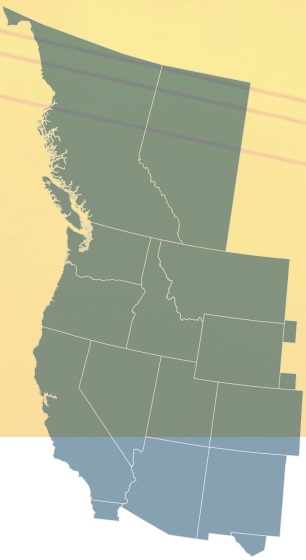
WESTERN ASSESSMENT
of Resource Adequacy

Northwest Power Pool Northwest (NWPP-NW)

This section covers the Northwest Power Pool Northwest (NWPP-NW) subregion, which includes British Columbia, Washington, Oregon, and parts of Montana, Idaho, and California.

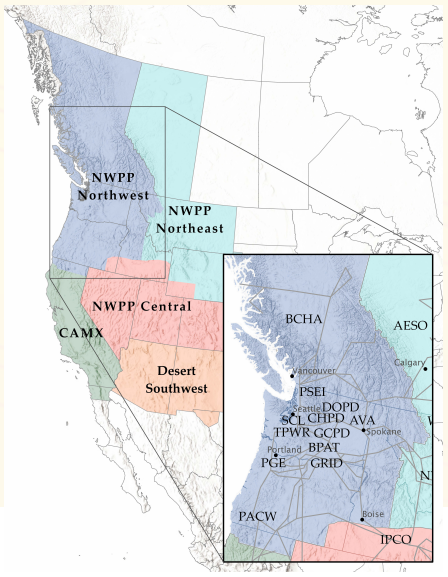
While the demand-at-risk hours increase over the next eight years, they have substantially improved since last year's assessment due to adjustments to the subregion's demand forecast.

Variability in the NWPP-NW subregion remains consistent over the next 10 years. The majority of the 2 GW of new resources planned in this subregion over the next 10 years are hydro resources.



SUB-REGIONAL RISKS

The addition of almost 2,000 MW of new resources, most of which are conventional hydro, will help mitigate resource variability. However, increasing variability in load and resources, as well as hard-to-predict changes caused by climate change, electrification, new technologies, and other drivers, will continue to challenge the subregion. In addition, reliance on imports to be resource adequate will continue to pose a risk to the NWPP-NW subregion.



WECC

Electric Reliability and Security for the West

Western Assessment of Resource Adequacy Subregional Results

November 2022

The Western Assessment examines resource adequacy across the Western Interconnection and within each of five subregions:

- California-Mexico (CAMX)
- Desert-Southwest (DSW)
- Northwest Power Pool Northwest Central (NWPP-Central)
- NWPP Northeast (NWPP-NE)
- NWPP Northwest (NWPP-NW)

This part of the report provides information on each of the five subregions, including:

Drivers of Resource Adequacy Challenges in the West

This section describes some of the drivers of resource adequacy challenges in the West and the ways they factor into this assessment.

Demand And Risk Indicator (DRI)

This section provides information on each subregion's Demand at Risk Indicator (DRI). The DRI defines *resource adequacy risk* strictly as the number of hours in a year when demand is at risk, i.e., when the risk for loss of load exceeds the one-day-in-ten-years (ODITY) or 99.98% risk threshold. See the main report for more information on the DRI.

Planning Reserve Margin Indicator (PRMI)

This indicator is a measure of variability on the system. It defines resource adequacy risk by the reserve margin that entities need to account for variability on the system and meet an ODITY, or 99.98%, reliability threshold. See the main report for more information on the PRMI.

Resource Adequacy Risks

This section highlights the frequency, magnitude, and timing of demand-at-risk hours in each subregion. See the main report for more information.

