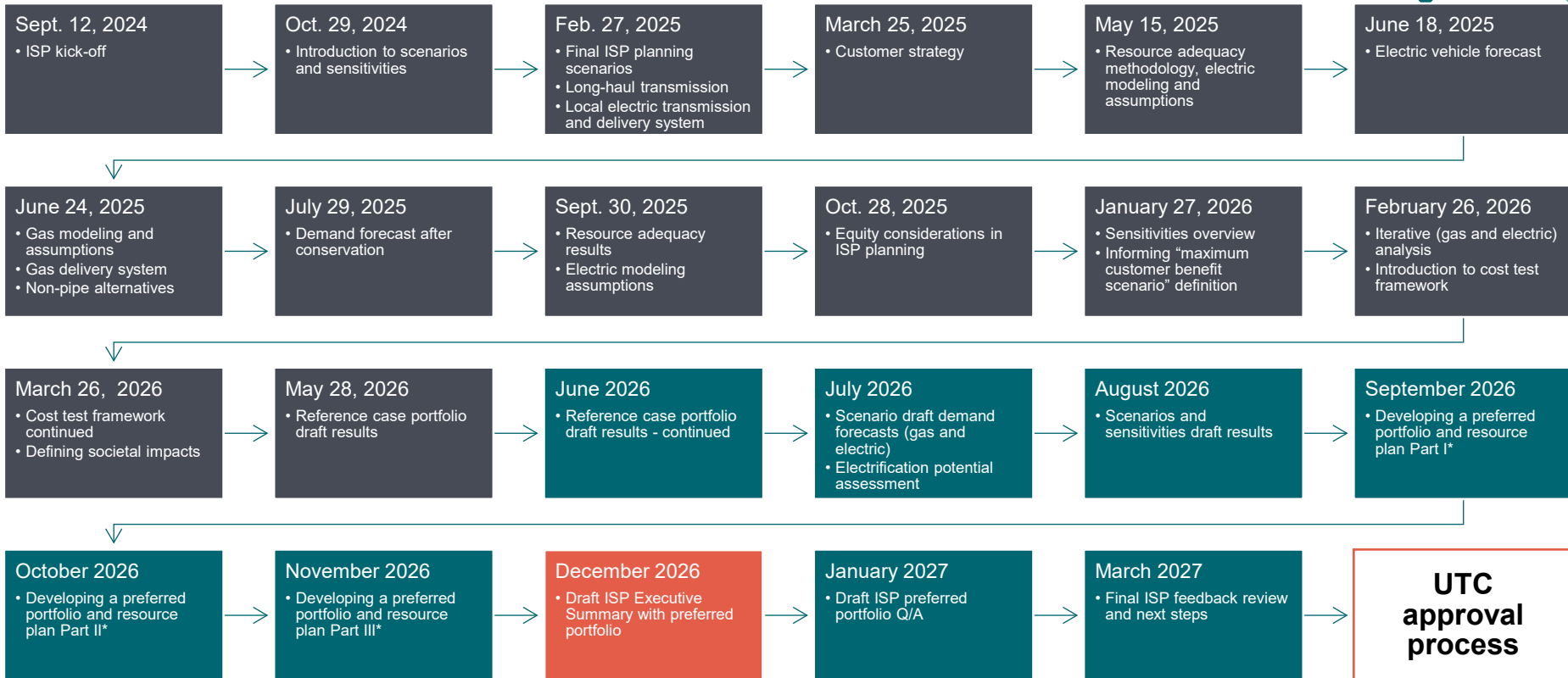
- Energy need refers to the resources required to meet customer demand in every hour. How the demand is met changes by scenario and is dependent on how resources are dispatched versus buying on the market.

Based on the initial assumptions and resource options in place – the model did not produce a feasible solution.

*This is important because it highlights the risks associated with meeting PSEs growing electric demand while continuing to ensure a safe and reliable system.*

# Resource planning advisory group engagement timeline

PSE



# Questions?



# Electric distribution system planning reference case

**David Landers**

Director, Planning, PSE

June 23, 2026



# There are four key takeaways from the electric distribution system reference case



**Alignment** – The Electric Distribution System Reference case aligns with the 2027 ISP load forecast update and latest 2026 General Rate Case (GRC)



**Steady investment** – The overall investment is steady across different time horizons, going from \$200M/year investment in the first 5 years to \$165M/year across 25 years



**Investment shifting** – The investment spending shifts from primarily capacity additions in the early years due to substation overloading to incremental maintenance associated with the growing electric system



**Future iterations** – The sensitivity analysis may iterate based on findings from the gas non-pipeline alternative (NPA) analysis

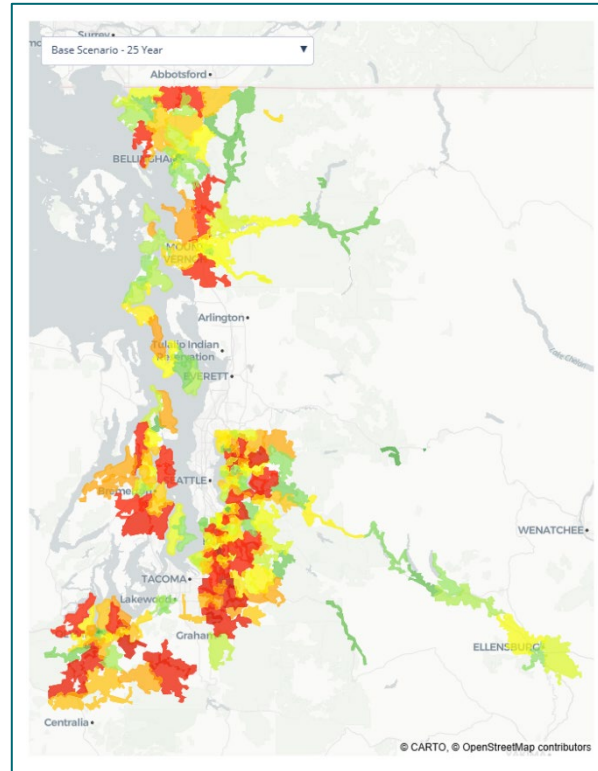
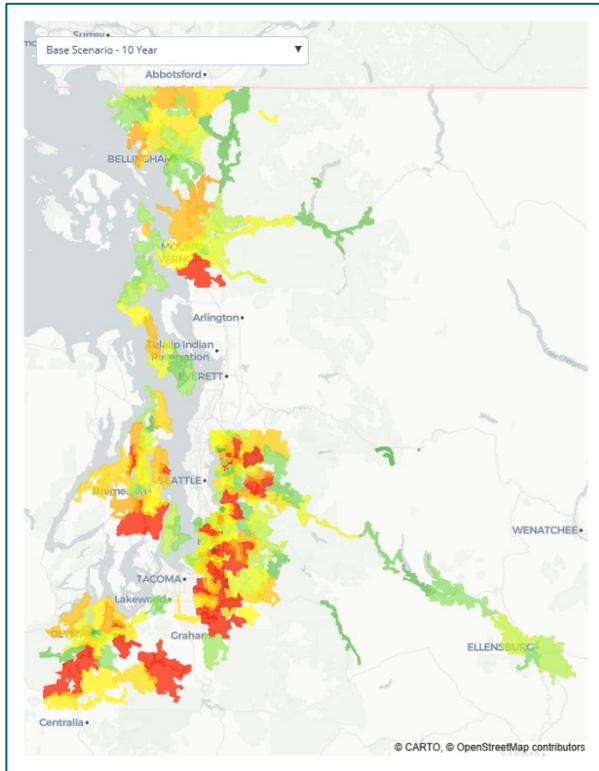
# There were four overall assumptions for the reference case

Category	Reference case
<b>Load</b>	<ul style="list-style-type: none"><li>• Used 2027 ISP Update Demand Forecast county-level load forecast spread across substations based on location</li></ul>
<b>Investment decisions for capacity</b>	<ul style="list-style-type: none"><li>• Used 2028 – 2029 capacity spending based on 2026 GRC</li><li>• Based on substations overloaded in five-year period and total capacity spend, determined cost per overloaded substation (~\$36M/substation) that gets extracted from 2030-2050</li></ul>
<b>Investment decisions for maintenance</b>	<ul style="list-style-type: none"><li>• Based on \$/MW maintenance spending within five years, that grows incrementally with demand</li></ul>
<b>Expected T&amp;D infrastructure</b>	<ul style="list-style-type: none"><li>• Overloaded substation metrics provided based on time increments (5-year, 10-year, etc.)</li><li>• Identified 10 substations could be potentially deferred by collocation of a 5 MW BESS if the transformer had &lt;100% loading in year 5, &gt;100% loading in year 10, and less than 120% loading in year 25; assumed 30% success rate (3 total substations)</li></ul>

