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## Northwest **Power** and **Conservation** Council

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October 4, 2023

### **MEMORANDUM**

**TO: Council Members**

**FROM: Brian Dekiep; Senior Energy and Policy Analyst, Montana Office**

**SUBJECT: NorthernGrid 2022-2023 Draft Transmission Plan**

### **BACKGROUND:**

**Presenter:** Chelsea Loomis Manager of Regional Transmission Planning Services at NorthernGrid

**Summary:** Chelsea will present on NorthernGrid's 2022-2023 Draft Regional Transmission Plan

**Workplan:** 4.3.3 Track market efforts, including day-ahead market offerings and transmission planning to inform Council analysis.

**Background:**

The Federal Energy Regulatory Commission (FERC) requires, through orders 890 and 1000, each Transmission Provider to publish local and regional transmission plans on a periodic basis using open and transparent processes. FERC requires that each Transmission Provider develop and file their transmission planning processes for FERC's acceptance. Once accepted, the processes are published in the provider's Open Access Transmission Tariff (Attachment K) – Transmission Planning Process.

The NorthernGrid is an unincorporated association of entities that either own or operate, or that propose to own or operate, electric transmission facilities in the Western Interconnection. (See list of members and organizations at the end of this document)

The NorthernGrid promotes coordinated, open, and transparent transmission planning and facilitates compliance with FERC Orders No. 890 and 1000 for its members. The NorthernGrid is comprised of entities regulated by FERC and those that are not. The regional transmission planning process for the enrolled FERC jurisdictional Transmission Providers is defined in each provider's Attachment K.

The NorthernGrid entities that are not regulated by FERC participate in the regional transmission planning process through the NorthernGrid Planning Agreement for Planning Cycle 2022-2023. The 2022-2023 Draft Regional Transmission Plan was developed according to the NorthernGrid regional planning process.

The objective of the planning process is to identify the projects that either cost-effectively or efficiently meet the needs of the NorthernGrid region in a 10-year horizon.

The process began with each NorthernGrid Member submitting their 10-year forecasted load, projected resource additions, retirements, public policy requirements, and projected transmission additions. All this information was summarized and incorporated into a Study Scope. The Study Scope also describes the process, assumptions, power flow case selection, production cost modeling use, analysis methods, and criteria.

Non-member entities were also permitted to submit regional transmission projects for consideration. Four non-incumbent transmission project developers, Absaroka Energy LLC, TransCanyon LLC, Great Basin Transmission LLC, and PowerBridge LLC, submitted transmission projects.

Three of these developers also submitted information that met the Qualified Developer criteria for the purpose of project cost allocation. All this information was summarized and incorporated into a Study Scope. The Study Scope also describes the process, the assumptions, power flow case selection, production cost modeling use, analysis methods, and criteria. The Members chose several Western Electricity Coordinating Council (WECC) 2032 and 2033 power flow base cases representing heavy summer, heavy winter, and light spring conditions for reliability analysis.

These cases were modified to achieve the following three transmission stress conditions:

- 2032 heavy summer loads with high power flow as follows: from Oregon to California, from Washington and Oregon to Idaho, and Alberta to Montana,
- 2031-2032 heavy winter loads with typical seasonal generation resource dispatch and power flow from Montana to Alberta, and
- 2033 light spring loads with high power flows from California to Oregon.

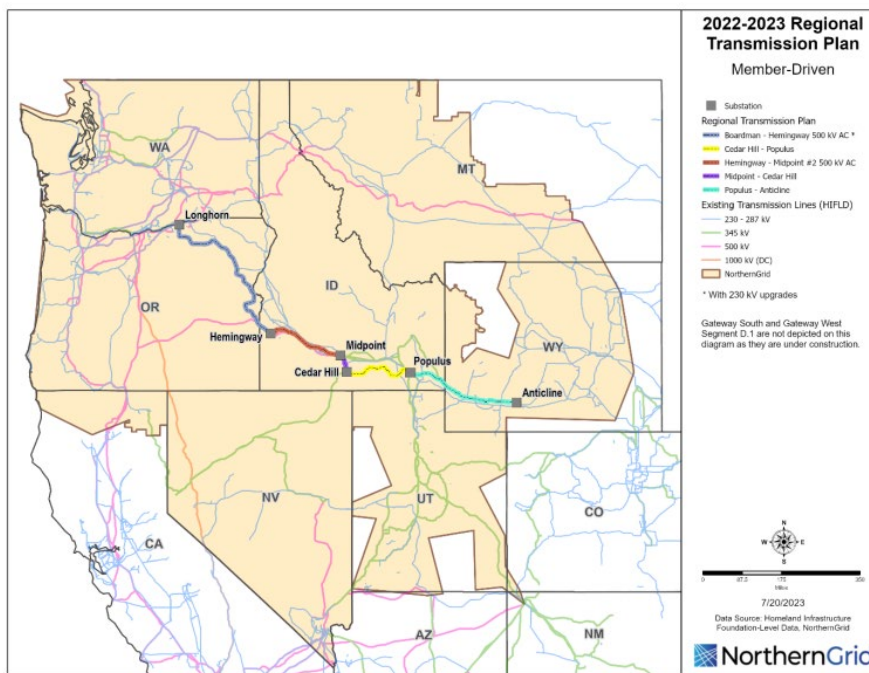
An additional heavy winter power flow case was developed through analysis of the 2032 Anchor Data set production cost model (PCM) to analyze westbound transmission flows from Wyoming wind resources across the Northern Grid region.

The hour with the heaviest westbound flows out of Wyoming 2022-2023 was selected to represent regional transmission stress conditions during high Wyoming wind generation. This hour occurred at noon on December 11, 2032, in the PCM model. Each power flow case's regional transmission configuration was modified to represent unique regional combinations of the submitted regional transmission projects. The

combinations ranged including non to all submitted regional transmission projects. Then, contingency analysis was performed on these power flow cases using 230 kV and above electrical facility contingencies submitted by the Members. Facilities within the NorthernGrid region and adjacent regions were monitored for reliability criteria violations.

The regional combinations were ranked based on the weighted number of reliability criteria violations occurring during the contingency analysis. The regional combination with the fewest violations received the highest ranking. The 2023 Regional Transmission Plan was selected based on the regional combination ranking and total estimated cost of the projects included in the regional combination.

The regional combination of Boardman to Hemingway, Gateway West Phase 1, and Cascade Renewable Transmission Project received the highest contingency analysis ranking. A review of the violations identified that the eliminated violations changed from slightly above to slightly below the criteria threshold. When considering this minimal improvement and the additional project cost, the combination including Cascade Renewable Transmission Project was deemed less cost effective than the regional combination of Boardman to Hemingway and Gateway West Phase 1. A cost allocation analysis was not required because no Qualified Developers' projects were selected into the Regional Transmission Plan. The figure below depicts the projects evaluated and those, with pink highlight, that were determined to be the most efficient and cost-effective combination for the NorthernGrid region given the analysis performed as described in this report.



NorthernGrid Members: Avista Corporation, BHE U.S, Transmission (MATL), Bonneville Power Administration, Chelan County PUD, Idaho Power Company, NorthWestern Energy, NV Energy, PacifiCorp, Portland General Electric. Puget Sound Energy, Seattle City Light, Snohomish County PUD, Tacoma Power.

Interregional or non-Incumbent Transmission Project Sponsors PowerBridge – Cascade Renewable Transmission Project Absaroka Energy, LLC – Loco Falls Greenline TransCanyon, LLC – Cross-Tie Transmission Line Great Basin Transmission, LLC – Southwest Intertie Project – North

Neighboring Regional Entities: CAISO, WestConnect  
Participating State Agencies Idaho PUC, Idaho OER, Montana PSC, Montana Consumer Counsel, Oregon PUC, Utah Department of Commerce, Utah Office of Energy Development, Washington UTC, Washington EFSEC, Wyoming PSC

Consultants and Other Contributors: Western Power Pool Power Systems Consulting (PSC) Western Electricity Coordinating Council – power flow and production cost model base cases.