WECC

Electric Reliability and Security for the West

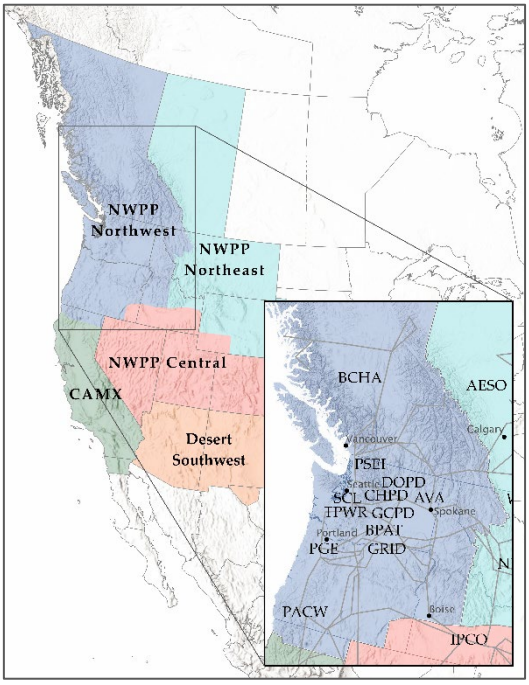
Western Assessment of Resource Adequacy—Northwest Power Pool Northwest

November 2022

Northwest Power Pool Northwest

This section covers the Northwest Power Pool Northwest (NWPP-NW) subregion, which includes British Columbia, Washington, Oregon, and parts of Montana, Idaho, and California. The section covers four areas:

- Drivers of resource adequacy challenges in the West;
- Demand at Risk Indicator (DRI);
- Planning Reserve Margin Indicator (PRMI);
- Resource Adequacy Risks.



Risks to the Subregion

The addition of almost 2,000 MW of new resources, most of which are conventional hydro, will help mitigate resource variability. However, increasing variability in load and resources, as well as hard-to-predict changes caused by climate change, electrification, new technologies, and other drivers will continue to challenge the subregion. In addition, reliance on imports to be resource adequate will continue to pose a risk to the NWPP-NW subregion.

Drivers of Resource Adequacy Challenges

Energy Policy

Washington

WA House Bill 1125—Energy Conservation and Efficiency (January 2021)

Encouraging investments in energy conservation and efficiency measures and expanding opportunities for energy rate discounts to, among other objectives, reduce the energy burden of low-income customers and vulnerable populations.

WA House Bill 1091—Reducing Greenhouse Gas Emissions by Reducing Carbon (July 2021)

Reducing greenhouse gas emissions by reducing the carbon intensity of transportation fuel.

Oregon

OR House Bill 2021*—*Clean Energy Bill

Requires retail electricity providers to reduce greenhouse gas emissions associated with electricity sold to Oregon consumers to 80% below baseline emissions levels by 2030, 90% below baseline emissions levels by 2035, and 100% below baseline emissions levels by 2040.

Changing Resource Mix

According to current plans, three-quarters of the NWPP-NW subregion's 2023 resource portfolio will be hydro, with natural gas and wind making up another 20%.

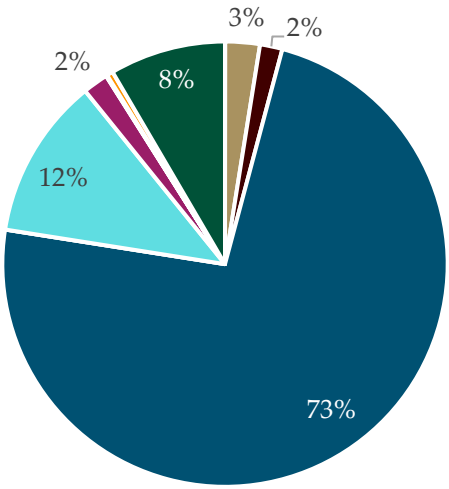


Figure 2: NWPP-NW 2023 Resource Portfolio

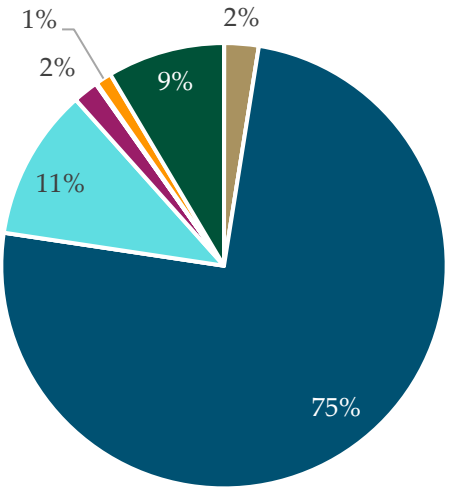


Figure 1: NWPP-NW 2032 Resource Portfolio

Battery Coal Hydro Solar Wind Natural Gas Nuclear Geothermal Biomass Petroleum Other

Over the next 10 years, entities plan to build over 2 GW of new resources in the NWPP-NW subregion. Most of the new resources will be added in the next four years and include hydro (largely in British Columbia) with some solar and wind. The relative composition of the resource mix is not expected to change drastically over the next 10 years.

