NorthernGrid

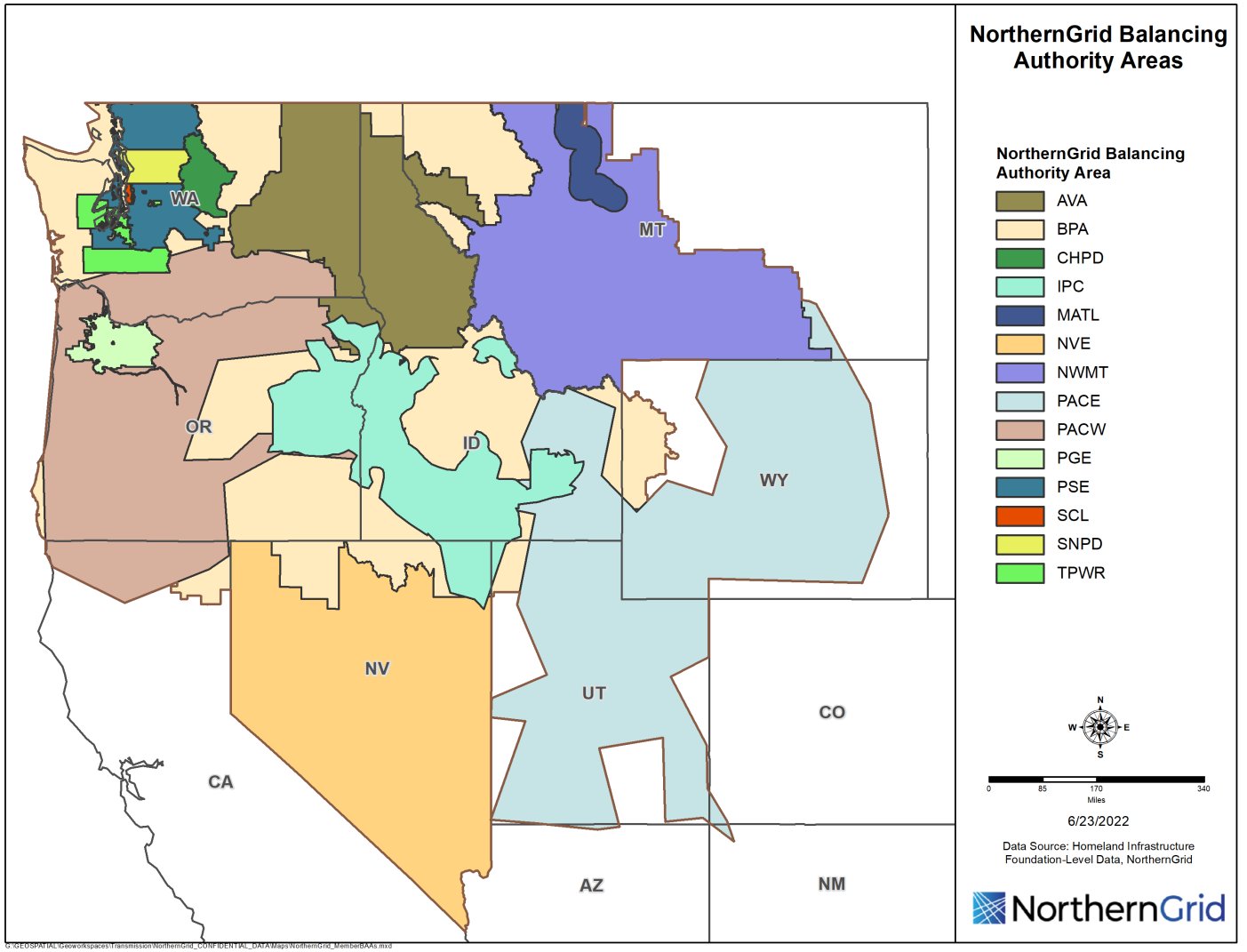
Interregional Coordination
March 9, 2023

Overview

Regional Transmission Plan

Economic Study Scope: Pumped Storage Hydro

Economic Study Scope: Offshore Wind



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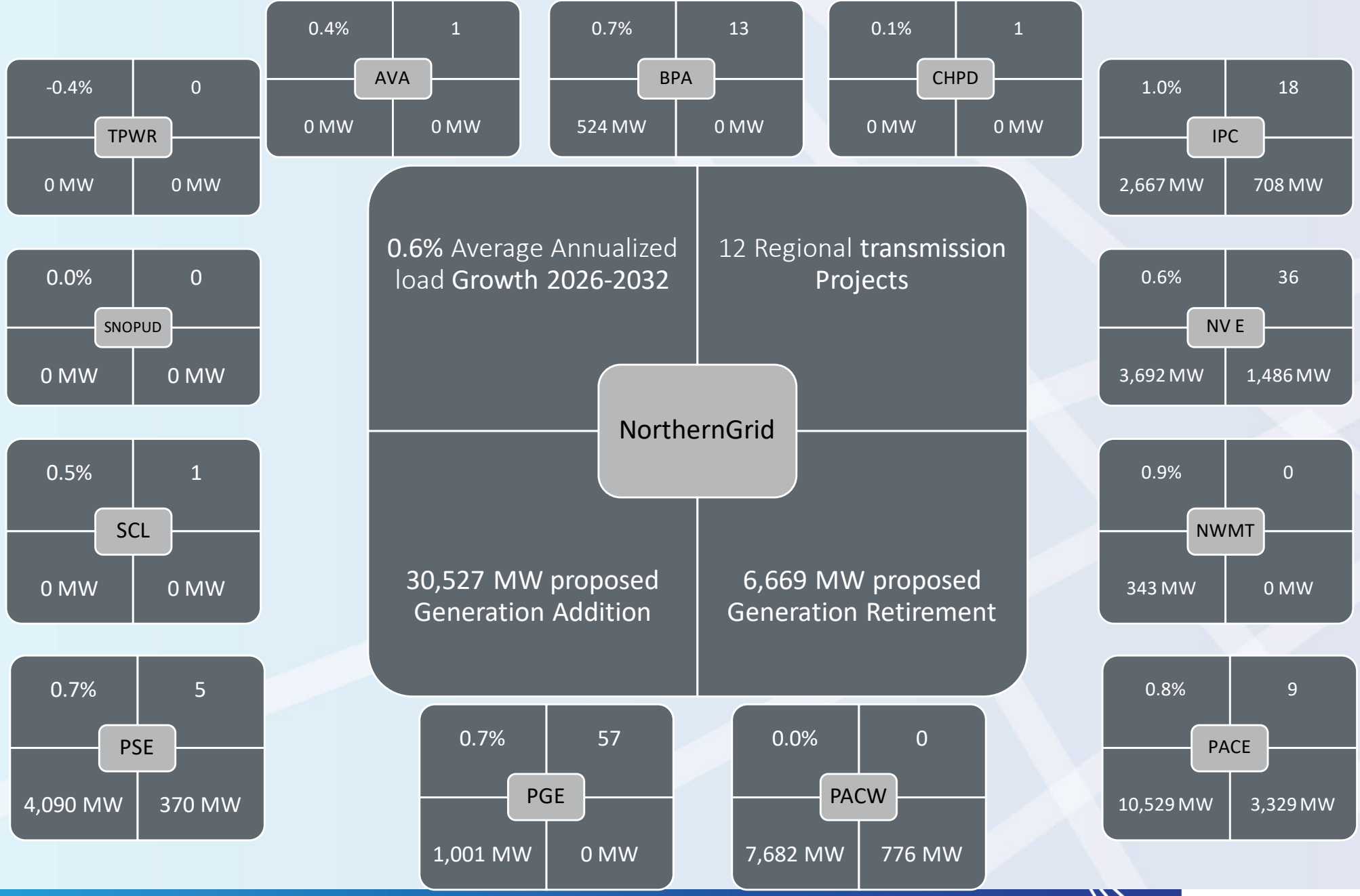