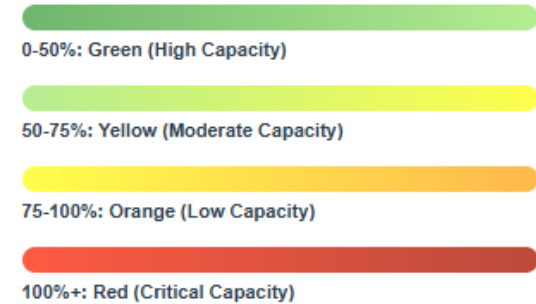
**The substation results showed high loading in the first five years, followed by a slower decline based on the load forecast**

<b>Time Horizon</b>	<b>Qty of Substations Loaded &gt;100%</b>	<b>% of Total Substations Load &gt; 100%</b>
Five-Year	28	9.3%
10-Year	42	13.9%
20-Year	63	20.9%
25-Year	71	23.5%

# The distribution substation loading shows higher loads critical capacity needs heightened geographically from the 10-year to 25-year forecast



## Capacity Legend



10-year forecast

25-year forecast

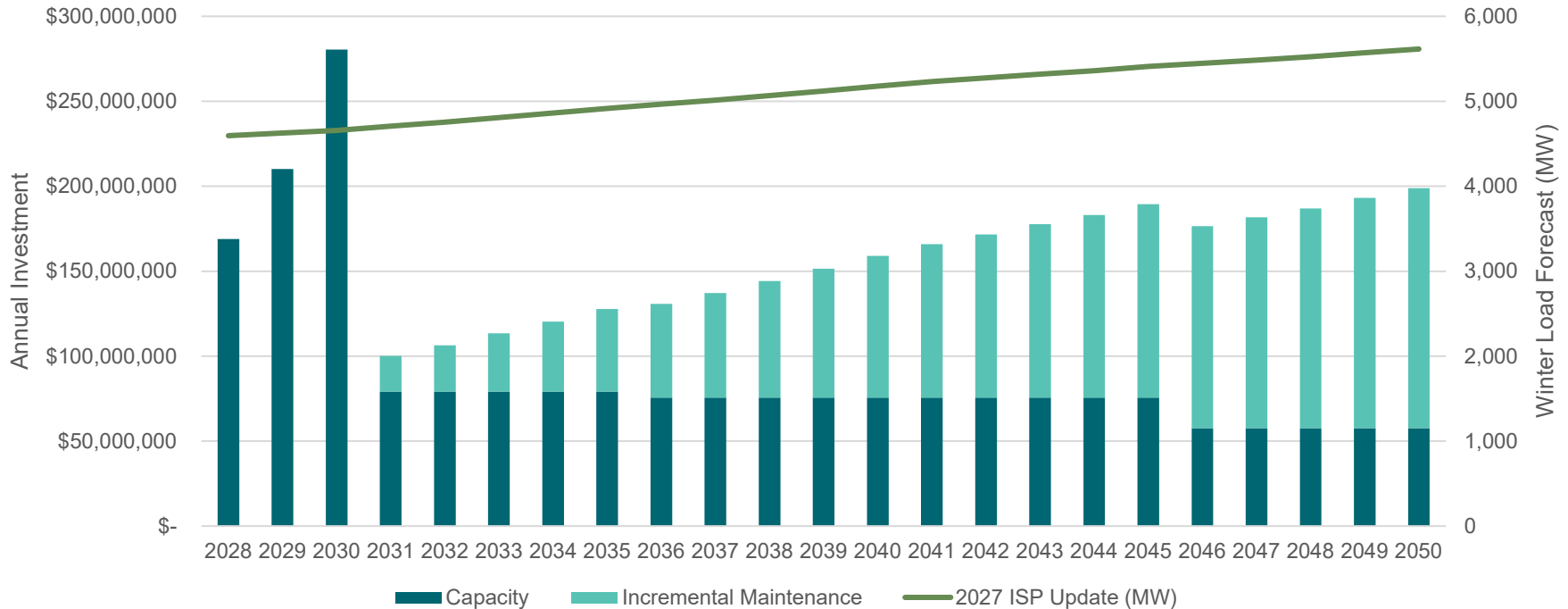
## The reference case investment spending shifts from primarily capacity additions in the early years to incremental maintenance associated with the growing electric system

Time horizon	Capacity investment (\$M)	Incremental maintenance investment (\$M)	Total investment (\$M)	Spending drivers
2026-2030	\$1,007M	\$0M	\$660M	<ul style="list-style-type: none"> <li>28 overloaded substations</li> </ul>
2031-2035	\$396M	\$172M	\$568M	<ul style="list-style-type: none"> <li>14 additional overloaded substations (42 total)</li> <li>3 assumed to be solved with DER co-location</li> <li>260 MW of load growth (2035-2030)</li> </ul>
2036-2045	\$755M	\$855M	\$1,610M	<ul style="list-style-type: none"> <li>21 additional overloaded substations (63 total)</li> <li>753 MW of load growth (2045-2036)</li> </ul>
2046-2050	\$288M	\$649M	\$937M	<ul style="list-style-type: none"> <li>8 additional overloaded substations (71 total)</li> <li>959 MW of load growth (2050-2030)</li> </ul>
<b>Total</b>	<b>\$2,446M</b>	<b>\$1,677M</b>	<b>\$4,123M</b>	

# The reference case investment spending shifts from primarily capacity additions in the early years to incremental maintenance associated with the growing electric system



Reference case (annual investment vs. winter load forecast)



# Electric transmission reference case

**Shaun Foster**

Director, Electric Transmission, PSE

June 23, 2026



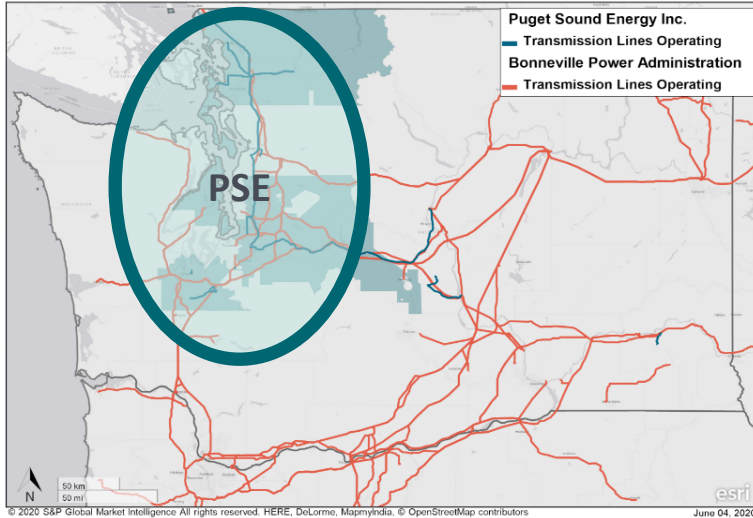
# Local transmission planning

For more details regarding the PSE local transmission analysis please refer to the [February 27, 2025 RPAG meeting](#)

June 23, 2026



# Local transmission planning



- Historically, local system planning has focused on system reliability and capacity to serve load.
- Recent IRP portfolios have identified significant on-system resources needed to enable clean energy goals.
- PSE’s local transmission system planning process needs to consider resource integration in addition to reliability and capacity considerations.
- Resource integration will likely drive system improvements and will require reasonable assumptions of where these resources may be developed on-system.

## 2023 Electric Progress Report Preferred Portfolio On-System Resources

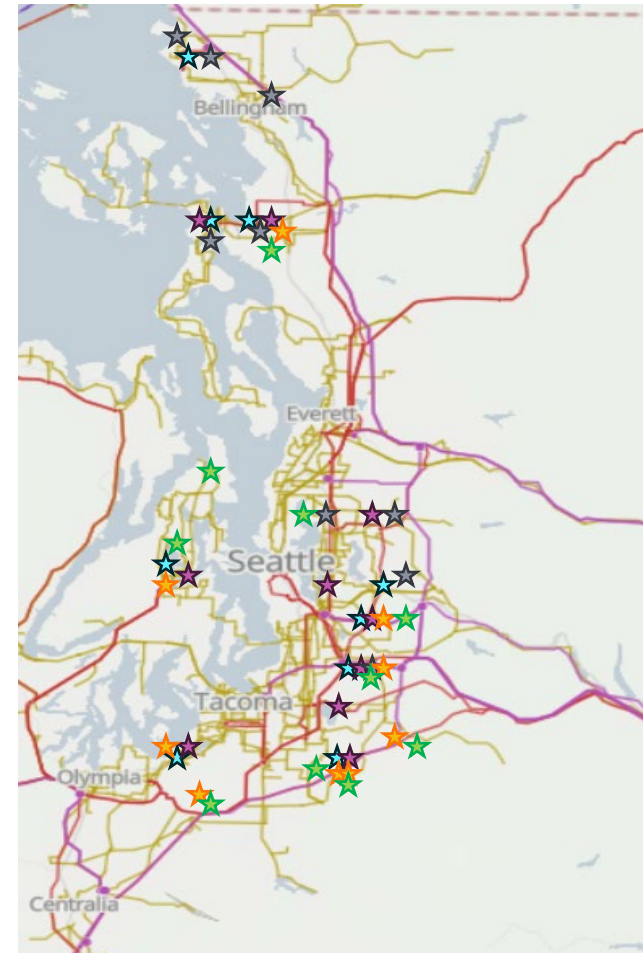
Resource	2030	2035	2040	2045
CETA-qualifying Peaking Capacity	711 MW	711 MW	985 MW	1,588 MW
Battery Energy Storage	600 MW	1,200 MW	1,300 MW	1,400 MW
<b>Total</b>	<b>1,311 MW</b>	<b>1,911 MW</b>	<b>2,285 MW</b>	<b>2,988 MW</b>