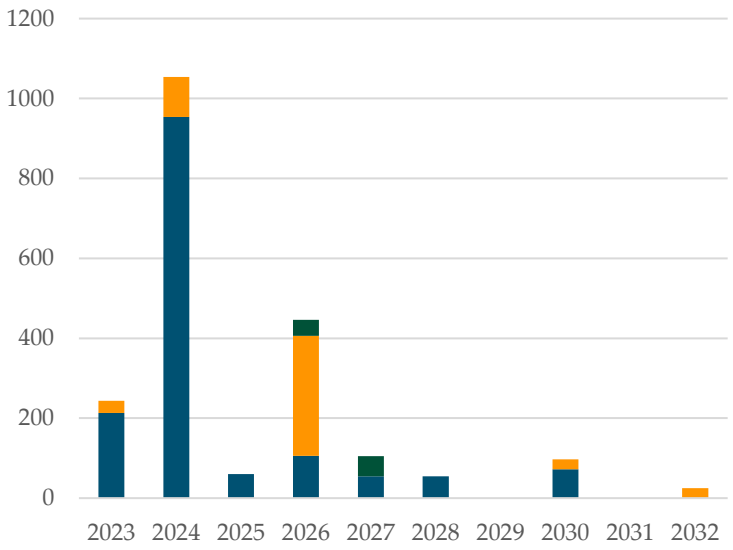


Figure 3: NWPP-NW Planned Resources 2023-2032 (MW)

Over the next 10 years, the Northwest subregion is expected to retire just over 1.7 GW of resources. Most of this will be coal resources (1 GW).

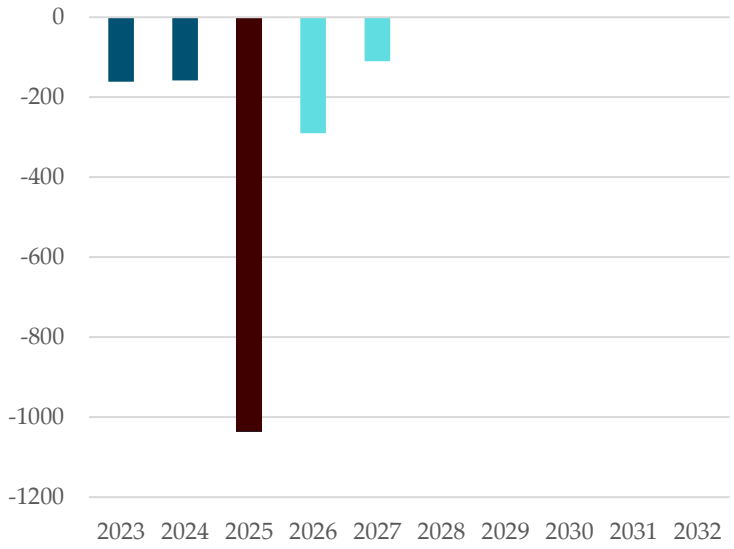
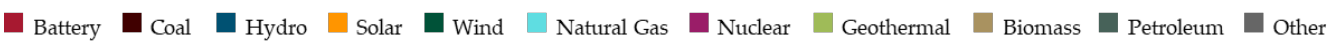


Figure 4: NWPP-NW Planned Retirements 2023-2032 (MW)