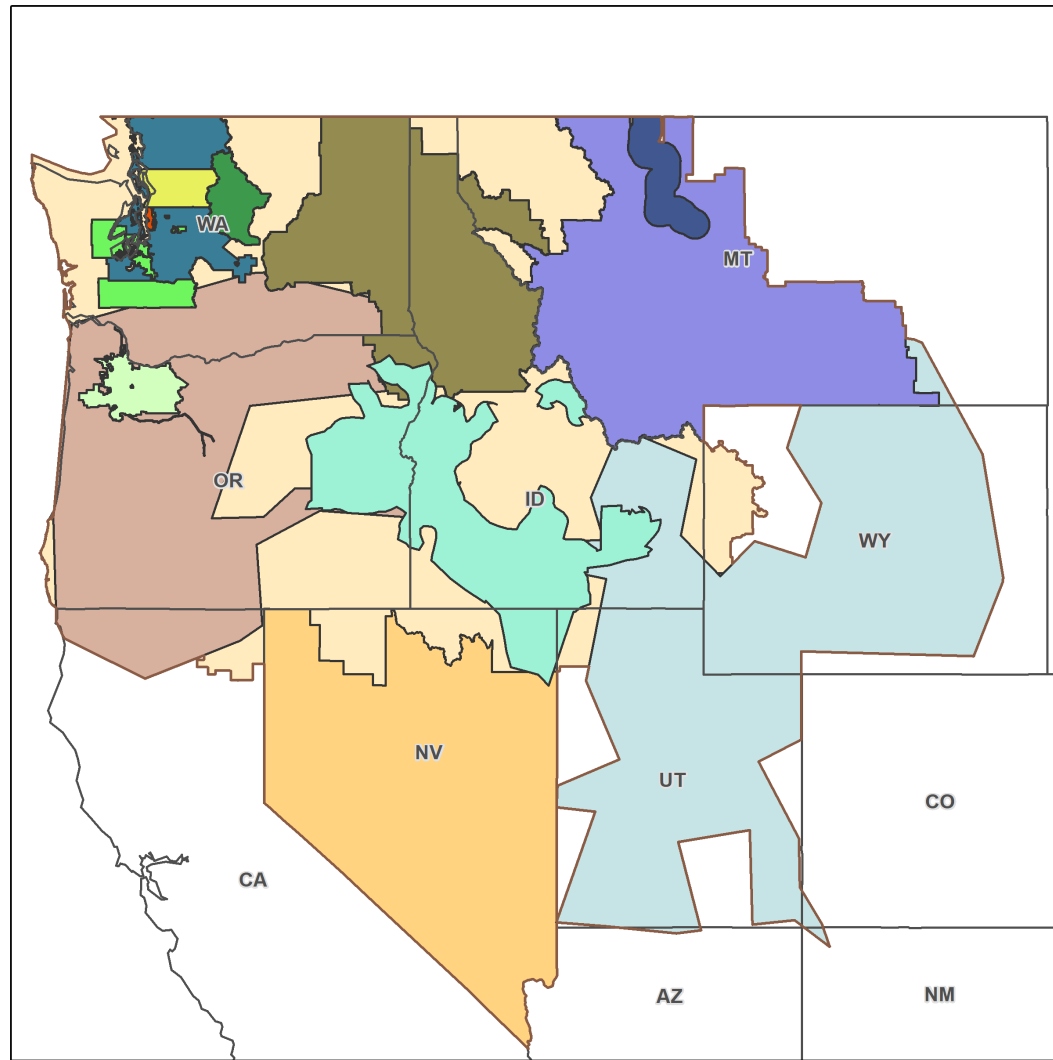
More Info: The full draft plan can be downloaded here:  
[https://www.northerngrid.net/private-media/documents/2022-23\\_DraftFinal\\_Regional\\_Transmission\\_Plan.pdf](https://www.northerngrid.net/private-media/documents/2022-23_DraftFinal_Regional_Transmission_Plan.pdf)

The background of the slide features a blue gradient with a white grid pattern of thick, intersecting diagonal lines.

# NorthernGrid

Northwest Power Planning Council

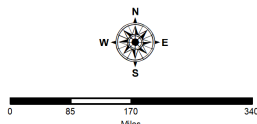
October 12, 2023



### NorthernGrid Balancing Authority Areas

#### NorthernGrid Balancing Authority Area

- AVA
- BPA
- CHPD
- IPC
- MATL
- NVE
- NWMT
- PACE
- PACW
- PGE
- PSE
- SCL
- SNPD
- TPWR

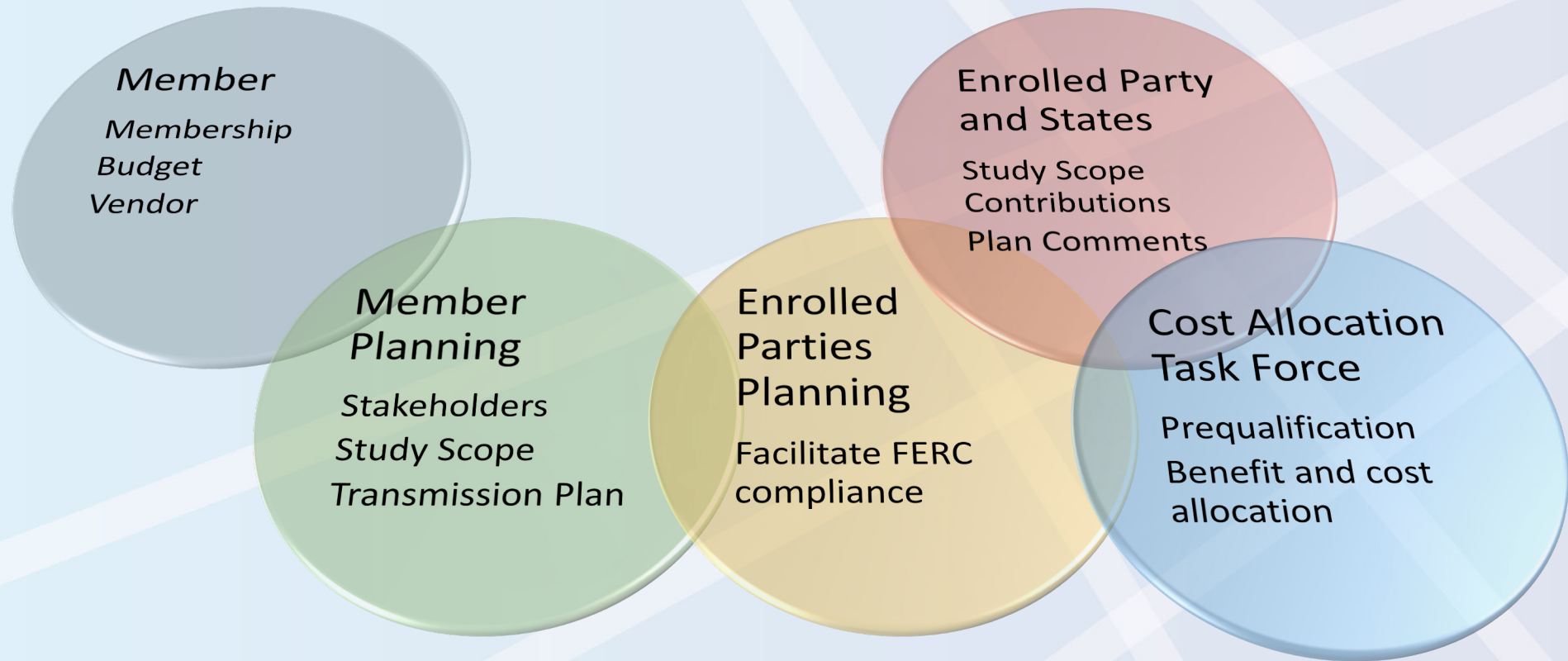


6/23/2022

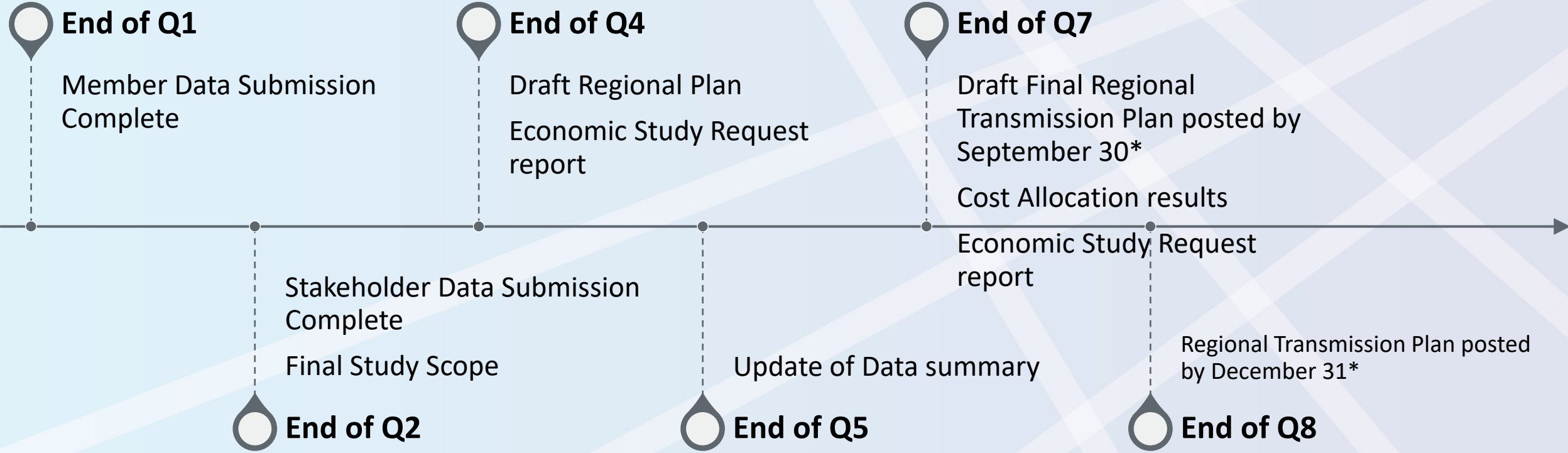
Data Source: Homeland Infrastructure Foundation-Level Data, NorthernGrid