# Analysis of resource builds in the PSE Zone supported ISP assumptions

PSE

**An analysis of resource builds on the local system identified:**

- ◆ Local transmission system upgrades needed to support added resources in the PSE Zone
- ◆ The cost of the local system upgrades required for resource integration
- ◆ 5 scenarios were studied to capture uncertainty in future resource siting
  - § Alignment with the interconnection queue and RFP proposals
  - § Resource placement focused on the 230 kV system
  - § Three geographically focused cases (Northern Region, Southern Region, and Western Region respectively)



- ★ Scenario 1
- ★ Scenario 2
- ★ Scenario 3
- ★ Scenario 4
- ★ Scenario 5

# Reference Case transmission costs incorporated presumed local and regional system builds

*To determine local system Network Upgrade costs to use in the ISP, technical studies evaluated the cost of incorporating resources across 5 different resource scenarios:*

- ◆ 2,000 MW of resources by 2035
- ◆ Additional 1,000 MW of resources by 2045

*Network Upgrades needed to incorporate 3,000 MW of resources across the 5 studied scenarios included:*

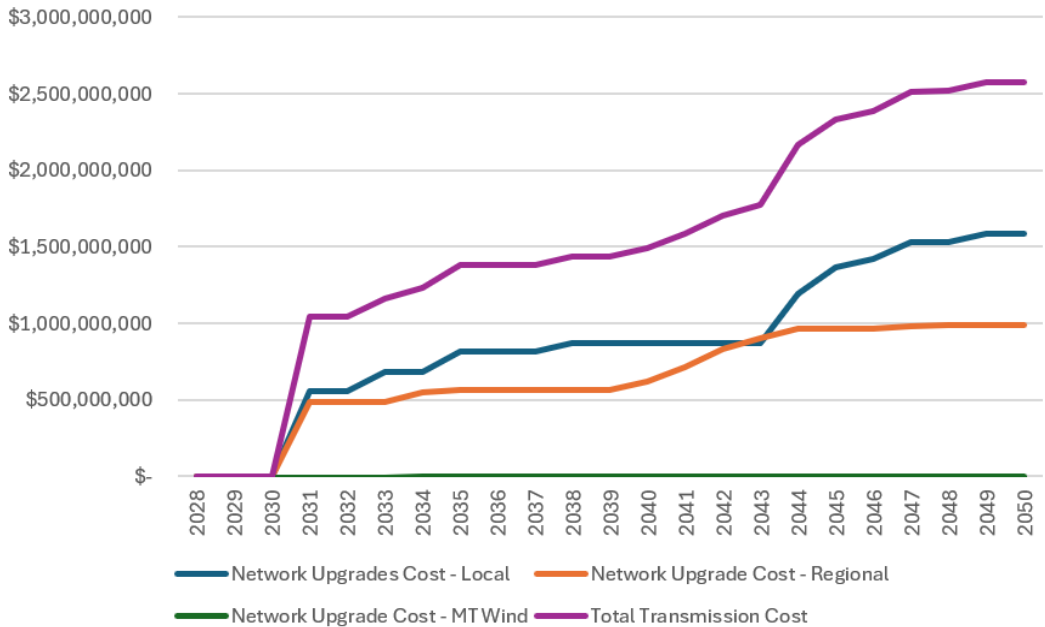
<b>Build</b>	<b>Low</b>	<b>High</b>
115 kV Line Reconductor (miles)	220	305
New 115 kV and 230 kV Transmission Build (miles)	30	130
New Bulk Transformers	6	10
New Transmission Substations	1	5
Total Upgrade Costs (MM)	\$1,000	\$2,500

*Using these results, the 27 ISP Reference Case assumed a \$/MW for interconnecting new resources on PSE's local transmission system.*

# Reference Case transmission costs incorporated presumed local and regional system upgrades



Network Upgrade Costs for Reference Portfolio



\*Network Upgrade costs for resources interconnecting to the regional transmission system were based off an average of historical costs for interconnecting across the region.

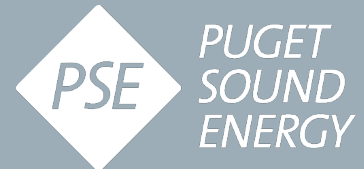
*The ISP uses the PSE Zone to balance resource needs after regional transmission capacity has been fully utilized.*

- ◆ Resultant cost for local system transmission upgrades is \$1,500MM
- ◆ There is a practical limitation for PSE Zone builds, but that limit is difficult to define.
  - ◇ PSE must execute on the portfolio of projects needed for capacity and reliability for load service
  - ◇ Resource needs are expected to be incremental due to the challenge of siting resources close to load
- ◆ Factors influencing resource siting and transmission development include:
  - ◇ City and county policies on renewable resource development
  - ◇ Local codes
  - ◇ Zoning
  - ◇ Land availability
  - ◇ Permitting Concerns

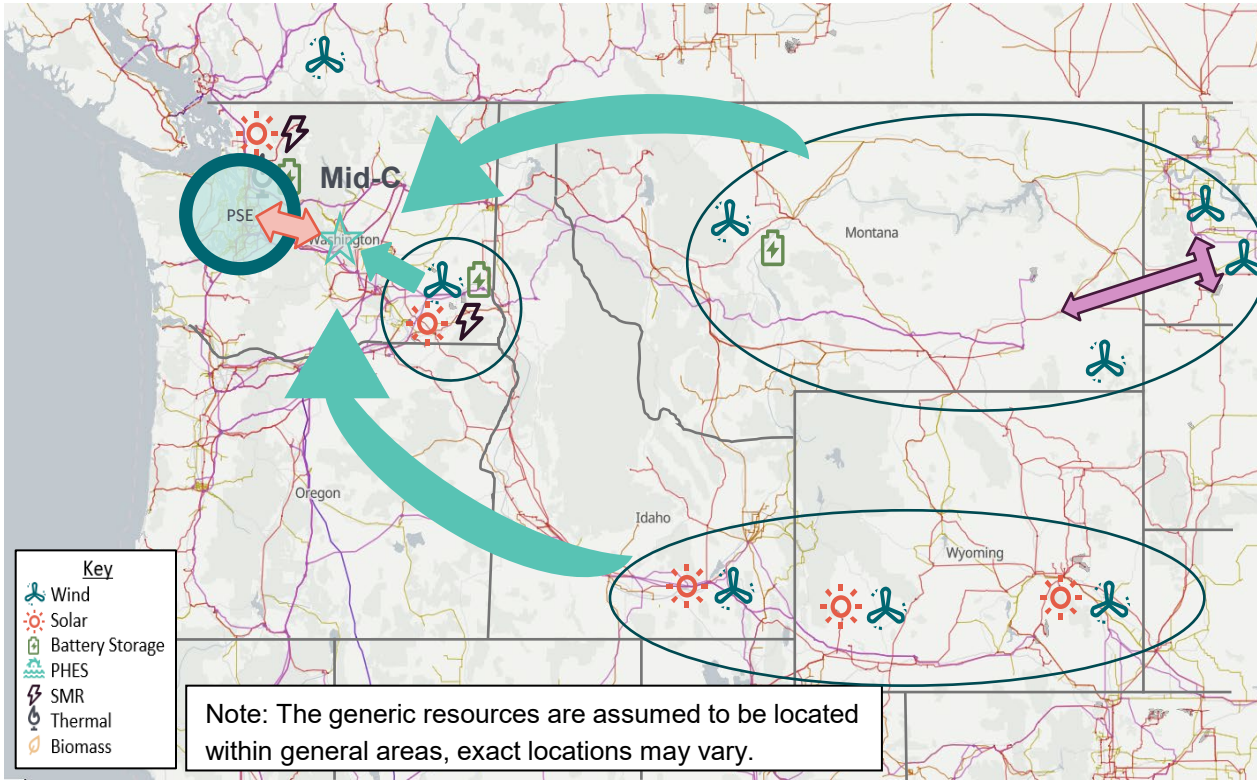
# Regional transmission

For more details regarding the regional transmission analysis please refer to the February 27, 2025 RPAG meeting

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# Transmission expansion to enable clean energy delivery



Transmission to deliver Clean Energy Zones (CEZ) to PSE's service territory will require multiple segments.