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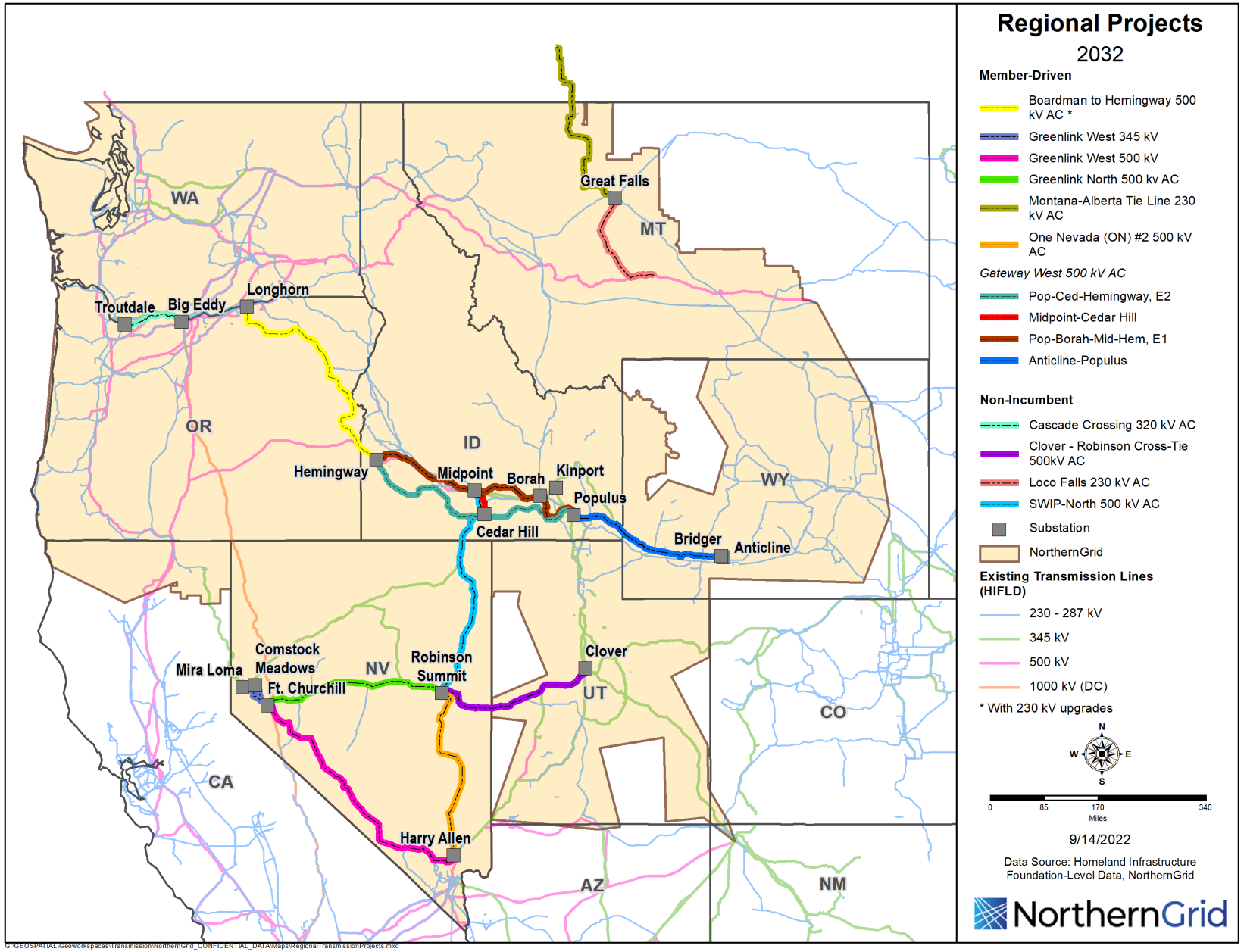
Regional Projects



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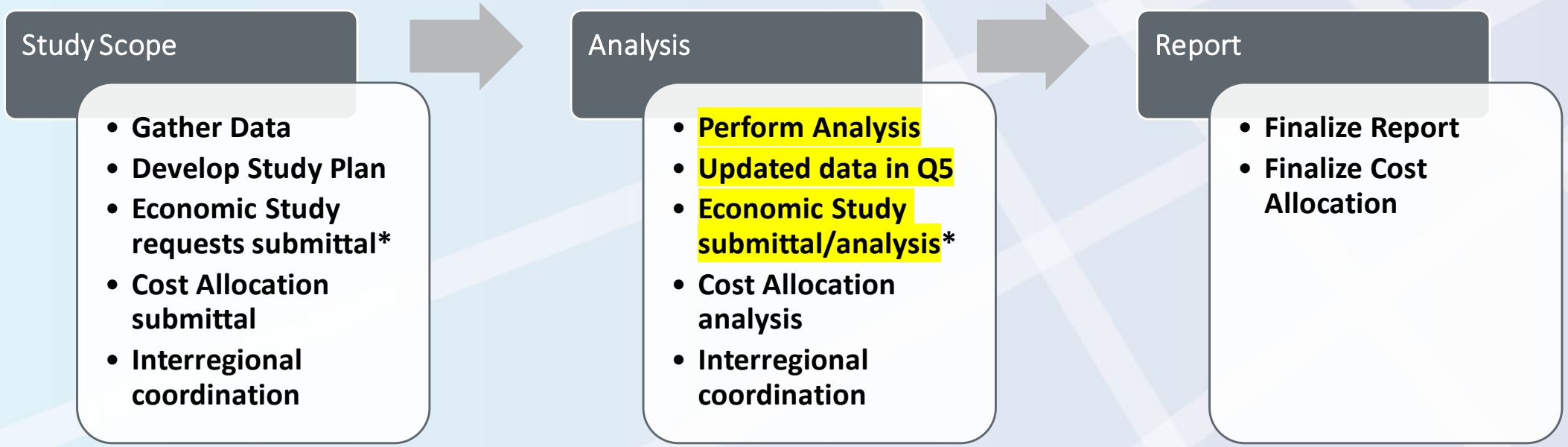
Regional Transmission Process

- Work together to create a Regional Plan that "exceeds" a simple rollup of all the Local Area Plans