# Committee Functions



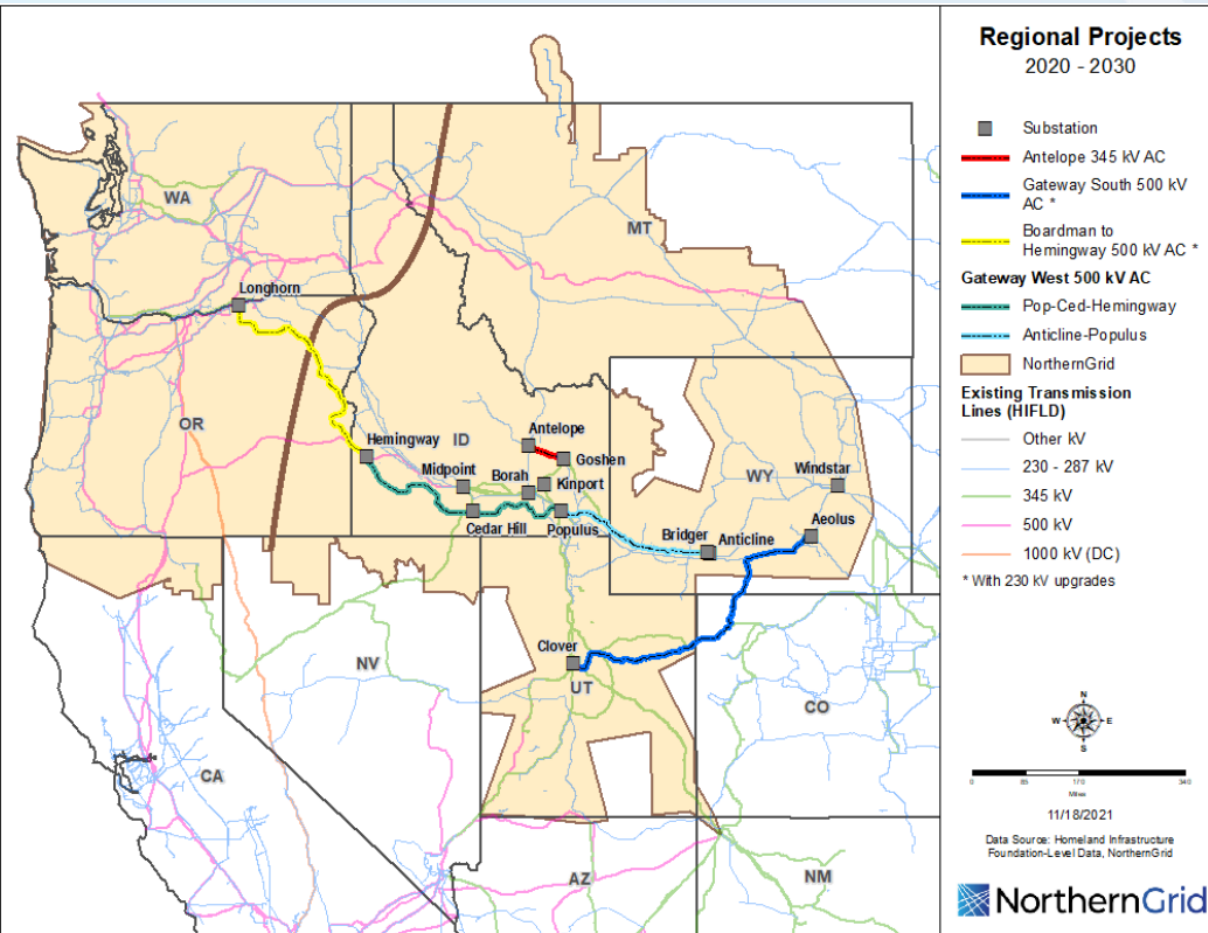
# NorthernGrid Schedule of Deliverables



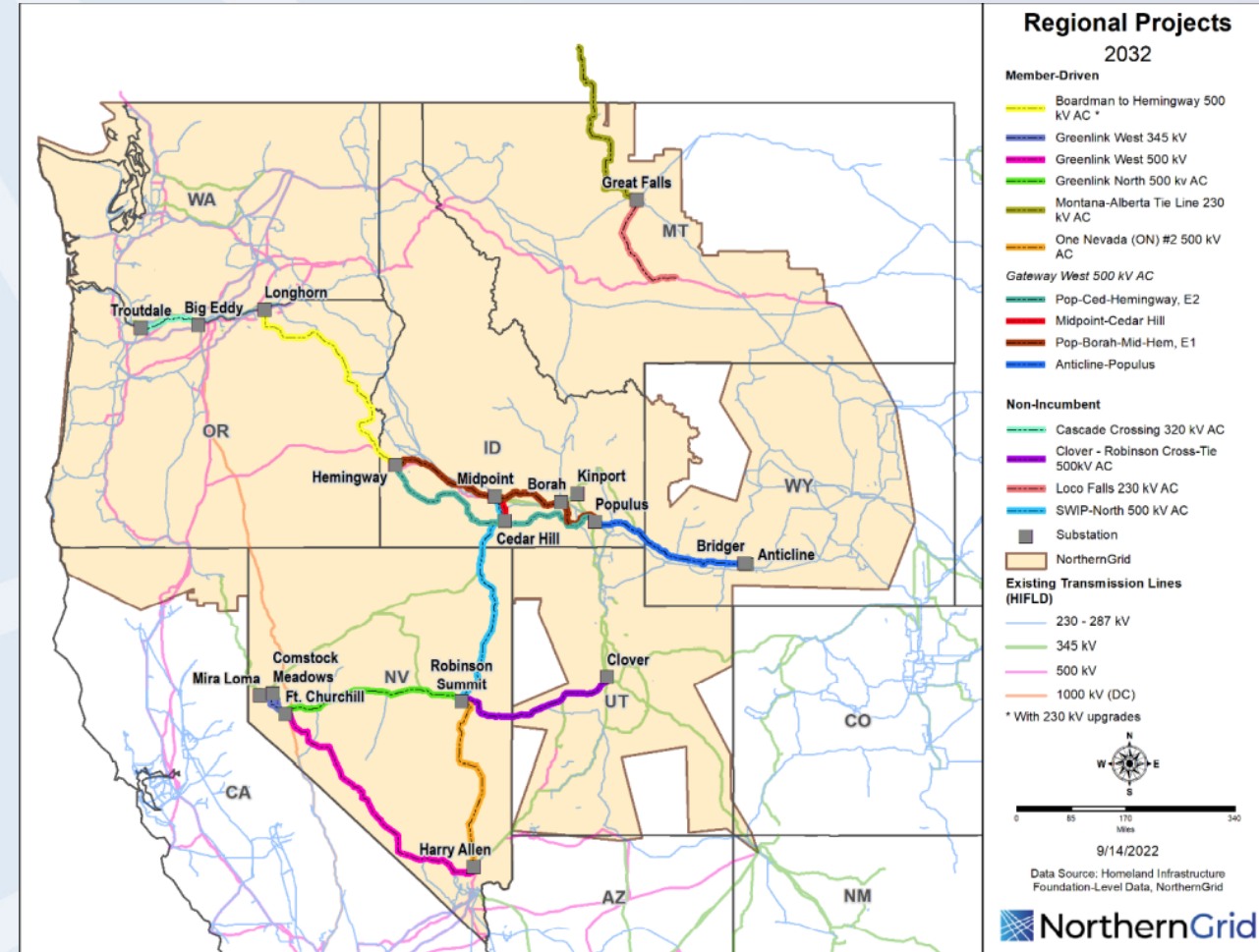
\*Indicates FERC requirement, all others typically agreed upon by members