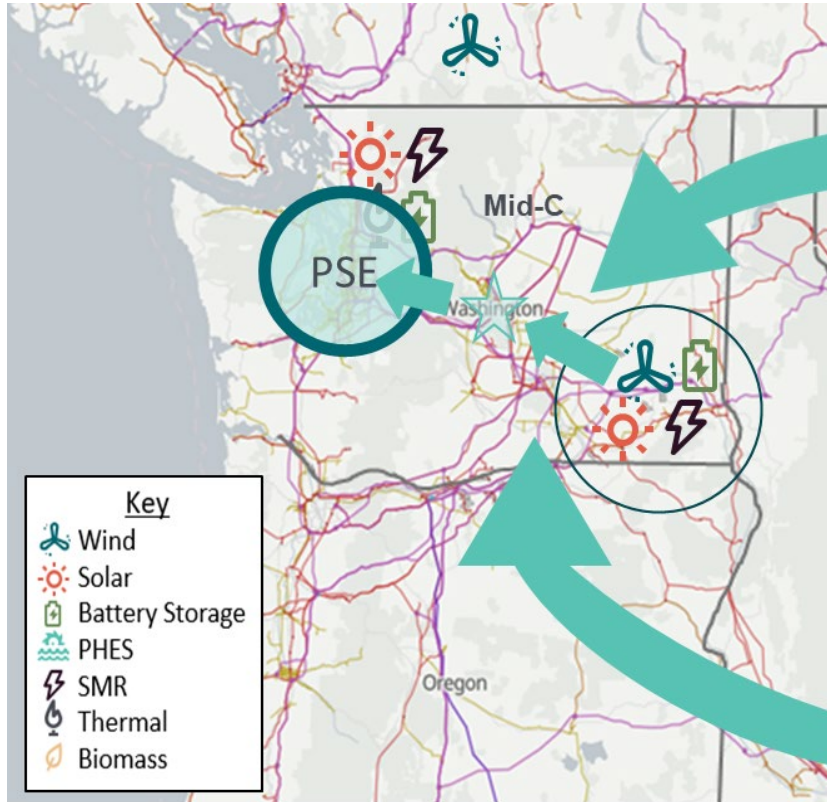
Key constraints

- ◆ Cross-Cascades via the West of Cascades North (WOCN) path
- ◆ Montana/North Dakota to WA
- ◆ Idaho/Wyoming to WA

↔ Cross-Cascades Project

↔ North Plains Connector Project

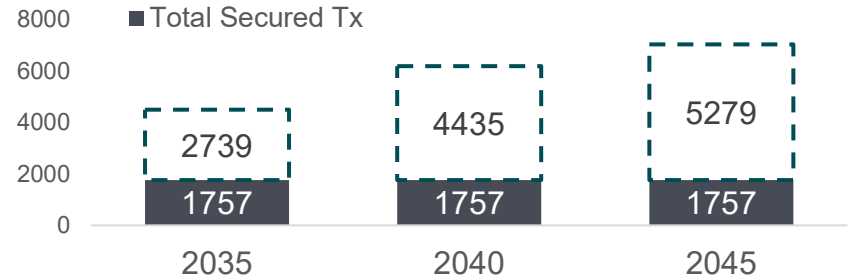
# A. Cross-Cascade transmission need



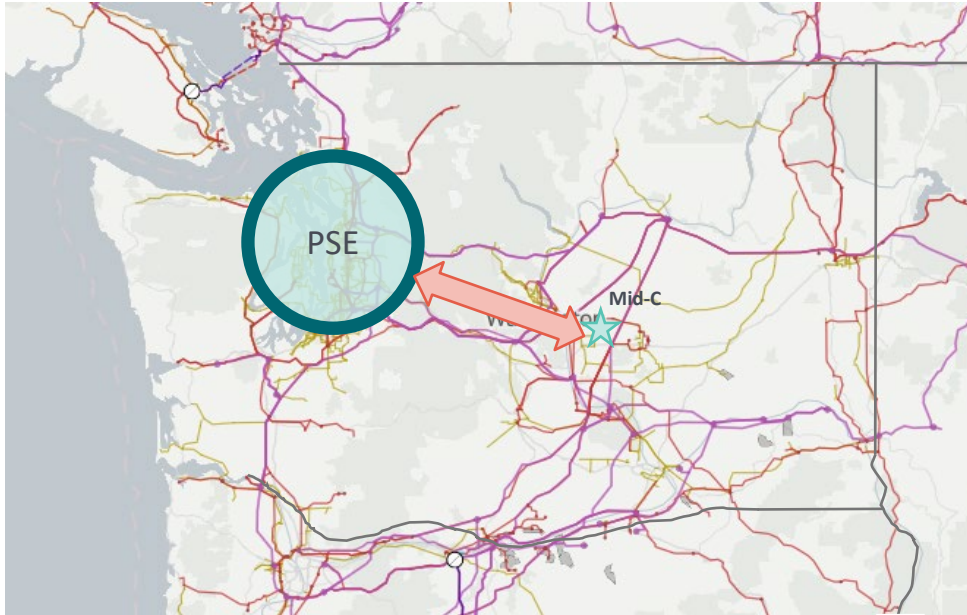
Additional Cross-Cascades capacity is critical first step to deliver clean energy to PSE.

- ◆ Majority of clean energy from WA, MT, ID and other clean energy zones will come across the Cascades.
- ◆ Significant need to address and will require additional transmission lines.

**2023 Electric Progress Report Preferred Portfolio Transmission Needs**



# Cross-Cascades transmission solution development to access WA, MT/ND and ID/WY clean energy

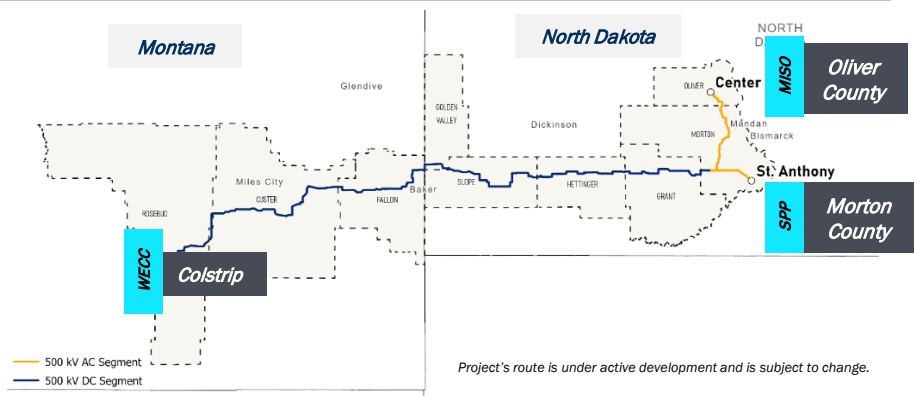


- ◆ PSE is evaluating options to increase capacity across the Cascades by about 3,500 MW
  - ◇ Focus on repurposing existing corridors
- ◆ Due to the large need, at least 2 additional 500kV lines will be required on the West of Cascades North path.