Changing Load and Demand

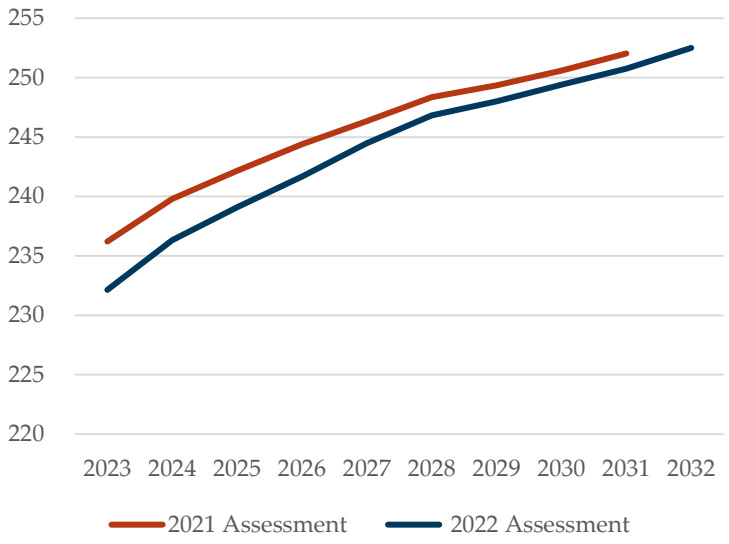


Figure 5: NWPP-NW Annual Energy Demand 2023-2032 (TWh)

Between 2023 and 2032, the total energy demand in the NWPP-NW subregion is expected to grow by 9%. This is up slightly from the growth of 7% seen in last year's assessment. However, the total demand is lower than what was seen in last year's assessment. This is due to adjustments that entities in the subregion made to their demand forecasts to reflect new economic and power use realities in the pandemic- and economic-recovery phase. The adjustments account for a shift from commercial consumption to residential consumption, aggressive conservation and efficiency standards, and economic recession.

The NWPP-NW subregion's peak hour demand occurs in the winter. It is expected to steadily grow from 33.3 GW in 2023 to 36.4 GW in 2032. Compared to last year's assessment, there is a deceleration in peak demand growth from 2024–2028.

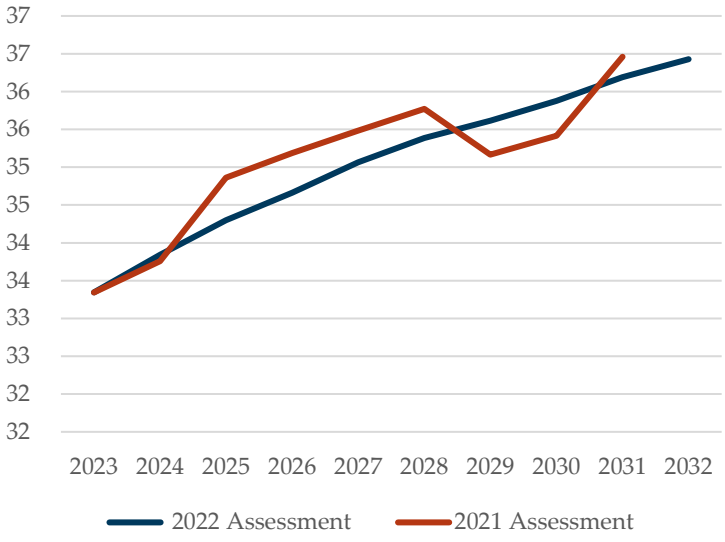
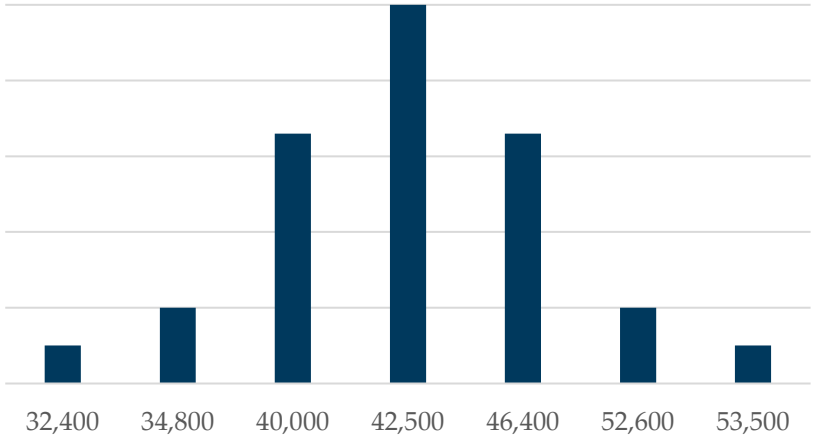


Figure 6: NWPP-NW Peak Demand 2023-2032 (GW)

Resource Variability

Balancing Authorities in the NWPP-NW subregion provided WECC with expected demand and resource numbers. Because demand and resources rarely occur as expected, WECC looks at the variability of both using a statistical range of resource availability and demand possibilities.