A Regional Transmission Plan is not a Construction Plan

*Economic Study Requests occur annually

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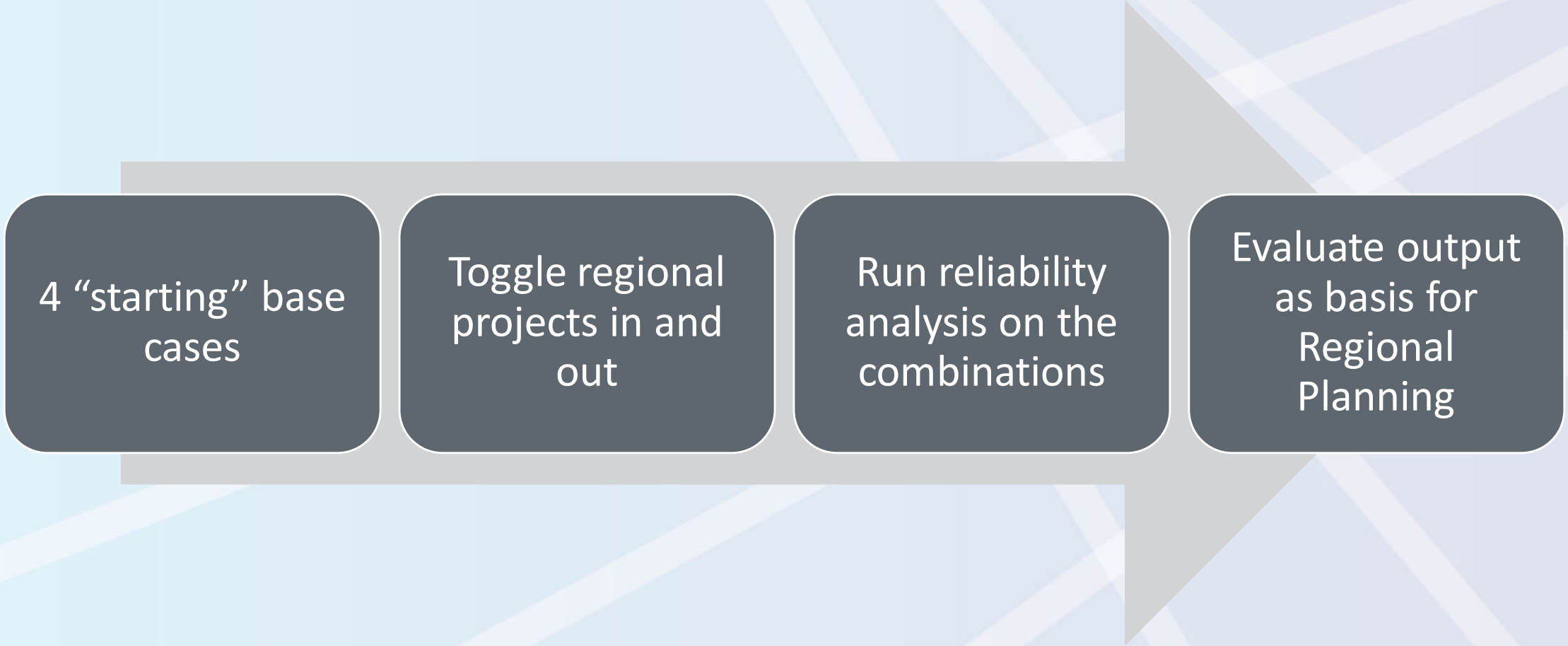
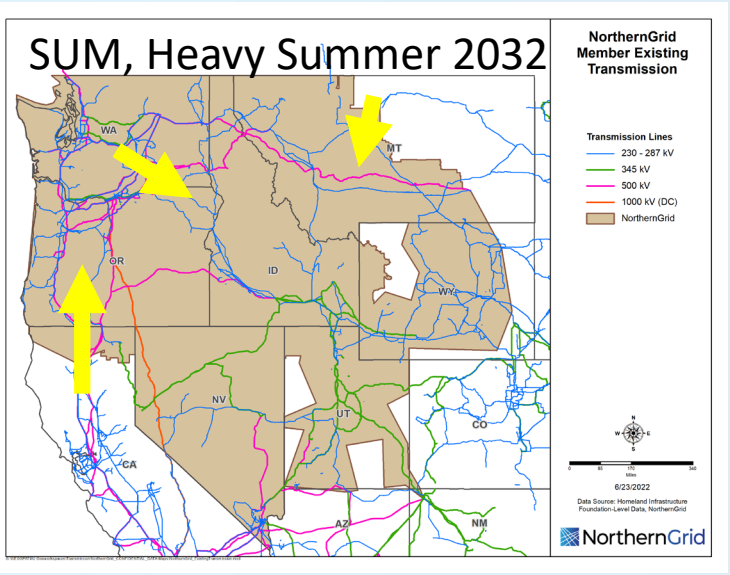
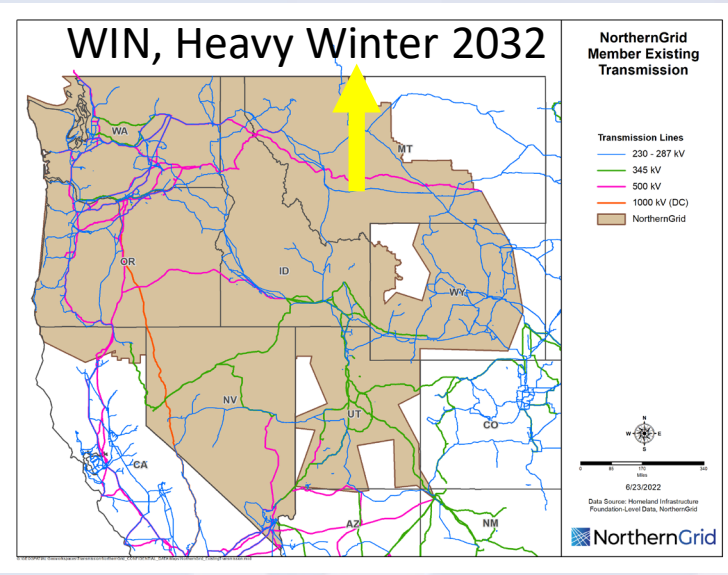
Study Approach