# North Plains Connector



## Preliminary Route



- This project is a 420-mile HVDC transmission line connecting Colstrip, Montana to endpoints near Bismarck, North Dakota
- PSE currently has 746 MW of rights on Colstrip Tx
- PSE has executed an MOU to purchase up to 25% (750 MWs) of the project
- **GRIP grant recipient**

## Project Configuration

<b>Development</b>	Grid United and Pattern Energy
<b>Length</b>	~420 mi.
<b>Configuration</b>	HVDC (VSC)   525 kV   3,000 MW   bi-directional
<b>Interconnections</b>	<ul style="list-style-type: none"> <li>• WECC – 3,000 MW into Colstrip, MT 500kV system</li> <li>• MISO – 1,500 MW (AC) to new substation in Oliver County, ND;</li> <li>• SPP – 1,500 MW (AC) to new substation in Morton County, ND</li> </ul>
<b>Timeline</b>	Construction start: 2028 (expected) Commercial Operation Date: 2032 (expected)

## PSE portfolio benefits

- Adds access to North Dakota wind which correlates well to PSE load shape
- Market access to both SPP and MISO
  - Reduce curtailment risk of Montana wind
  - Improve resilience to extreme weather
- Enables near perfect capacity and full utilization of existing Colstrip Tx Montana to PSE

# BPA's Evolving Grid plans are underway to improve paths based on transmission service requests



Evolving Grid 1.0			Evolving Grid 2.0	
1	Cross Cascades North Upgrades <ul style="list-style-type: none"> <li>Schultz-Raver 500 kV Line Upgrade</li> <li>Paul 500 kV Substation Upgrade</li> <li>Olympia 230 kV Substation Upgrade</li> </ul>		1	Grand Coulee-Columbia-Schultz 500 kV Line Upgrade
2	Big Eddy-Chemawa 230/500 kV Line Upgrade	2	Schultz-Olympia 500 kV Line Upgrade	
3	Portland Area Upgrades <ul style="list-style-type: none"> <li>Pearl-Sherwood McLoughlin 230 kV Line Upgrade</li> <li>Keeler-Horizon 230 kV Line</li> <li>Keeler 230/500 kV Transformer Addition</li> </ul>	3	North of Pearl Upgrades	
4	Chehalis-Covington 230 kV Line Upgrade	4	Central Oregon 500 kV Dynamic Reactive Upgrades	
5	Ross-Rivergate 230 kV Line Upgrade	5	RATS: Reno-Alturas Reactive Addition	
6	Rock Creek-John Day 500 kV Line Upgrade	6	Salem Area Upgrades #1 (North of Marion)	
7	Six Mile Canyon 230/500 kV Substation (New Construction)	7	Salem Area Upgrades #2 (North of Marion)	
8	Bonanza 230/500 kV Substation (New Construction)	8	NOB Substation (New Construction)	
9	La Pine-Bonanza 230 kV Line (New Construction)	9	Lower Columbia-Bonanza 500 kV Line (New Construction)	
10	Buckley 500 kV Substation Rebuild	10	Bonanza to NOB 500 kV Line (New Construction)	
		11	Ostrander-Pearl 500 kV Line Upgrade	
		12	Big Eddy-Quenett Creek Upgrade	
		13	Big Eddy-The Dalles Line Rebuild	

BPA Evolving Grid Initiative has 2 main phases:

## Evolving Grid 1.0 - Committed Projects

- 10 proposed projects at a cost of \$2 billion
- Estimated in service dates of 2026-2032
- Additional capacity included in PSE's assessment

## Evolving Grid 2.0 - Proposed Projects

- 13 proposed projects at a cost of \$3 billion
- BPA is evaluating new grid enhancing technologies to reduce costs
- Estimated in service dates for key projects most directly affecting PSE are 2035+
- Risk that these projects will not have commitment to continue. Due to the uncertainty, we are considering these as scenarios in PSE's assessment.

Source: [BPA Evolving Grid Update on Transmission Activities](#), Dec. 4, 2024

# Transmission sensitivities will evaluate the impact of regional transmission on the portfolio



Sensitivity	Description
PSE Cross-Cascades Build	Double circuit 500 kV transmission line from PSE's local transmission system to Mid-C. Includes BPA GERP 1.0 capacity
PSE Cross-Cascades Build (Phased)	Double circuit 500 kV transmission line from PSE's local transmission system to Mid-C. Assumes one circuit is energized in 2035 and the second circuit is energized in 2045. Includes BPA GERP 1.0 capacity
North Plains Connector - Option 1	A 375 MW stake in the North Plains Connector project with 375 MW of North Dakota wind resources.
North Plains Connector - Option 2	A 375 MW W-E and 525 MW E-W stake in the North Plains Connector project with 525 MW of North Dakota wind resources.
North Plains Connector + Colstrip Transmission + MT to WA Transmission + PSE Cross-Cascades Build	A 375 MW stake in the North Plains Connector project with 375 MW of North Dakota wind resources. Incremental increase in Colstrip Transmission System Capacity as well as additional transmission capacity from Montana to Mid-C. Includes double circuit 500 kV transmission line from PSE's local transmission system to Mid-C.
Colstrip Transmission + MT to WA Transmission	Incremental increase in Colstrip Transmission System Capacity as well as additional transmission capacity from Montana to PSE's system.
Colstrip Transmission + MT to WA Transmission + PSE Cross-Cascades Build	Incremental increase in Colstrip Transmission System Capacity as well as additional transmission capacity from Montana to Mid-C. Includes double circuit 500 kV transmission line from PSE's local transmission system to Mid-C.

# Questions?

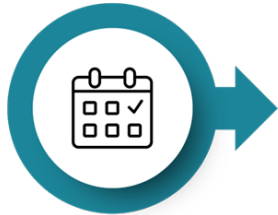


# Next steps

June 23, 2026



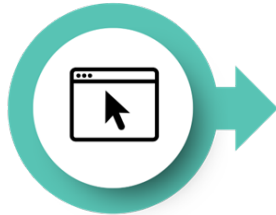
# Feedback process



01

## One week prior to meeting

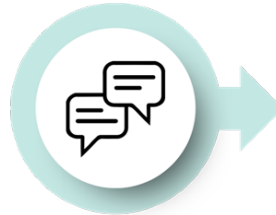
The feedback window for the upcoming meeting opens.



02

## 3-5 business days prior to meeting

PSE posts the meeting agenda and slide deck on the Clean Energy website.



03

## Day of meeting

PSE engages RPAG for feedback and facilitates a public comment opportunity.



04

## One week post meeting

Feedback window for the latest RPAG meeting closes. Feedback received outside this window will go into the subsequent feedback report.



05

## Four weeks post meeting

PSE posts the meeting summary and feedback report from the latest RPAG meeting on the Clean Energy website.

# Visit our website

- ◆ You can find meeting materials, meeting summaries, feedback reports, and links to meeting recordings on the RPAG portion of our [clean energy planning website](https://www.cleanenergyplan.pse.com/rpag).

Upcoming meetings

**August 2025**  
No scheduled meeting


**September 30, 2025**  
1 p.m. – 4 p.m.

**October 28, 2025**  
1 p.m. – 3 p.m.

**November 13, 2025**  
1 p.m. – 4 p.m.


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Registration information and how members of the public may participate are posted 2-4 weeks in advance of each meeting. Meeting materials are posted at least 3 business days in advance of each meeting.




**RPAG Meeting | July 29, 2025**

Demand forecast after conservation 7/29/25 | 10 a.m. – 1 p.m. Puget




**RPAG Meeting | June 24, 2025**

Gas modeling and assumptions, gas delivery system, non-pipe alternatives




**RPAG info session | June 18, 2025**

Electric vehicle forecast information session for the 2027 ISP 6/18/25 | 11




**RPAG Meeting | May 15, 2025**

Resource adequacy methodology and electric modeling for the 2027 ISP



**RPAG Meeting | March 25, 2025**

Customer strategy for the 2027 ISP 3/25/25 | 1 p.m. – 4 p.m. Puget



**RPAG Meeting | Feb. 27, 2025**

Electric delivery system, regional and local transmission, and finalizing

# Upcoming activities

Date	Activity
June 30, 2026	Feedback form for this meeting closes
July 28, 2026	RPAG meeting

# Contact us

- ◆ Via email at [isp@pse.com](mailto:isp@pse.com)
- ◆ Via feedback form at:  
<https://www.cleanenergyplan.pse.com/contact>
- ◆ Leave us a voicemail at 425-818-2051
- ◆ [Subscribe to our email list](#)
- ◆ Visit our website: [cleanenergyplan.pse.com](http://cleanenergyplan.pse.com)

# Public comment opportunity

June 23, 2026



# How to participate in public comment opportunity

The logo for PSE (Public Safety Emergency) is located in the top right corner. It consists of a teal diamond shape containing the letters 'PSE' in white, with a red triangle partially overlapping it from the top right.