On the peak hour in 2023, the resource availability in the NWPP-NW subregion may deviate from expectations by as much as 10 GW. This is largely driven by the variability of hydro generation, which accounts for 8 GW of variability in the hydro resource availability.



	1-in-20	1-in-10	1-in-3	1-in-2	1-in-3	1-in-10	1-in-20
Baseload	9,800	10,400	11,200	11,500	11,700	11,700	11,700
Hydro	22,600	24,400	28,600	30,500	32,900	35,900	36,500
Solar	-	-	-	-	-	-	-
Wind	-	-	200	500	1,800	5,000	5,300

Figure 7: NWPP-NW Peak Hour Resource Variability 2023 (MW)

On the demand side, in 2023, there is a one-in-33-year chance that peak demand in the subregion could reach 37 GW, an 11% increase over the expected peak demand of 33.3 GW. Under extreme conditions that affect both demand and resource availability, the subregion would need to import power to remain resource adequate. If that power is not available to import, the subregion could be at risk of load loss.

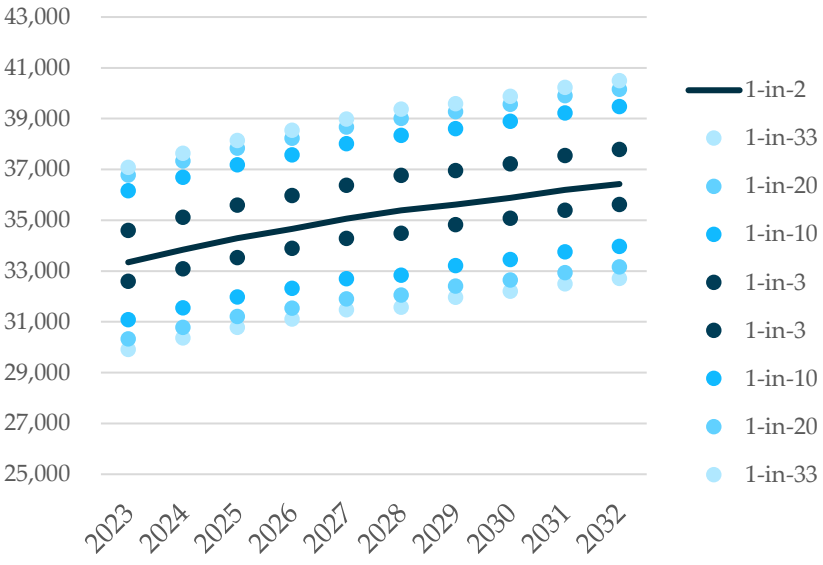


Figure 8: NWPP-NW Peak Demand Variability 2023-2032 (MW)

Demand at Risk Indicator

WECC uses a measure called the *Demand at Risk Indicator* to measure and track the number of hours in a year when demand is at risk, assuming all planned resources are built and imports are available.

The DRI for the NWPP-NW subregion substantially improved over last year's assessment. The change in DRI is due to the changes in demand noted above. The DRI increases between 2026 and 2030. In 2031, the DRI decreases because the number of imports in the subregion increase by an order of magnitude over 2023 levels.

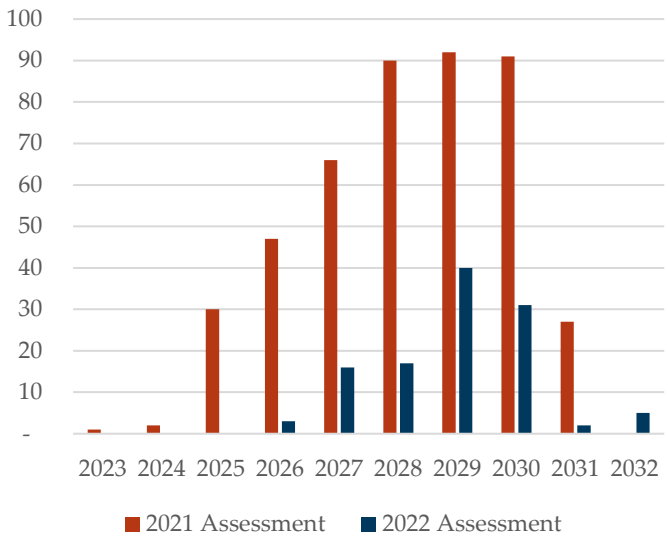


Figure 9: NWPP-NW DRI 2023-2032 (No. of Hours)