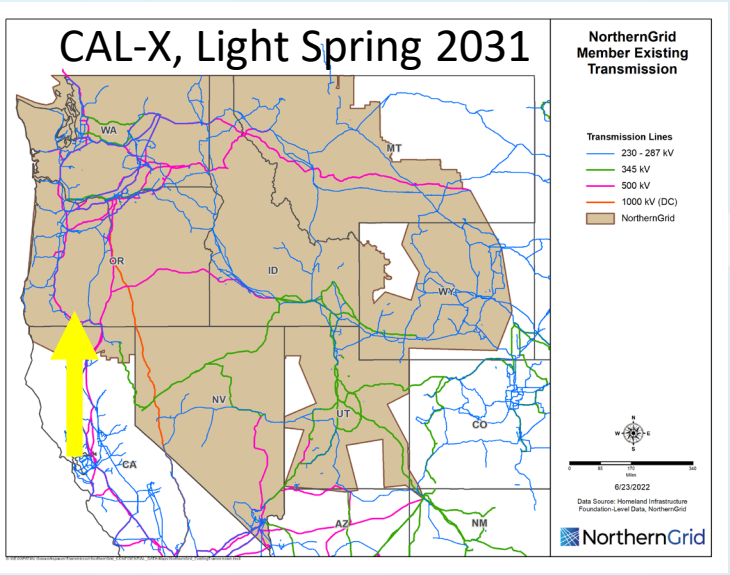
SUM, Heavy Summer 2032

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



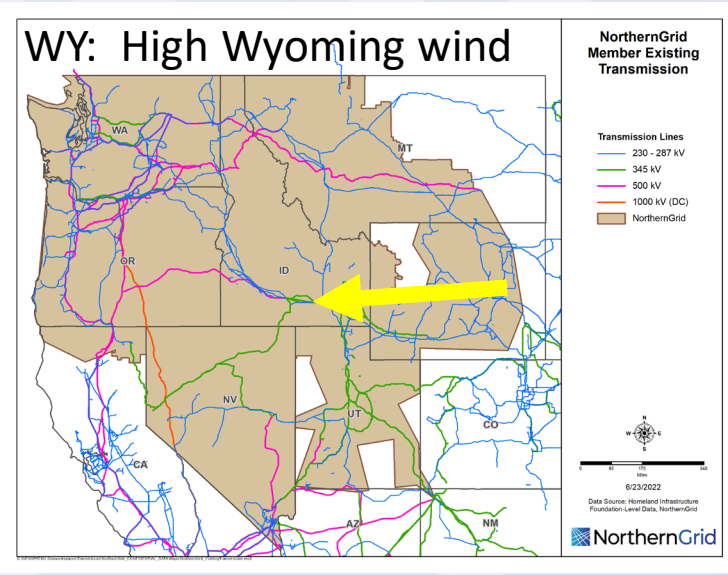
WIN, Heavy Winter 2032

- Typical seasonal dispatch
- Northbound MATL



CAL-X, Light Spring 2031

- Northbound California to Northwest
- 2032 loading



WY: High Wyoming wind export case

- Export hour from Production Cost Modeling

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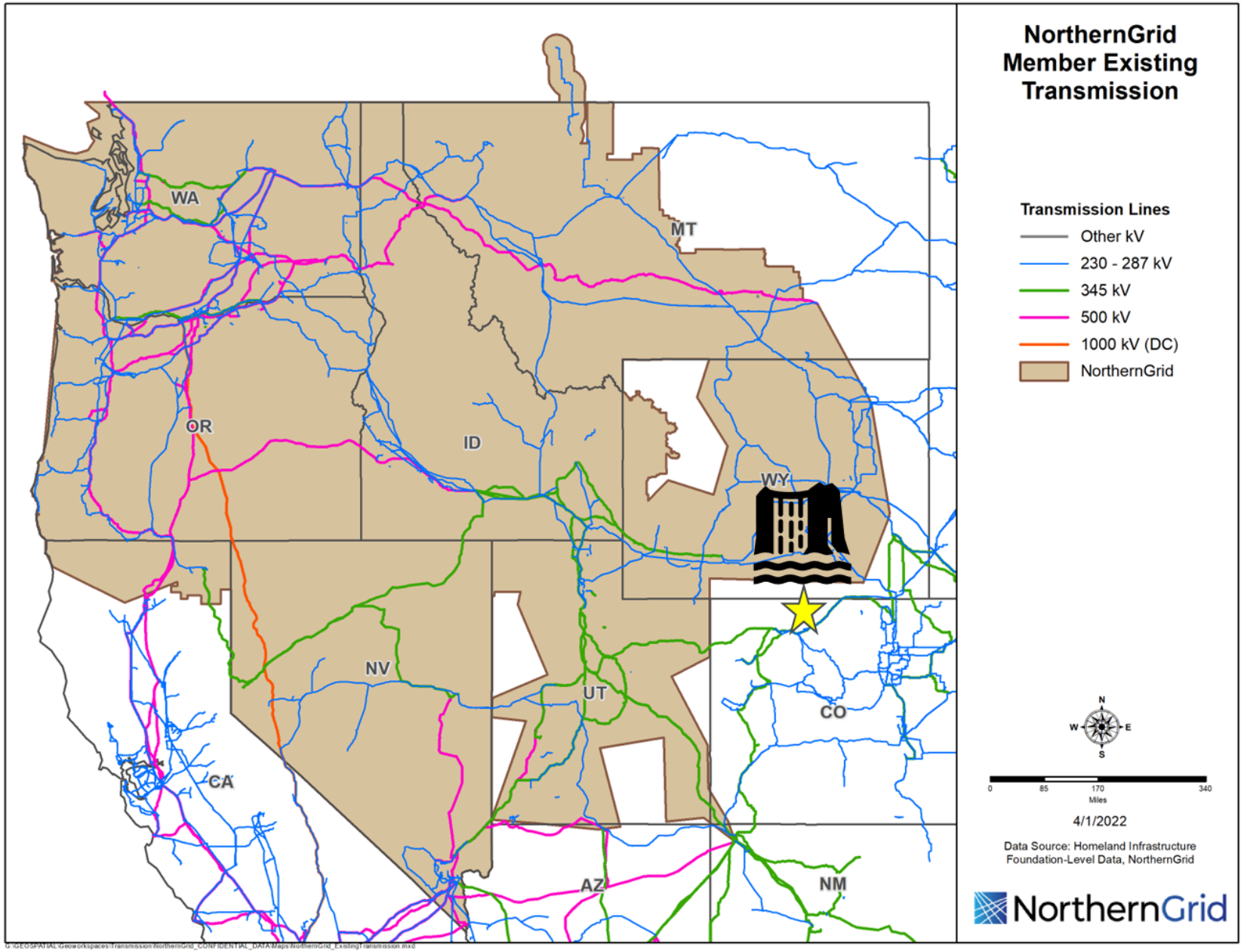
Economic Study Request: Pumped Storage Hydro