# What has changed from the last cycle?

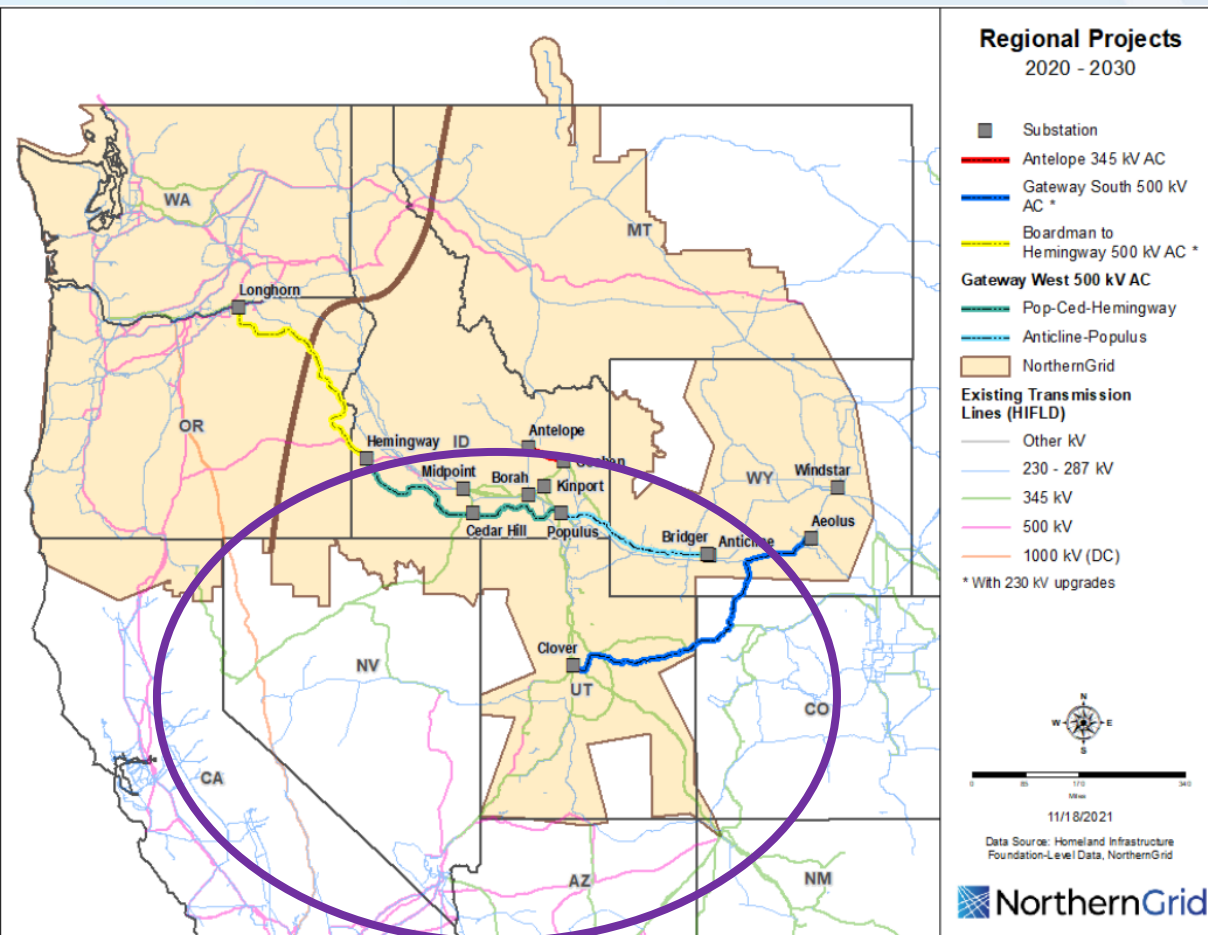


Final 2030 Regional Transmission Plan

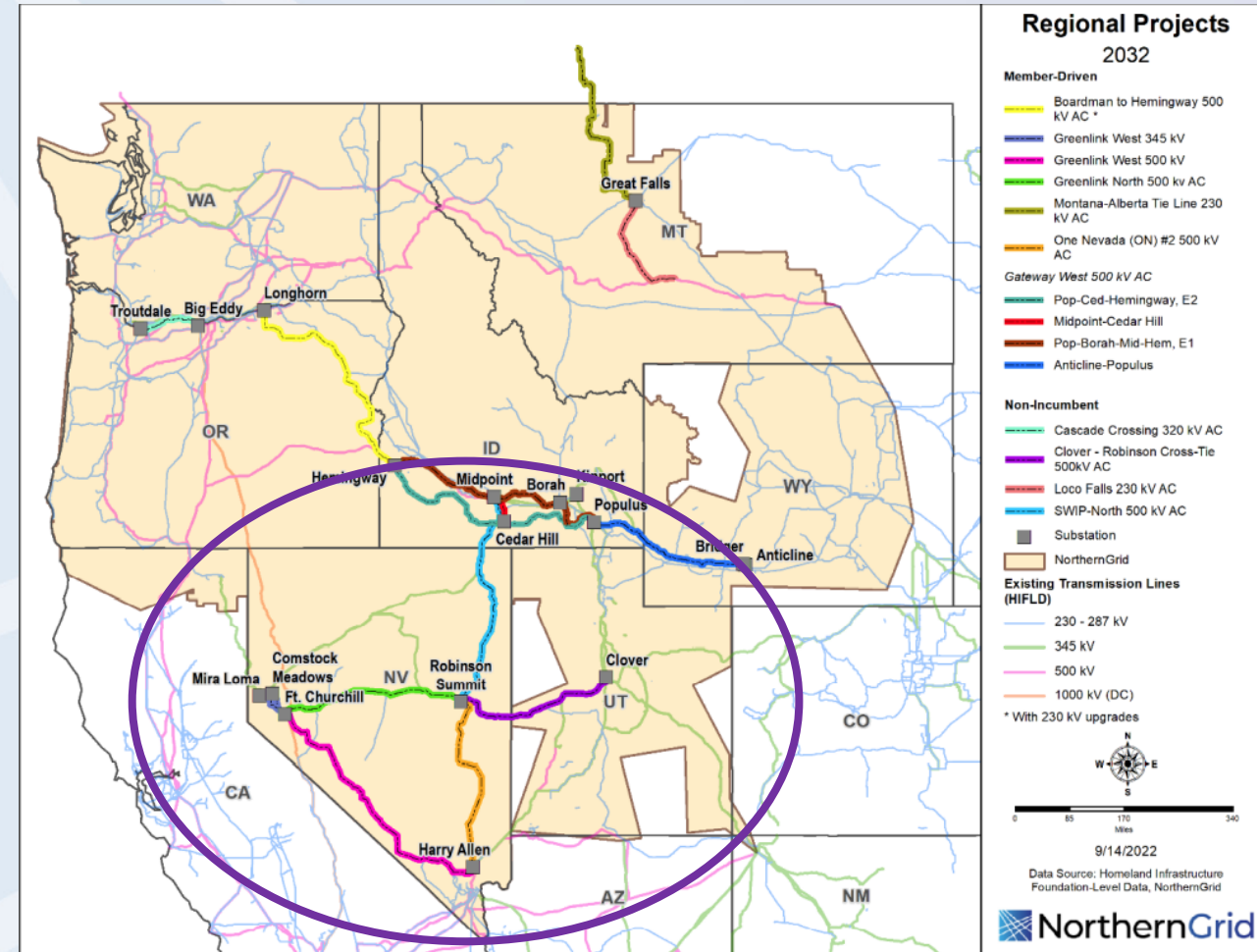


Projects under consideration for 2032 Regional Transmission Plan

# Inter-Cycle Change: Addition of NV Energy

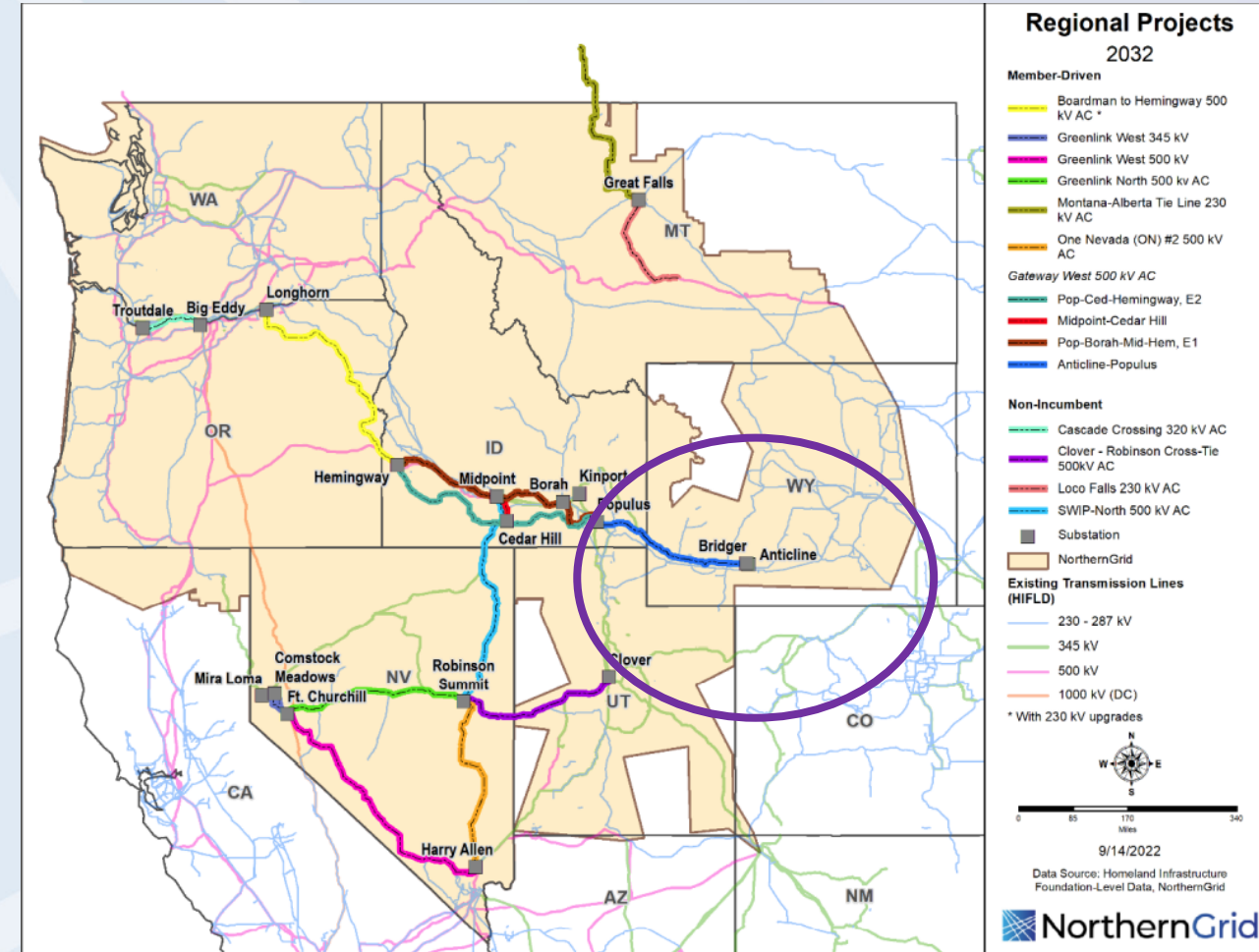
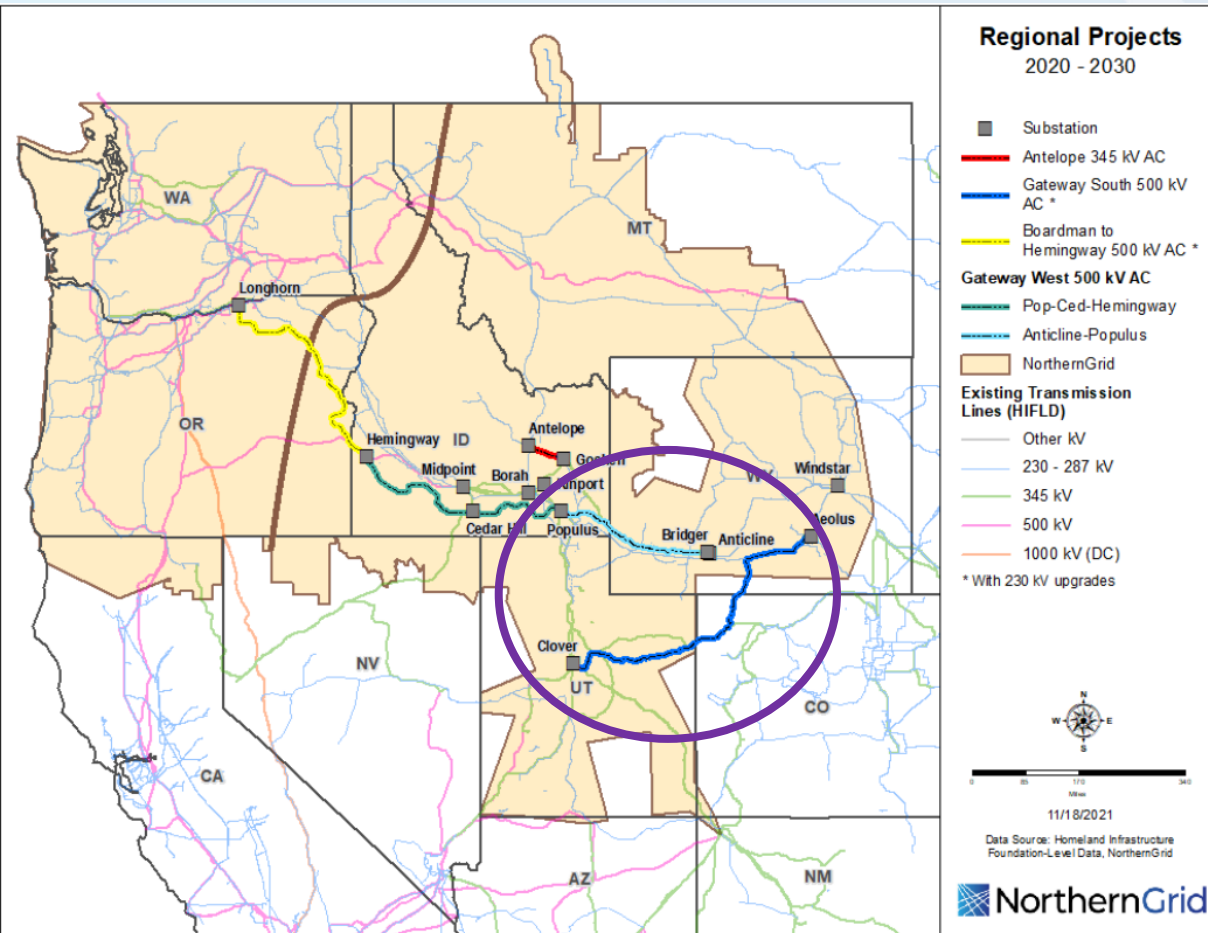