- ◆ Please use the “raise hand” feature if you would like to provide comment
- ◆ Each speaker will have up to 3 minutes to give comments
- ◆ Comments should relate to today’s meeting topics
- ◆ Please keep remarks respectful – no personal attacks
- ◆ Comments and questions will be included in the feedback report with PSE’s response
- ◆ You are welcome and encouraged to send written feedback and questions to [isp@pse.com](mailto:isp@pse.com)

**Thank you for joining us!**



# Appendix

# Definitions and acronyms

Acronym	Definition
BESS	Battery energy storage system
BPA	Bonneville Power Administration
C&S	Codes and standards
CCA	Climate Commitment Act
CEAP	Clean Energy Action Plan
CEIP	Clean Energy Implementation Plan
CETA	Clean Energy Transformation Act
CPA	Conservation potential assessment
DER	Distributed energy resources
DSP	Delivery system planning
GHG	Greenhouse gas
GRC	General rate case

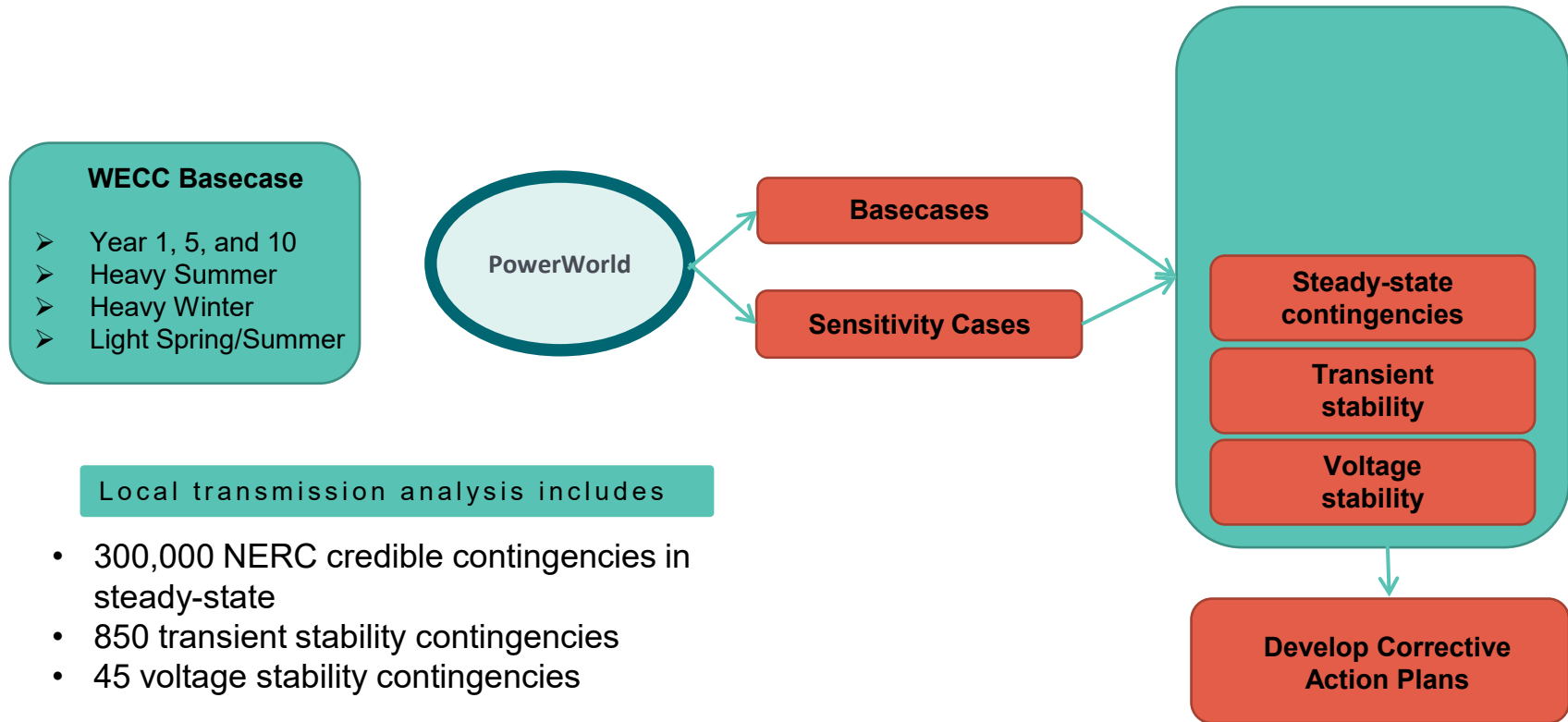
Acronym	Definition
HVDC	High voltage direct current
IRP	Integrated Resource Plan
ISP	Integrated System Plan
Mid-C	Mid Columbia energy market
MW	Megawatt
MISO	Midcontinent Independent System Operator
MWh	Megawatt hour
NPA	Non-pipeline alternative
RFP	Request for proposal
RNG	Renewable natural gas
RPAG	Resource Planning Advisory Group
WECC	Western Electricity Coordinating Council

# Local transmission planning

Eleanor Ewry, PSE



# Local transmission planning study methodology



# Each Annual Planning Study includes 15-20 study cases depicting a variety of conditions across the system



Basecases represent reasonably stressed conditions for the peak load hour of the winter and summer seasons.

Sensitivity cases vary assumptions such as generation dispatch, path flows and/or forecasted load to further stress the system.

Voltage stability cases test the stability limits of the system under various contingencies.

# Transmission needs and solution alternatives

Transmission Need	Potential solutions	Example
Transmission line capacity	Reconductoring (traditional or advanced conductors) Rebuild existing New transmission	Sedro – Bellingham #3 & #4 Reconductor/Rebuild Moorlands Area Capacity
Transmission transformer capacity	New transformer (existing or new substation)	Energize Eastside St. Clair Substation
Transmission system reliability	New transmission ROW mitigation	Bainbridge Island Missing Link Whidbey Island
Voltage stability*	Upgrade line voltage Voltage support devices	Electron Heights – Enumclaw 55 kV to 115 kV Conversion

# Energy equity

- ◆ PNNL Technical Assistance Program for energy equity
  - ◇ “The goal of the Technical Assistance (TA) program is to assist transmission planners in incorporating energy equity as an objective in their planning.”
  - ◇ Tier 1: Capacity building
    - Public engagement processes and best practices
  - ◇ Tier 2: Advanced capacity building
    - Quantification of costs/benefits and how to equitably distribute them
- ◆ Funding for this effort is currently paused

# Regional transmission

Eleanor Ewry, PSE



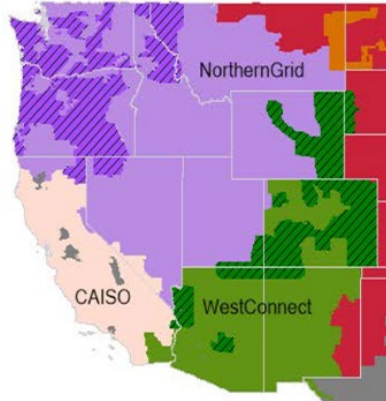
*PUGET  
SOUND  
ENERGY*



# Regional transmission planning



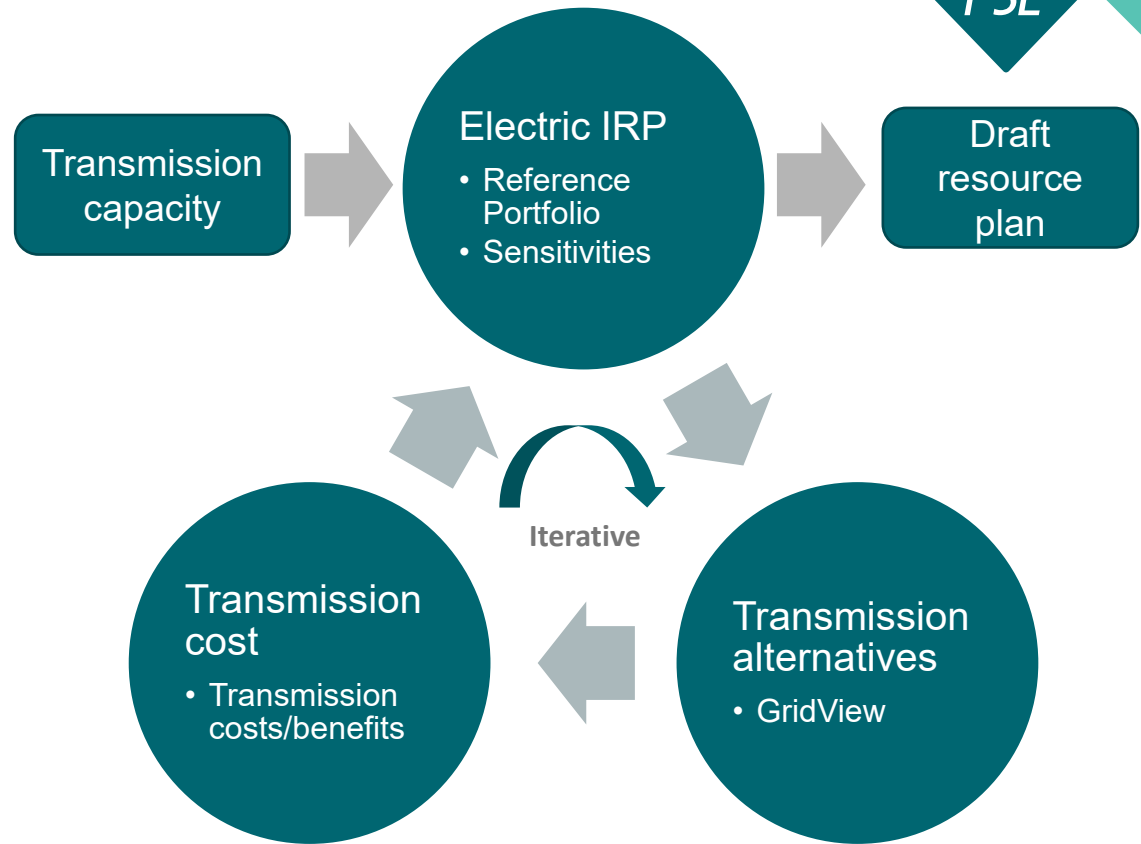
- ◆ *“NorthernGrid is the outcome of a single transmission planning region, facilitating regional transmission planning, enabling one common set of data and assumptions, identifying transmission projects through a single stakeholder forum, and eliminating duplicative administrative processes.”*
- ◆ NorthernGrid facilitates FERC Order 1000 and Order 1920 requirements for regional planning.