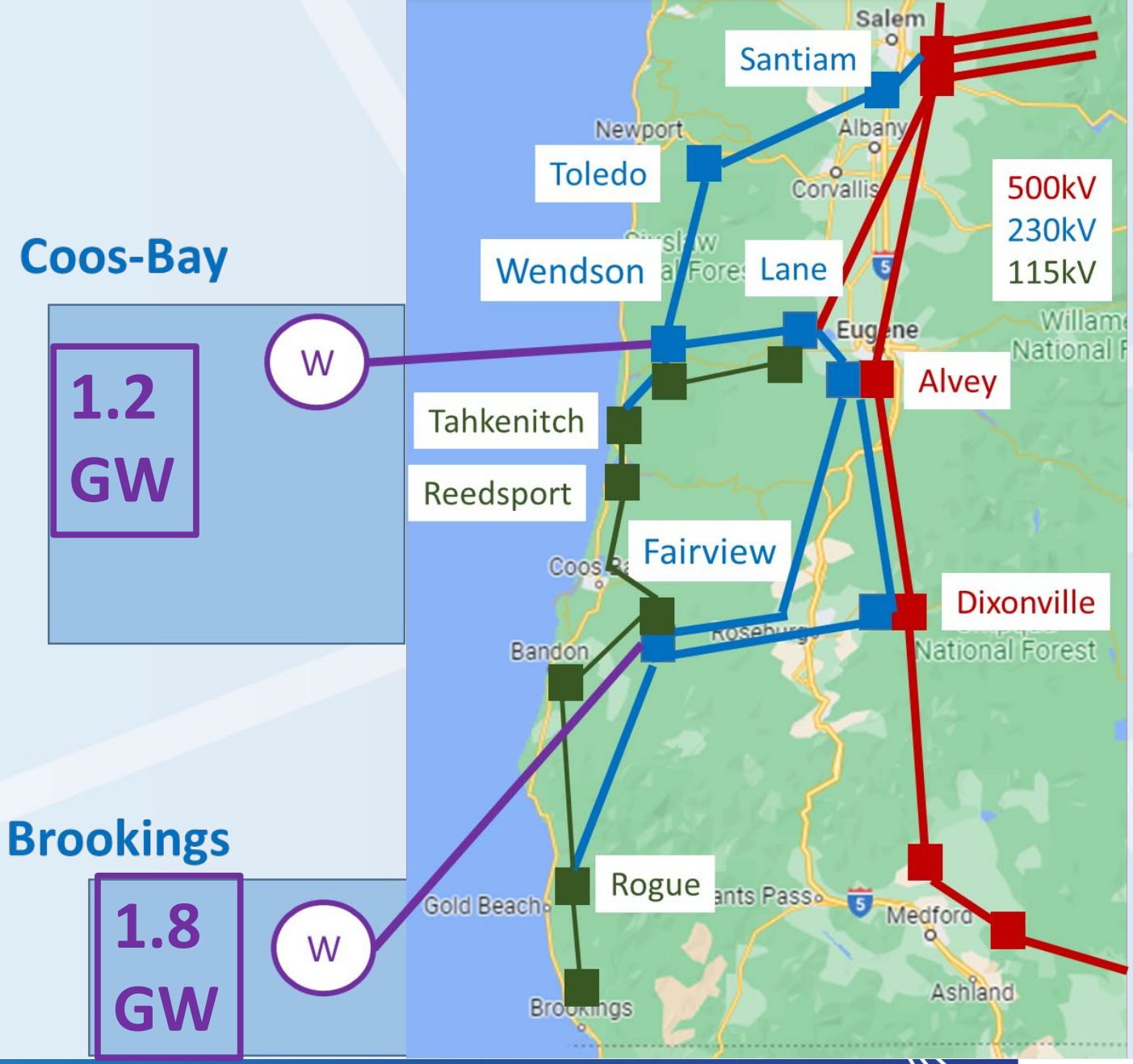
±900 MW
500 kV Aeolus Substation



Pumped Storage Analysis Approach

- Production Cost Modeling
- 2032 Anchor Data Set
- NorthernGrid Transmission additions

Economic Study Request: Offshore Wind



ESR_Study_Scope_Draft_Offshore_Wind_**FINAL**.pdf (northerngrid.net)

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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”

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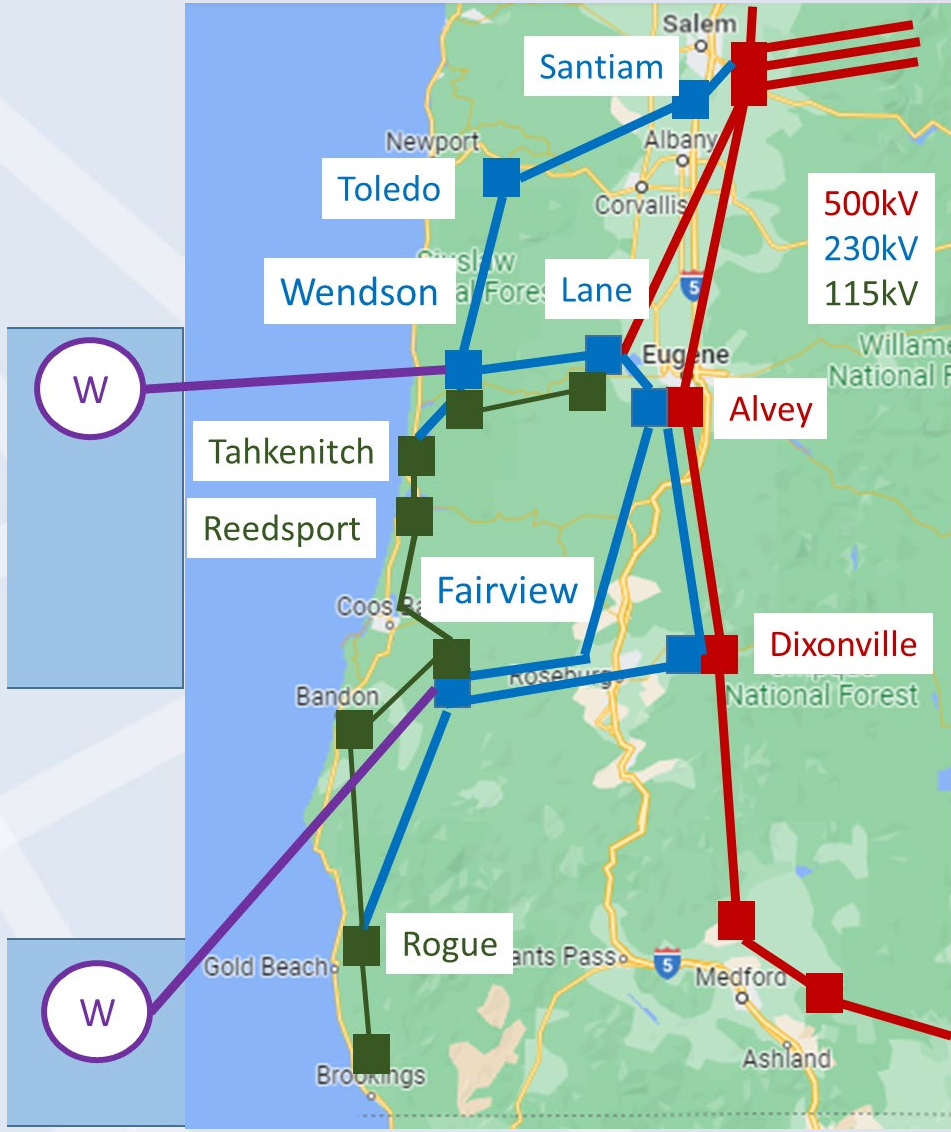
Existing Infrastructure Improvements

- New high-capacity 230 kV line from the Coos Bay area to Lane
- New high-capacity 230 kV line from the Coos Bay area to Dixonville
- Substation work at Lane, Dixonville, new telecom
- Dynamic reactive devices throughout
- Upgrade the 230 kV system in the Eugene area
- Upgrade Dixonville transformation and line