Final 2030 Regional Transmission Plan



Projects under consideration for 2032 Regional Transmission Plan

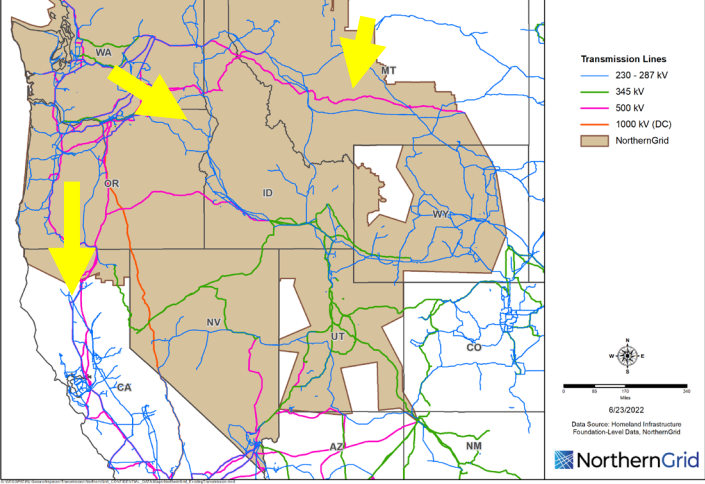
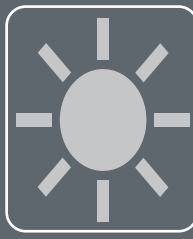
# Inter-Cycle Change: Clover-Aeolus under construction



Final 2030 Regional Transmission Plan

Projects under consideration for 2032 Regional Transmission Plan

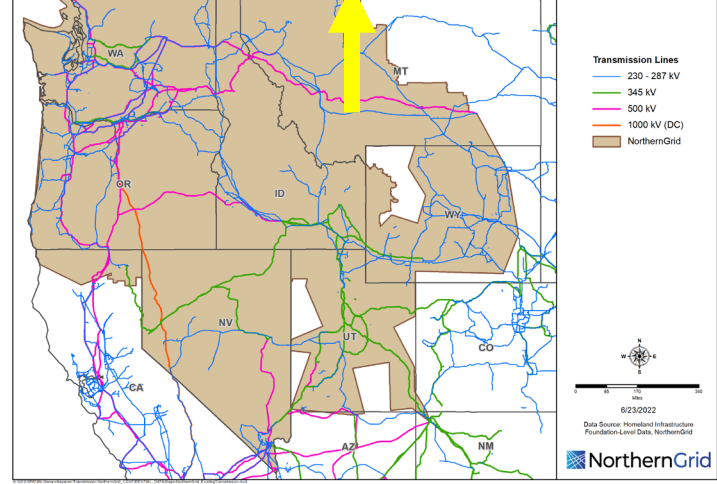
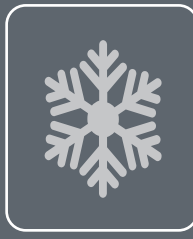
### SUM, Heavy Summer 2032

### SUM, Heavy Summer 2032

- Southbound Northwest to California
- Eastbound Northwest to Idaho
- Southbound MATL