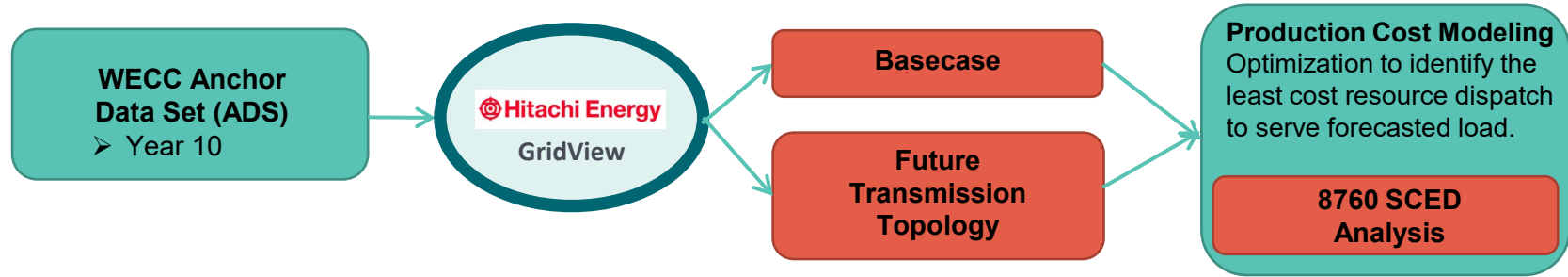
“The Western Transmission Expansion Coalition, or WestTEC, is a West-wide effort to develop an actionable transmission study to support the needs of the future energy grid. The final deliverable will be a West-wide transmission needs study looking out over 10- and 20-year periods. Western Power Pool is coordinating the project, which spans across the West and includes regional partners representing a broad swath of industry sectors, States and Tribes. Taking a new, unique approach, WestTEC is industry-led and anchored in four commitments: to be different, inclusive, expedient and transparent.”

# Integrated system planning

- ◆ ISP Inputs:
  - ◇ Existing and future planned transmission capacity
  - ◇ Transmission Costs (interconnection, wheeling, losses)
- ◆ ISP Iteration:
  - ◇ Iterate on resource portfolios and transmission builds to identify a cost-effective portfolio
- ◆ ISP Outputs:
  - ◇ Draft plan of optimized resource and transmission portfolio



# Regional Transmission Planning Study methodology



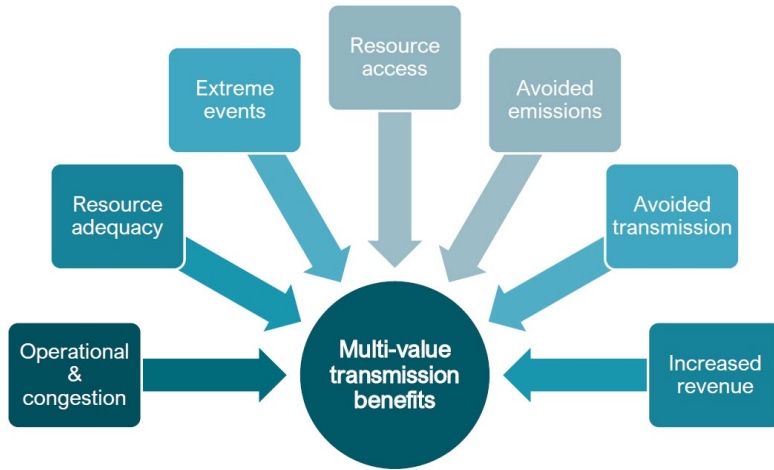
## Regional transmission analysis

- Uses the same study process as Local Transmission Planning but adds economic analysis.
- ADS represents future topology, load and resource assumptions.
- Gridview performs Security Constrained Economic Dispatch (SCED) across all hours of the year.
- Specific transmission projects can be evaluated against the basecase to evaluate the economic cost or benefit of those projects.

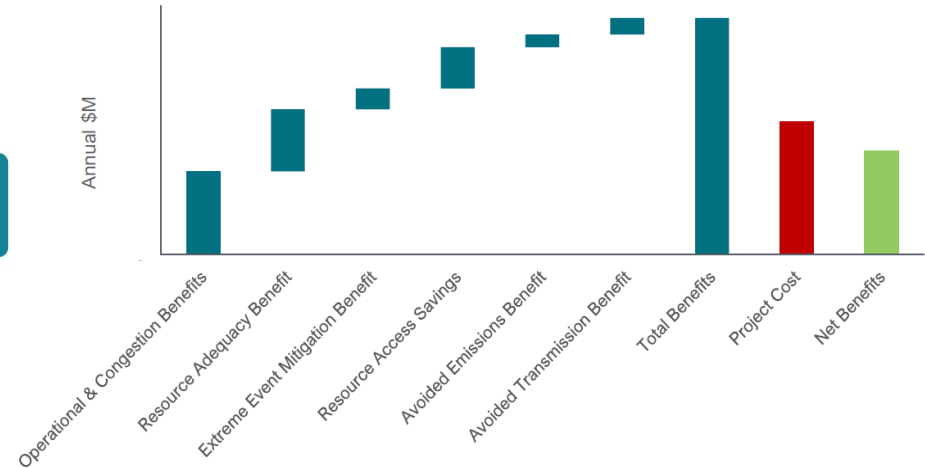
# Regional Transmission Planning Study methodology

## Regional transmission analysis

This multi-value benefit study can evaluate the costs and benefits of regional transmission projects under a variety of system conditions and market frameworks.

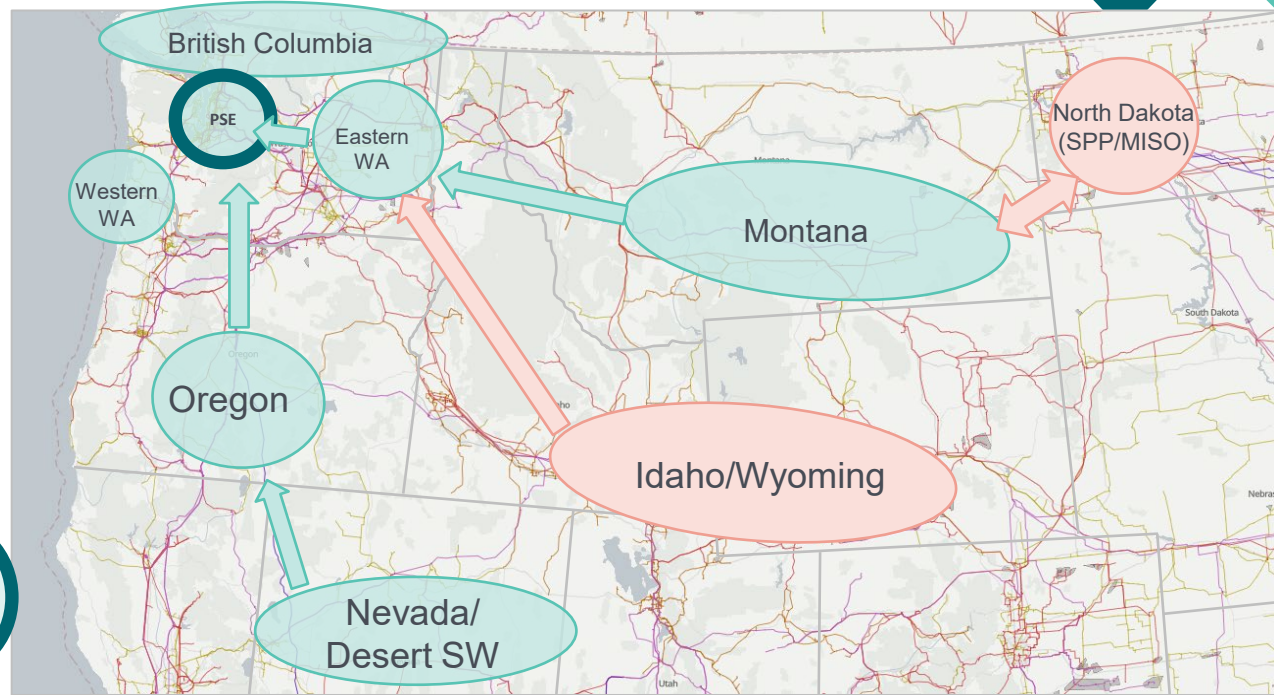
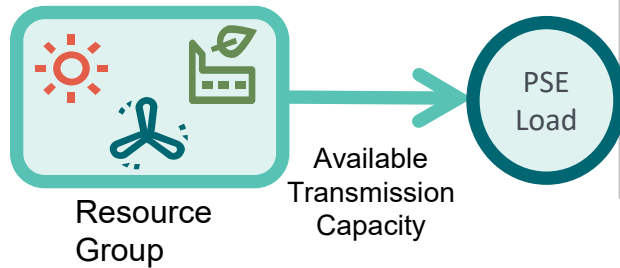