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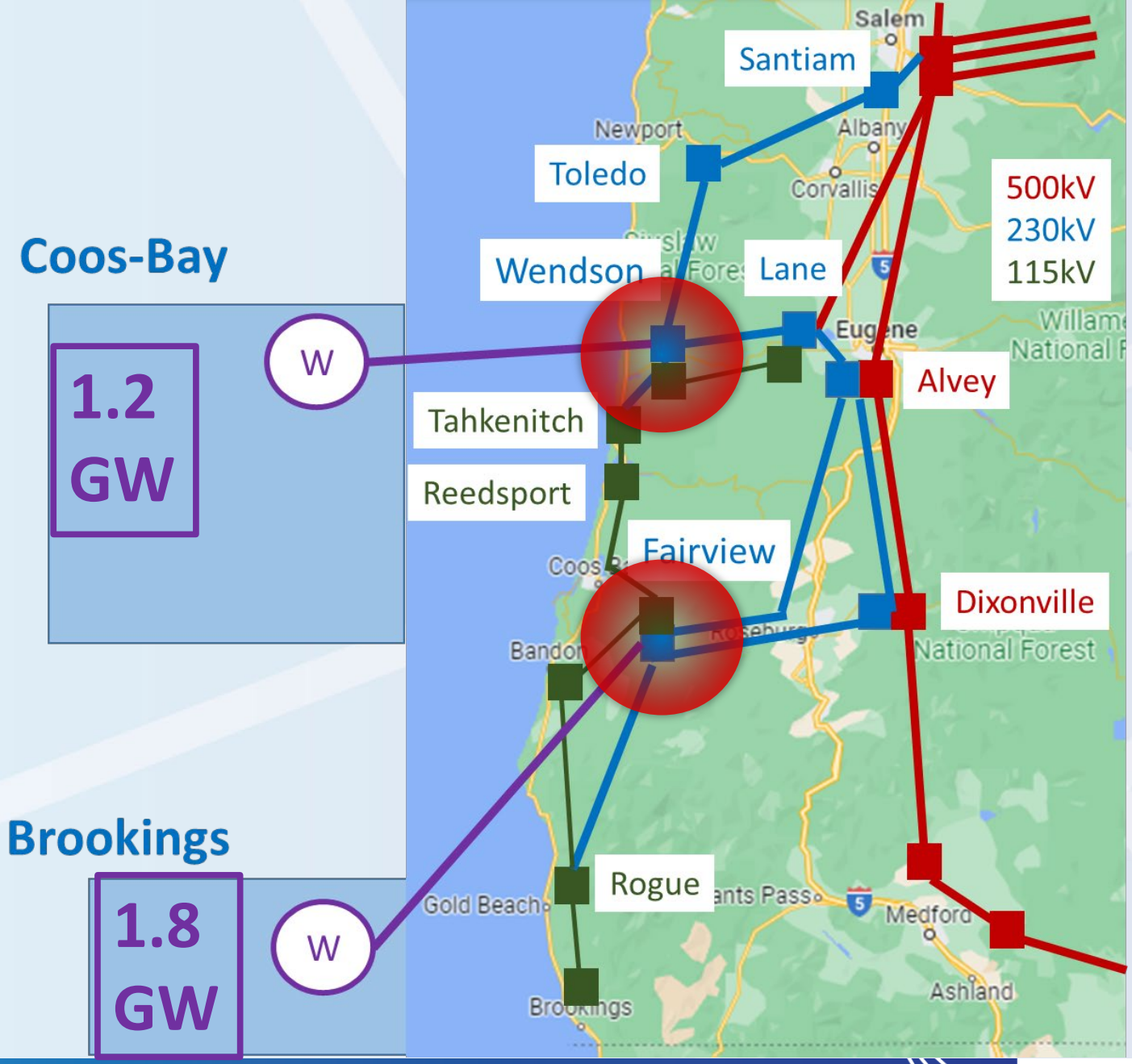
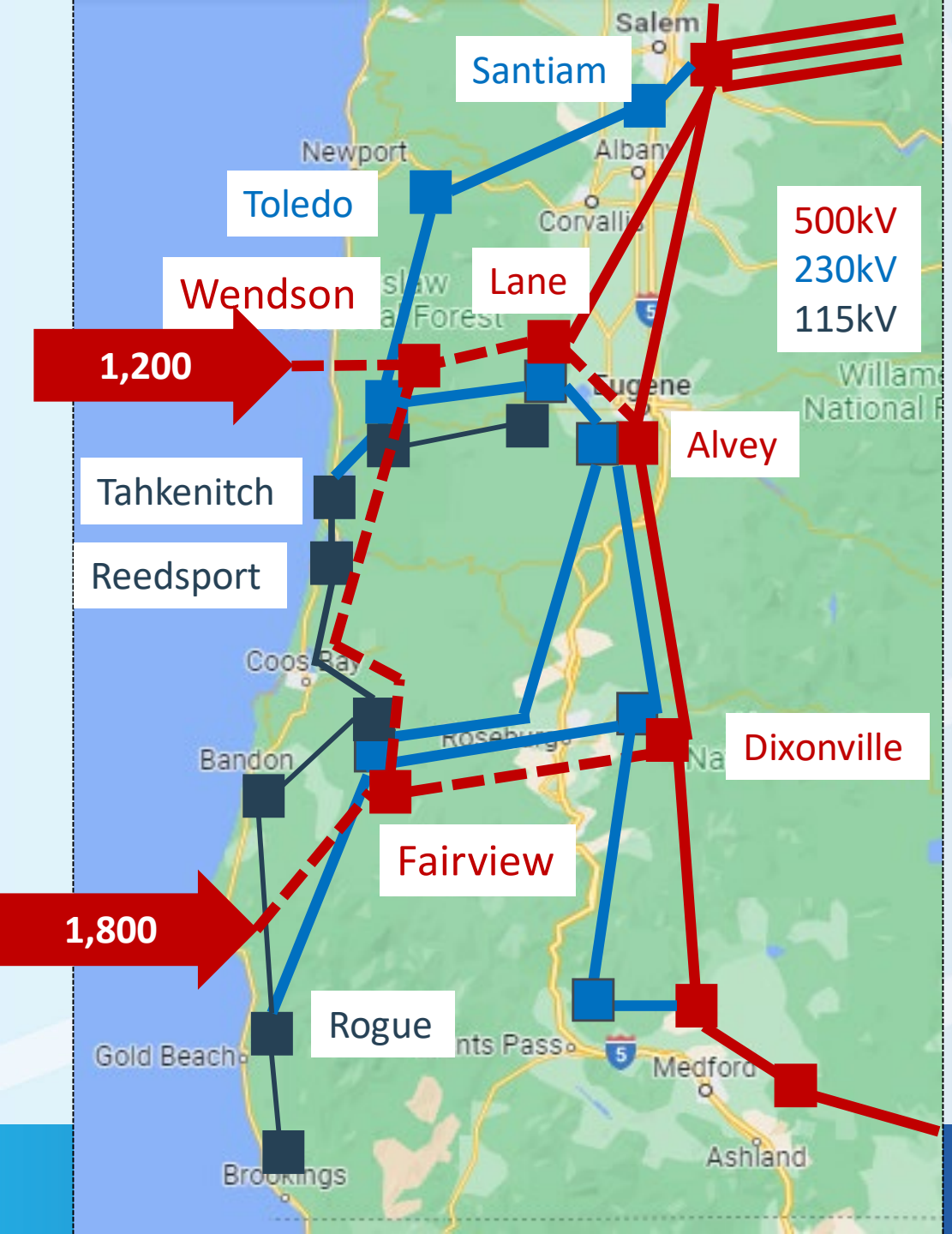
Initial reliability findings, “N-0”





500 kV Upgrades Needed

- Fairview 500 kV substation
- Wendson 500 kV substation
- Dixonville 500 kV substation upgrades
- Lane 500 kV substation upgrades
- Alvey 500 kV substation upgrades
- 49 mile 500 kV line from Fairview to Dixonville
- 41 mile 500 kV line from Wendson to Lane
- 63 mile 500 kV line from Fairview to Wendson
- 14-mile 500 kV line from Lane to Alvey
- Series compensation in Fairview-Wendson 500 kV line
- Fairview 500/230 kV transformer
- Wendson 500/230 transformer