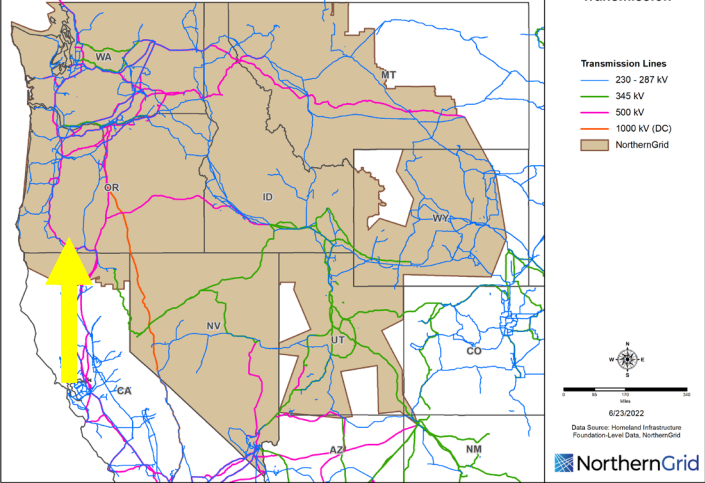

### WIN, Heavy Winter 2032

### WIN, Heavy Winter 2032

- Typical seasonal dispatch
- Northbound MATL

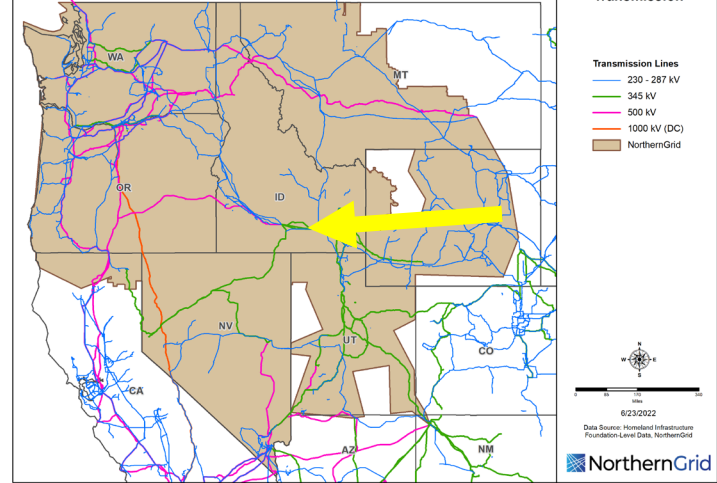

### CAL-X, Light Spring 2031

### CAL-X, Light Spring 2031

- Northbound California to Northwest
- 2032 loading

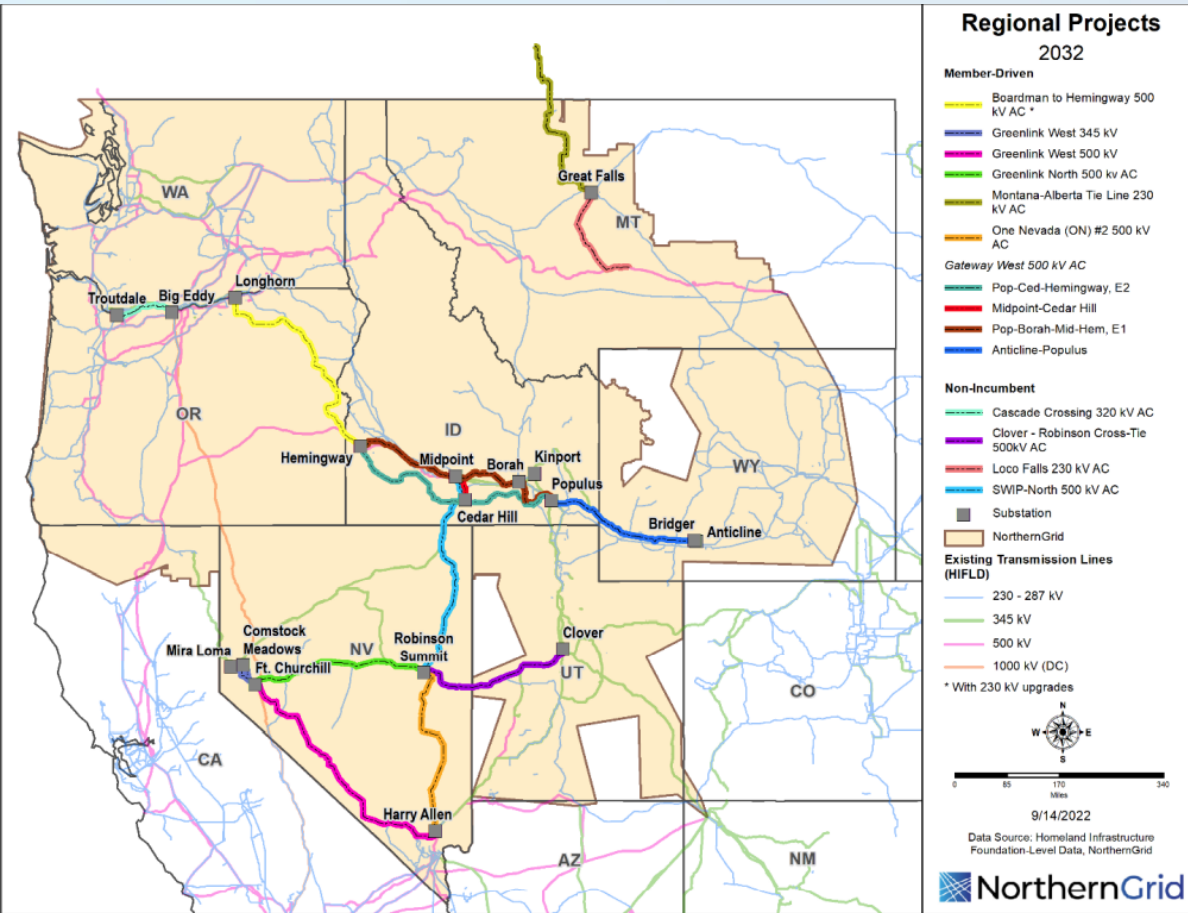
### WY: High Wyoming wind

### WY: High Wyoming wind export case

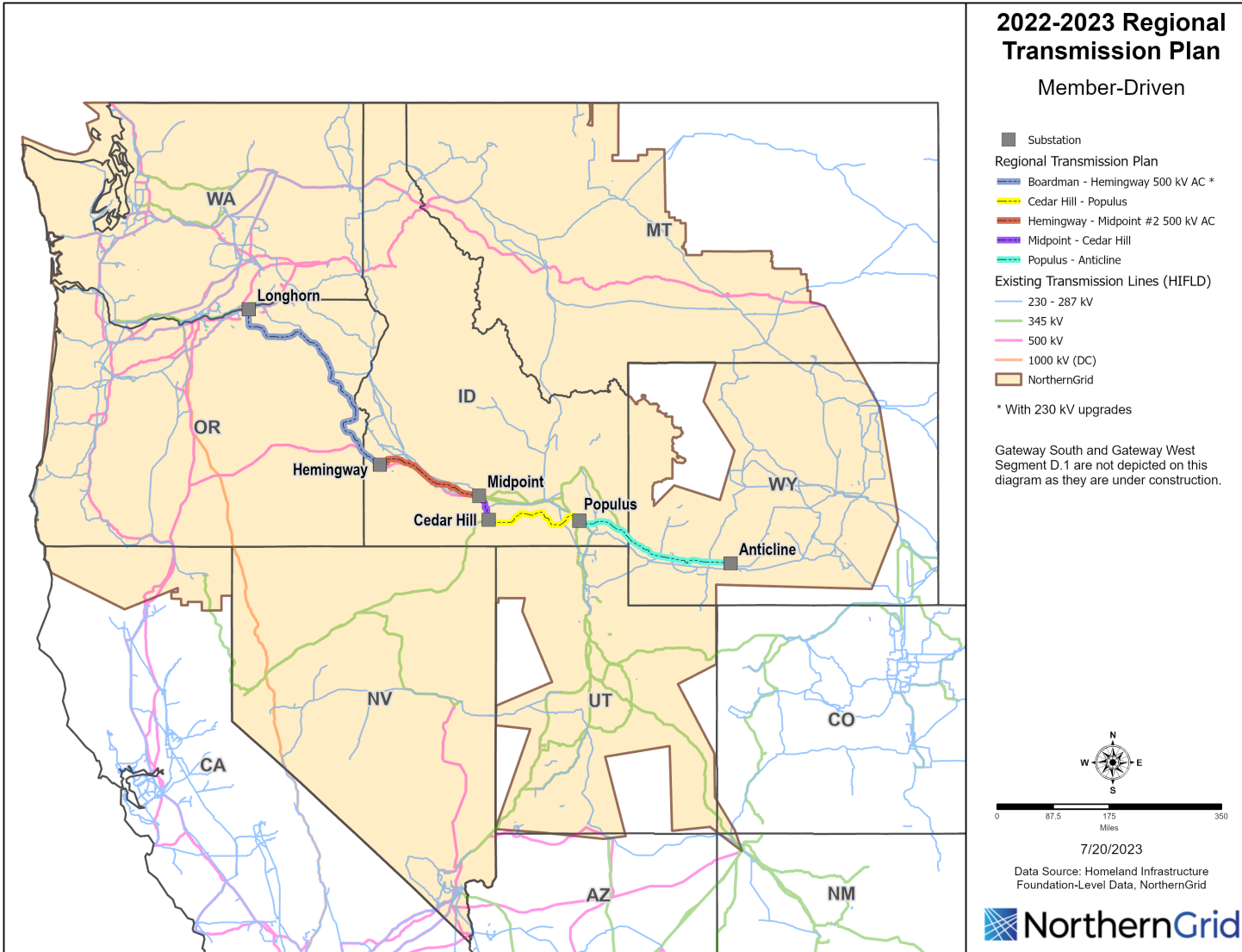
- Export hour from Production Cost Modeling

# Regional Transmission Plan Projects for Consideration



RC Name	Cascade	Boardman-Hem	GW: Windstar -Shirley	GW E1: Pop-Bor	GW E2: Pop-Ced	ON#2	Greenlink N,W	Cross-tie	SWIP-North	Loco Falls	MATL
<b>BLMP – Baseline Member Projects</b>		X	X	X	X	X	X				X
<b>BLNP – Baseline No Projects</b>											
RC1	X										
RC2		X									
RC3			X								
RC4					X						
RC5						X					
RC6							X				
RC7								X			
RC8									X		
RC9											X
<b>RC10 ("Bugatti")</b>	X	X	X	X	X	X	X	X	X	X	X
RC11		X	X		X						
RC12	X	X	X		X						
RC13		X	X		X				X		
RC14	X	X	X		X				X		
RC15		X	X	X							
RC16		X	X		X						X
RC17						X	X	X	X		
RC18							X	X	X		
RC19						X		X	X		
RC20						X	X		X		
RC21						X	X	X			
RC22							X	X			
RC23							X		X		
RC24						X	X				
RC25	X	X									
RC26										X	X

# Regional Transmission Plan



RC Name	Cascade	Boardman-Hem	GW: Windstar -Shirley	<b>GW E1: Pop-Bor</b>	GW E2: Pop-Ced	ON#2	Greenlink N,W	Cross-tie	SWIP-North	Loco Falls	MATL
<b>BLMP – Baseline Member Projects</b>		X	X	X	X	X	X				X
<b>BLNP – Baseline No Projects</b>											
RC1	X										
RC2		X									
RC3			X								
RC4					X						
RC5						X					
RC6							X				
RC7								X			
RC8									X		
RC9											X
<b>RC10 ("Bugatti")</b>	X	X	X	X	X	X	X	X	X	X	X
RC11		X	X		X						
RC12	X	X	X		X						
RC13		X	X		X				X		
RC14	X	X	X		X				X		
RC15		X	X	X							
RC16		X	X		X						X
RC17						X	X	X	X		
RC18							X	X	X		
RC19						X		X	X		
RC20						X	X		X		
RC21						X	X	X			
RC22							X	X			
RC23							X		X		
RC24						X	X				
RC25	X	X									
RC26										X	X