Demonstrating Multi-Value Transmission Benefits



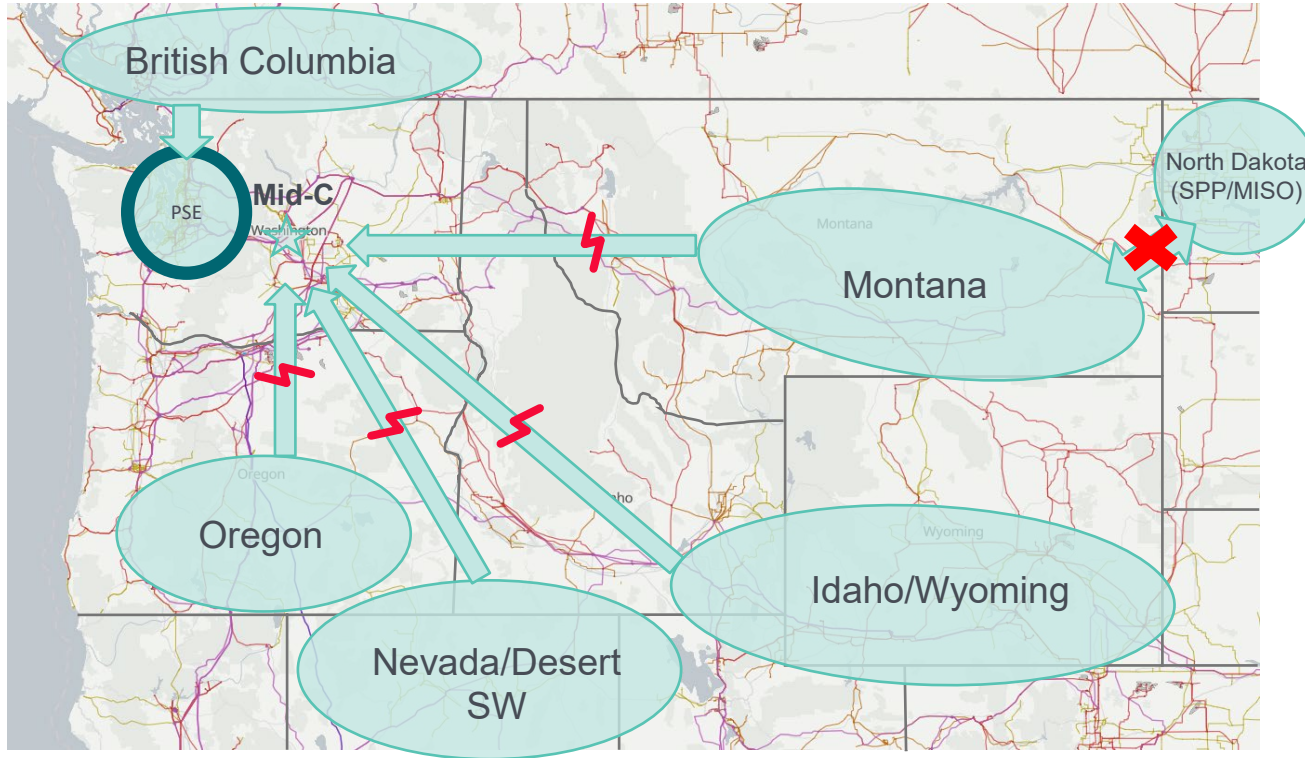
# Transmission groups to access Clean Energy Zones (CEZ)

- 'Transmission regions' have been translated into Resource Groups in the capacity expansion model.
- Allows different resources to be aggregated into unique transmission regions sharing a fixed transmission capacity.
- Transmission capacity will be modeled as a build limit for the resource group.



*North Dakota and Idaho/Wyoming will be evaluated as transmission sensitivities and were not included as resource zones in the Reference Case*

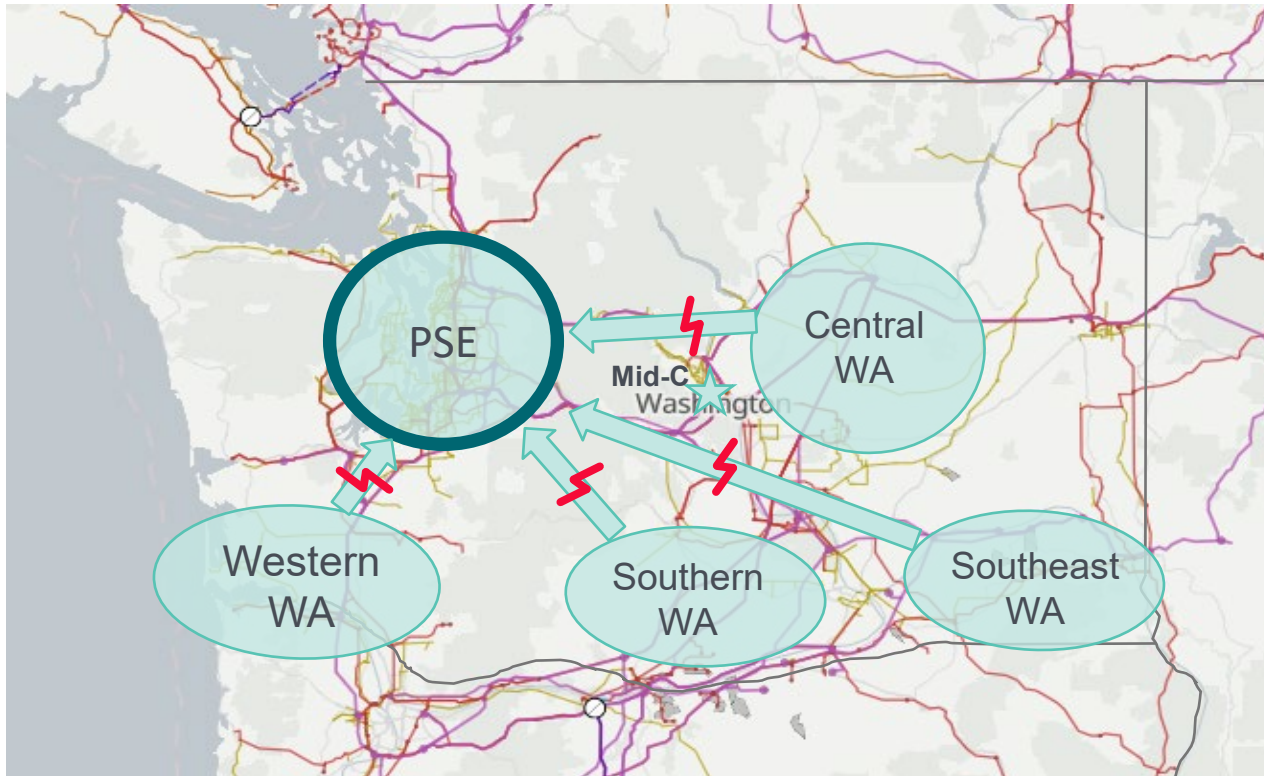
# Transmission constraints to CEZs across the region



Transmission across the region is significantly constrained.

Capacity from outside of Washington cannot be increased without significant transmission builds.

# Transmission constraints to CEZs within Washington



- ◆ Transmission within Washington state is constrained.
- ◆ PSE's existing rights from Southeast Washington and on Mid-C can be utilized to deliver a portion of the resource need

Open Infrastructure Map: <https://openinframap.org/#2/26/12>

# Transmission need was identified based on the nameplate capacity of the resources in each zone in the 2023 Electric Progress Report

## Overall transmission need

Year	Total Tx Need
2035	4,497 MW
2040	6,194 MW
2045	7,039 MW

## Need per zone

Zone	2035	2040	2045
Montana	400 MW	1,200 MW	1,650 MW
Idaho/ Wyoming	600 MW	600 MW	600 MW
Eastern Washington	3,497 MW	4,394 MW	4,789 MW
<b>Total Need</b>	<b>4,497 MW</b>	<b>6,194 MW</b>	<b>7,039 MW</b>