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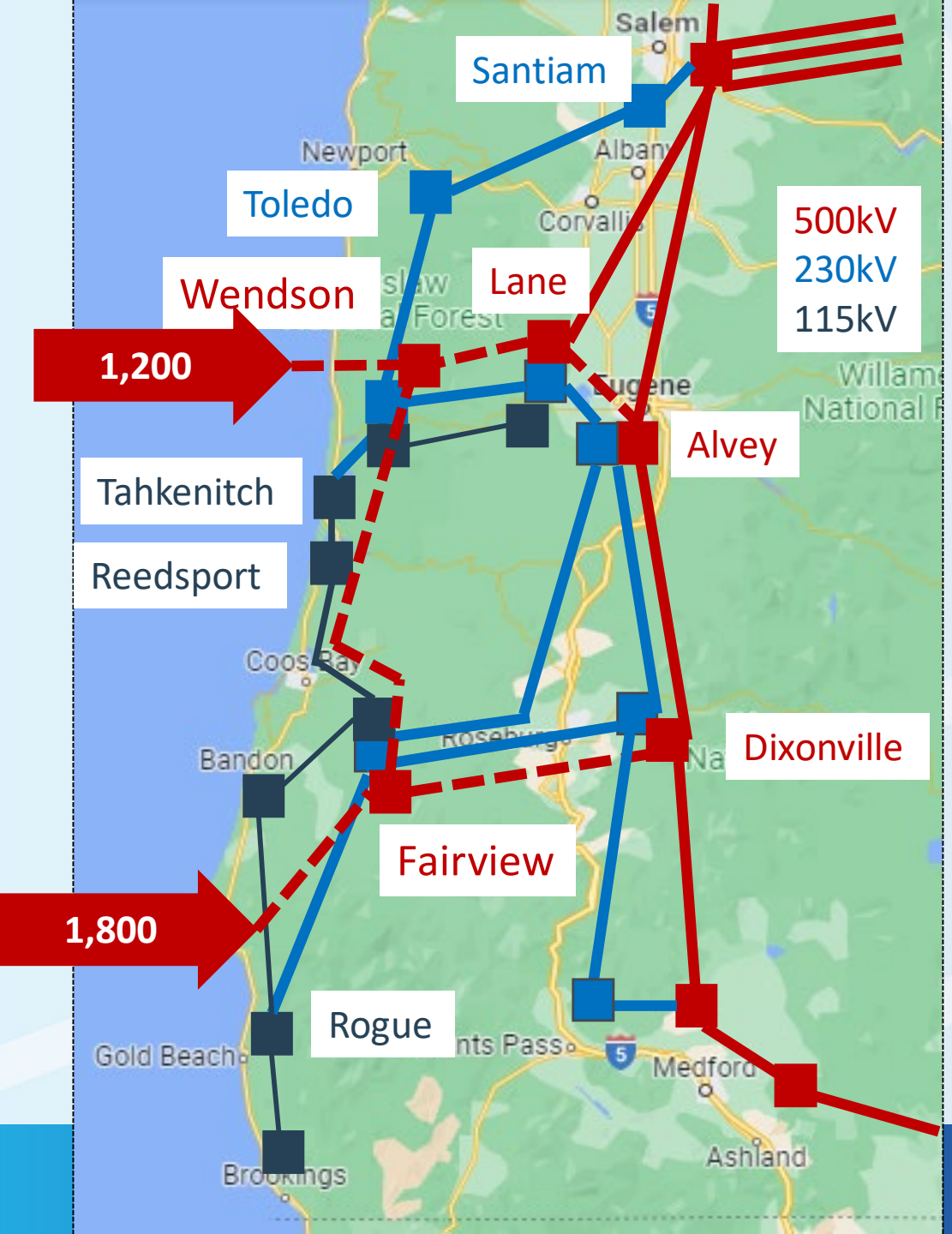

Reliability Findings

No Reliability violations, N-0 OR N-1

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Offshore Wind: Production Cost

1. Anchor Data Set
2. Account for NorthernGrid Data Submittals
3. Run Production Cost, establish "baseline"
4. Add in offshore wind and “Transmission Solution”
5. Run Production Cost, establish changes

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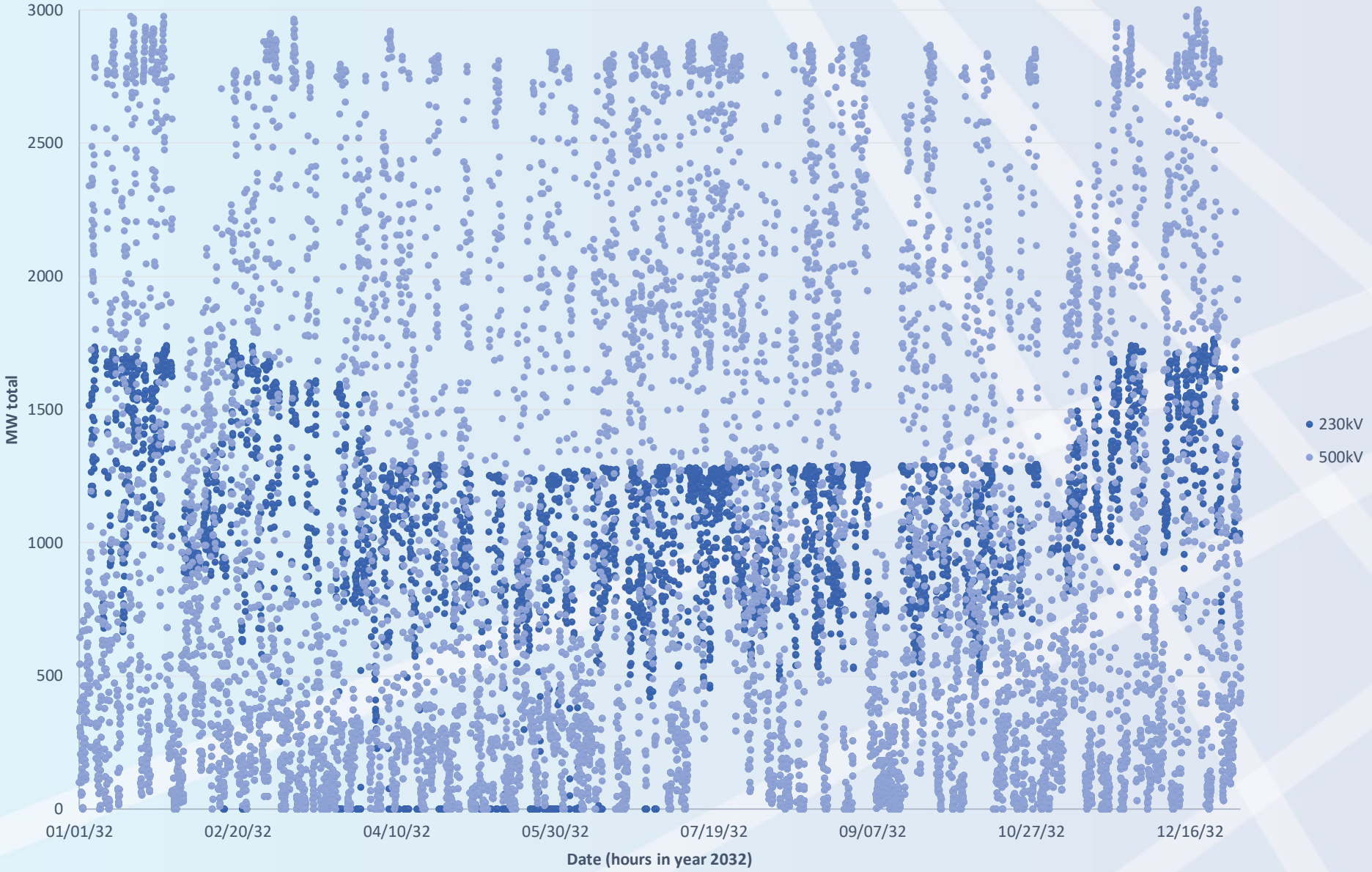
Offshore Wind Output