# Timeline for the remainder of the 2022-2023 Cycle



October 11, 2023

- Public comment window closed



October 18, 2023

- Review comments and planned responses



October 31, 2023

- Post Final RTP for MPC Approval



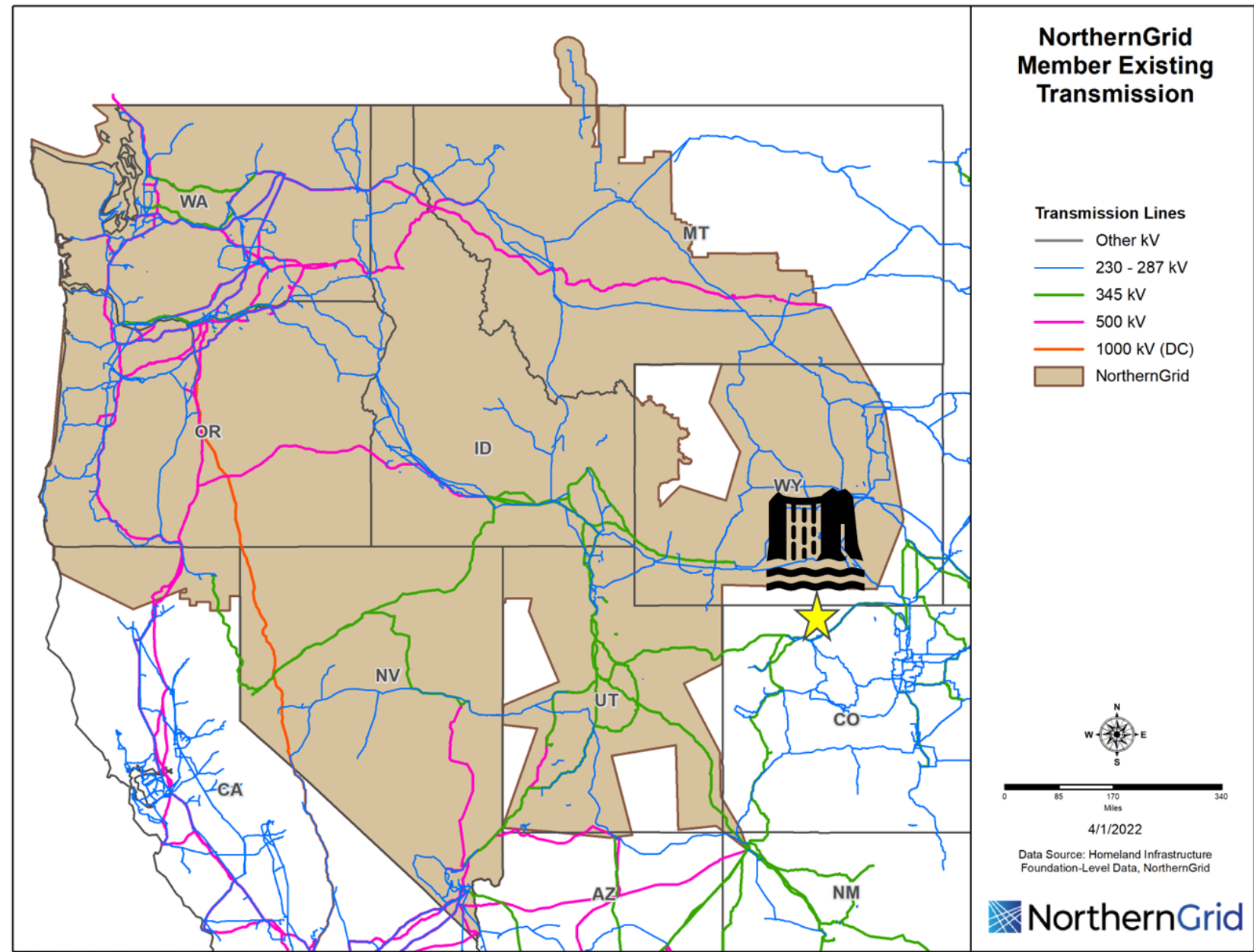
November 15, 2023

- MPC meeting for Enrolled Party Vote



# Economic Study Request: Pumped Storage Hydro

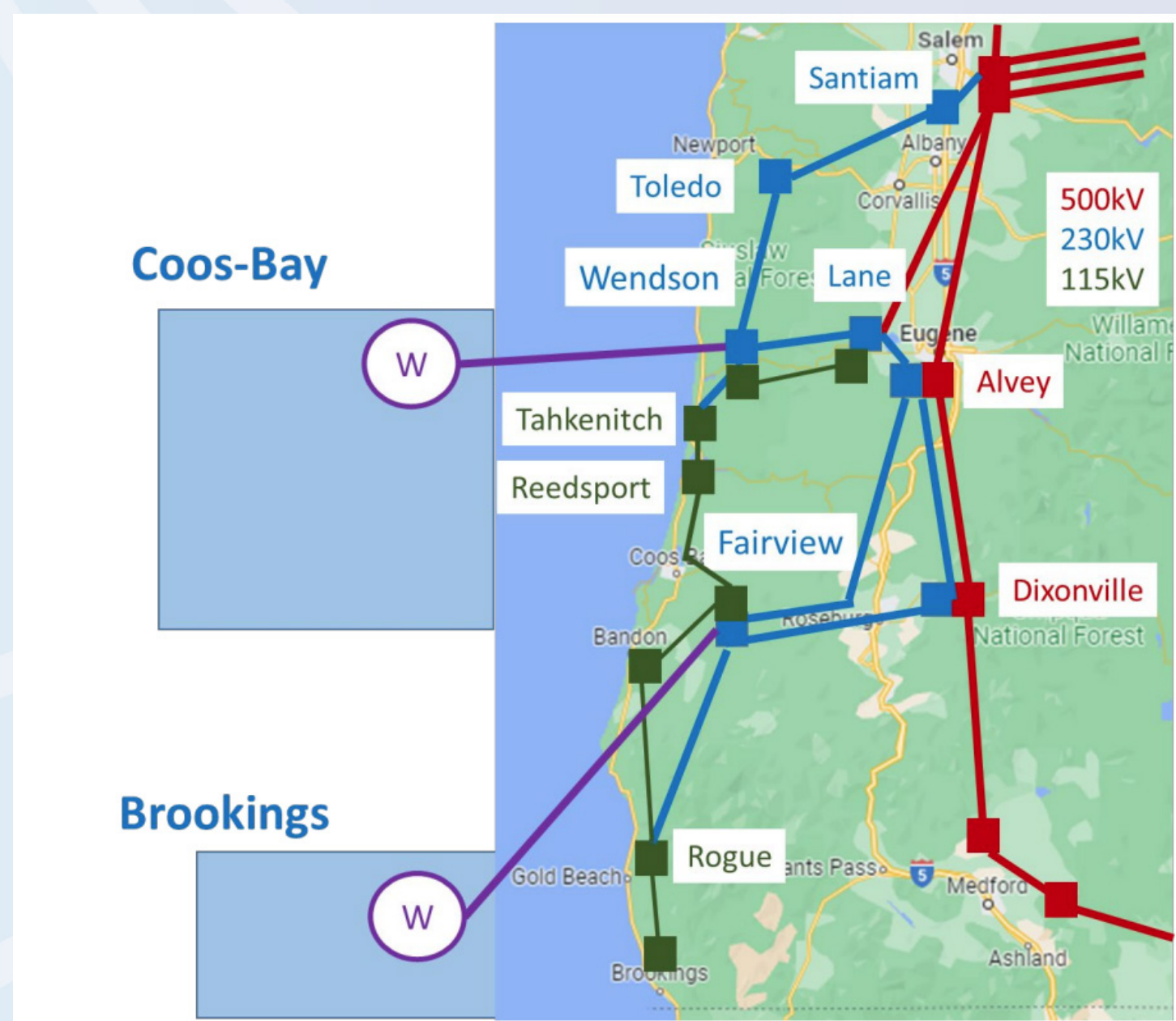
±900 MW  
500 kV Aeolus Substation





# ESR: Offshore Wind

1.2 GW, Wendson 230 kV  
1.8 GW, Fairview 230 kV



# Offshore Wind: Power Flow

2032 Heavy  
Summer base  
case "Stock"

Account for  
NorthernGrid  
Data  
submittals

Model in  
Offshore Wind  
at maximum  
output

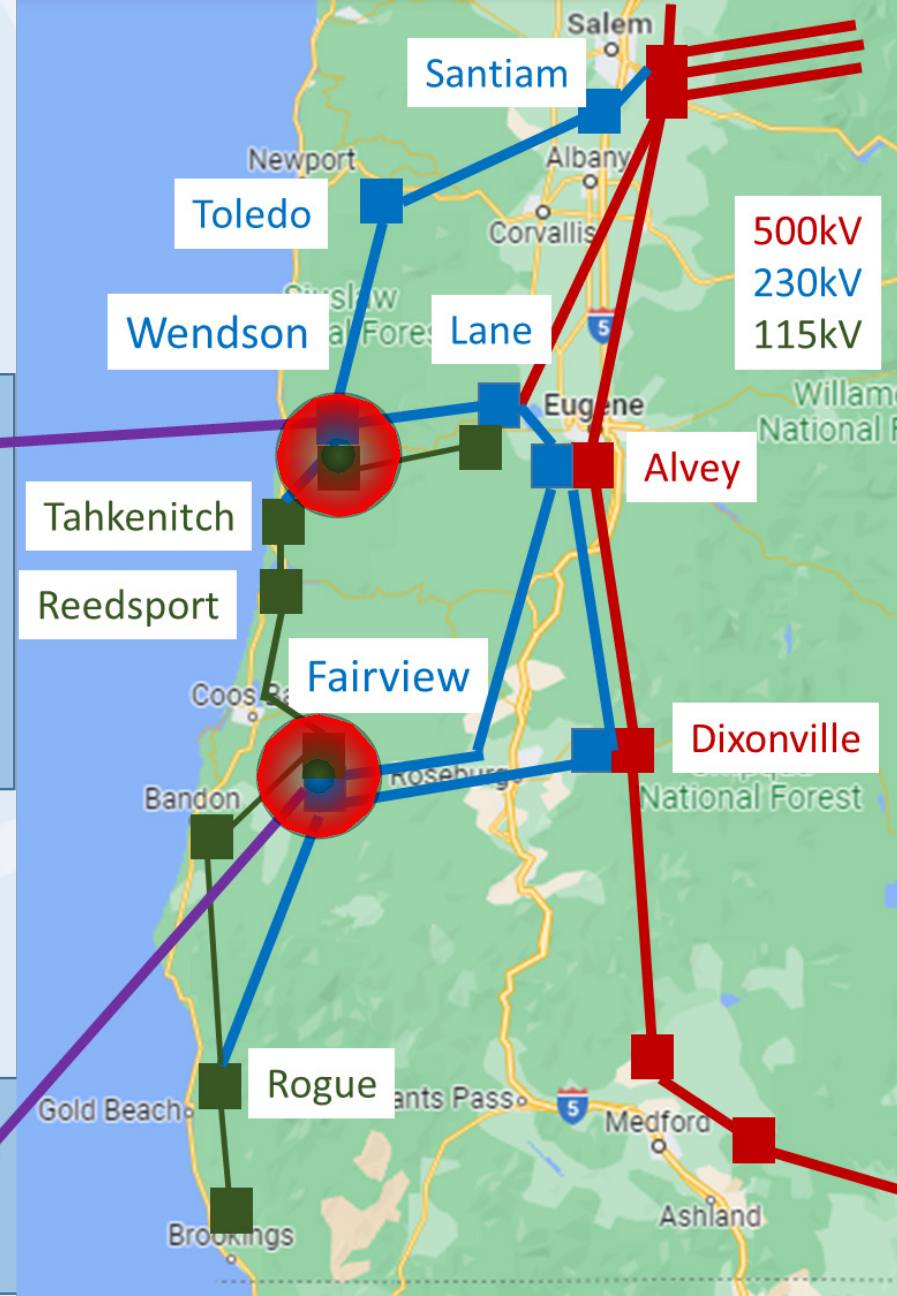
Perform  
reliability  
analysis



"Transmission  
Solution"