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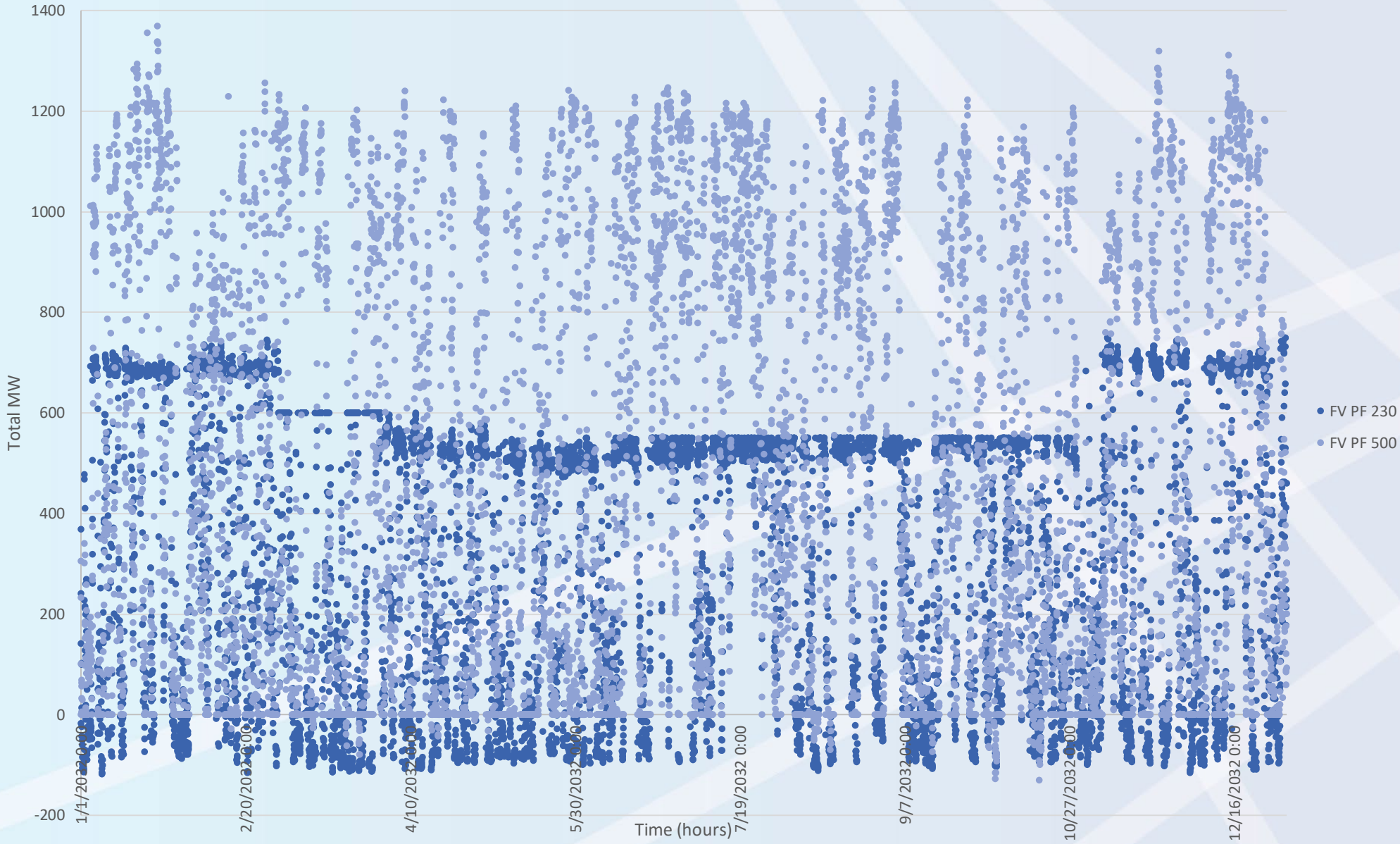
Fairview Cut Plane



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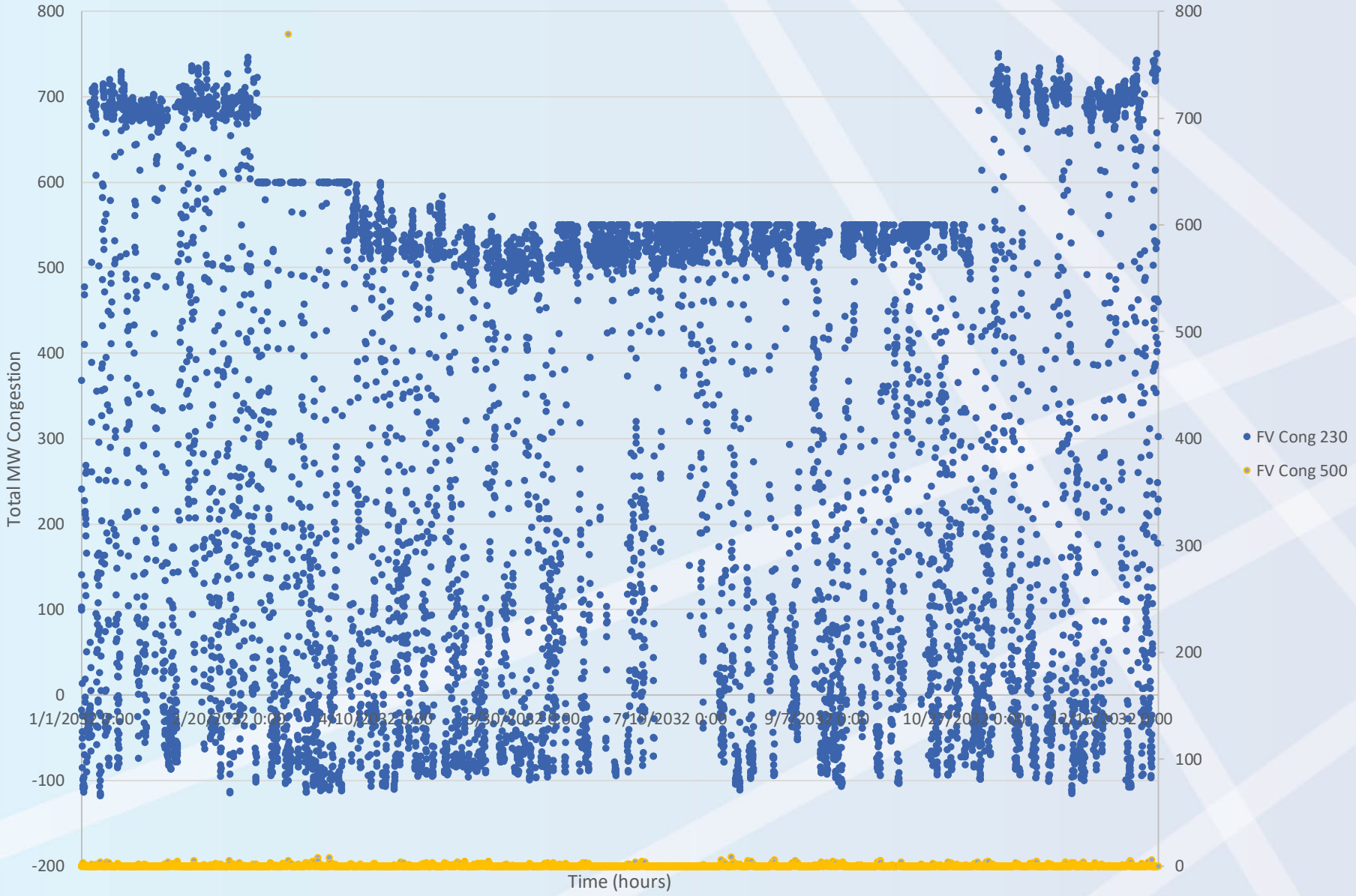
Fairview Cut Plane Congestion



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Thank you!

Chelsea Loomis

Regional Transmission Activities

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