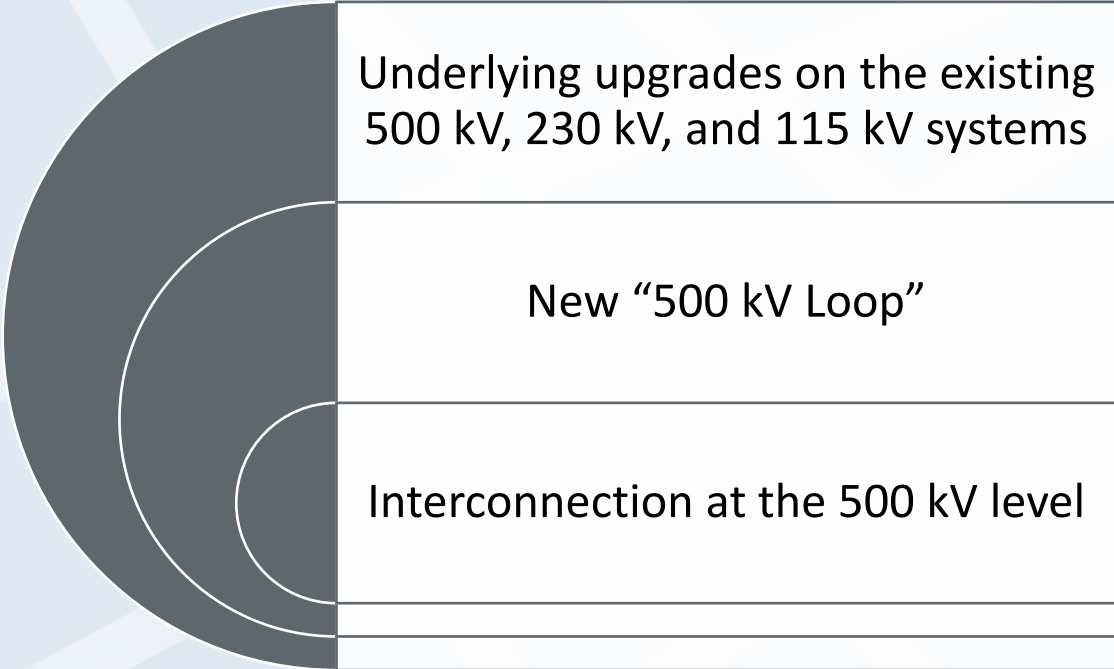
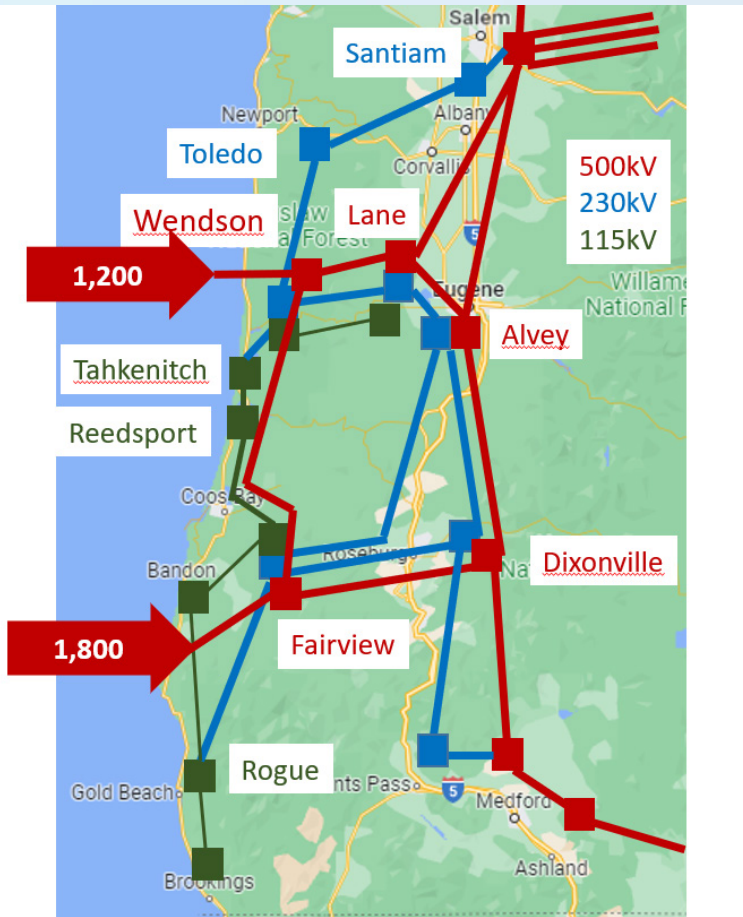
Coos-Bay

Brookings



500kV  
230kV  
115kV

# Transmission Solution



# Offshore Wind: Production Cost

1. Anchor Data Set

Account for NorthernGrid Data Submittals

Run Production Cost, establish "baseline"

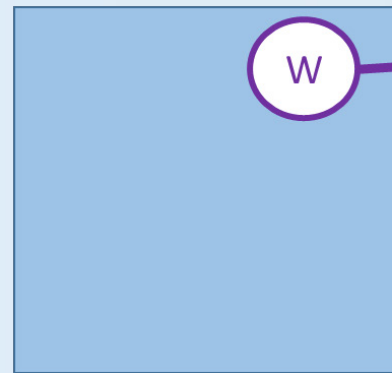
Add in offshore wind and "Transmission Solution"

Run Production Cost, establish changes

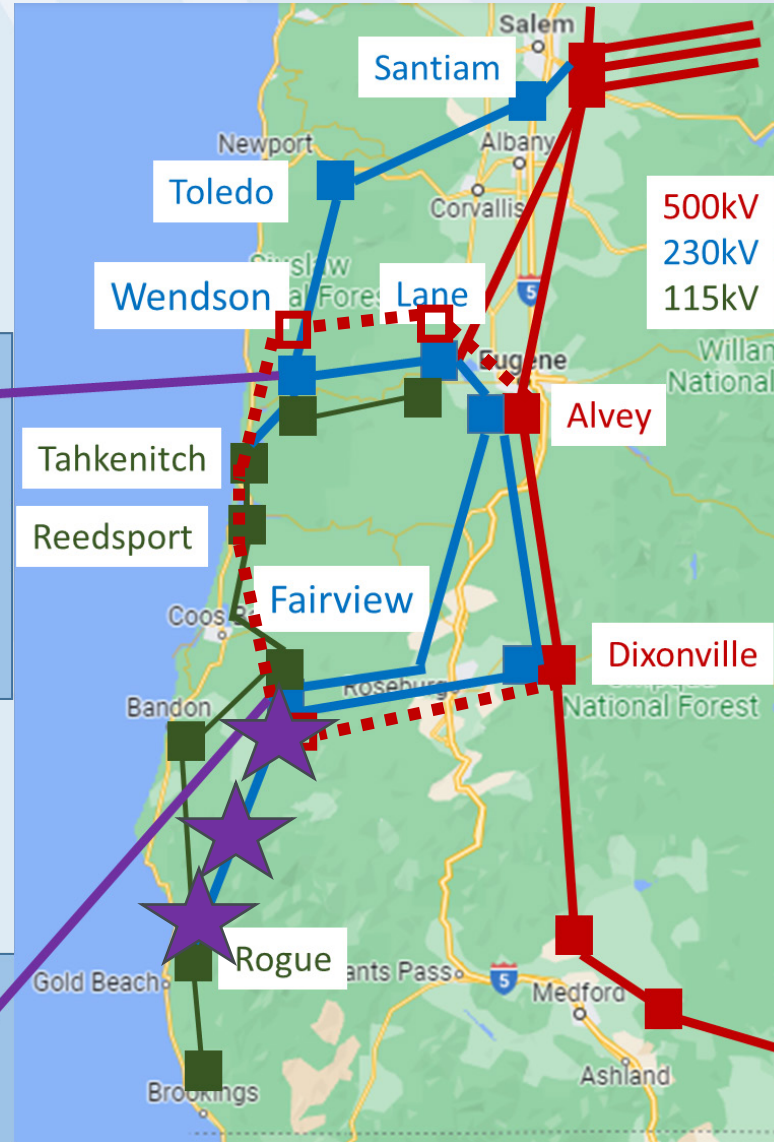
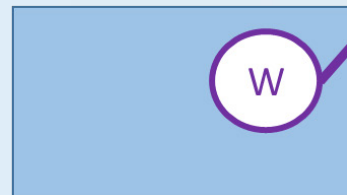


# 2023 ESR Rye Development

## Coos-Bay



## Brookings



- Build upon 3GW OSW 2022 Request
- Incorporate “500 kV Loop” solution
- Total of 1 GW Pumped Hydro Storage

# Thank you!

- Chelsea Loomis
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