Planning Reserve Margin Indicator

WECC uses a measure called the *Planning Reserve Margin Indicator* to measure and track variability on the system under different Planning Reserve Margin scenarios.

Given a planning reserve margin that is determined based on the peak demand hour, the NWPP-NW subregion has 6,116 demand-at-risk hours in 2023, assuming no imports from other subregions. The point at which the hours at risk fall below the one-day-in-ten-year threshold ($PRMI_{ODITY}$) is 24.8%. This means that there are over 6,000 non-peak hours when the variability is greater than the peak demand hour.

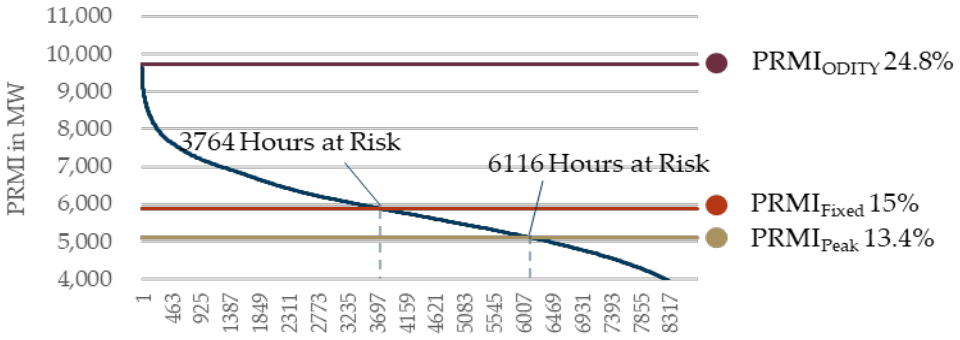


Figure 10: NWPP-NW PRMI 2023

Resource Adequacy Risks

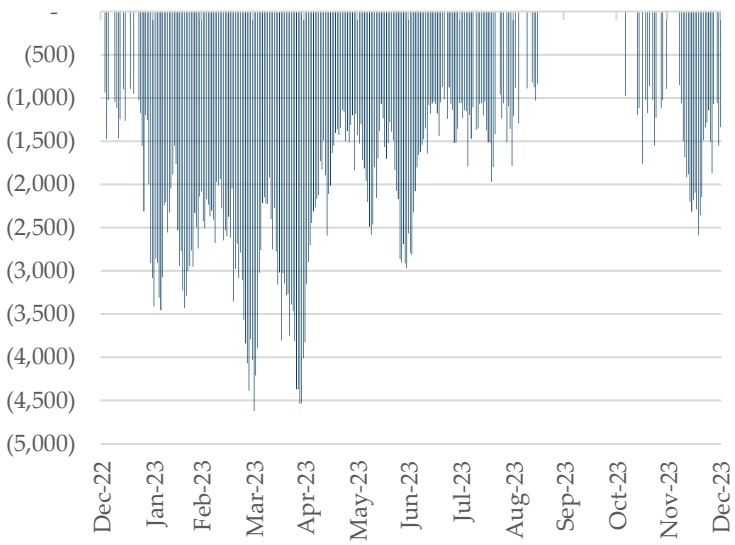


Figure 11: NWPP-NW Demand-at-Risk Hours Magnitude and Timing with $PRMI_{Peak}$ for 2023 (MW)

With a planning reserve margin of 13.4%, determined based on the peak hour, the demand-at-risk hours occur throughout the entire year except late fall. Almost every hour from February through June has some demand at risk.

With a planning reserve margin of 15%, the magnitude of the demand at risk decreases, and some of the demand-at-risk hours disappear; however, there is still substantial demand at risk throughout most of the year.

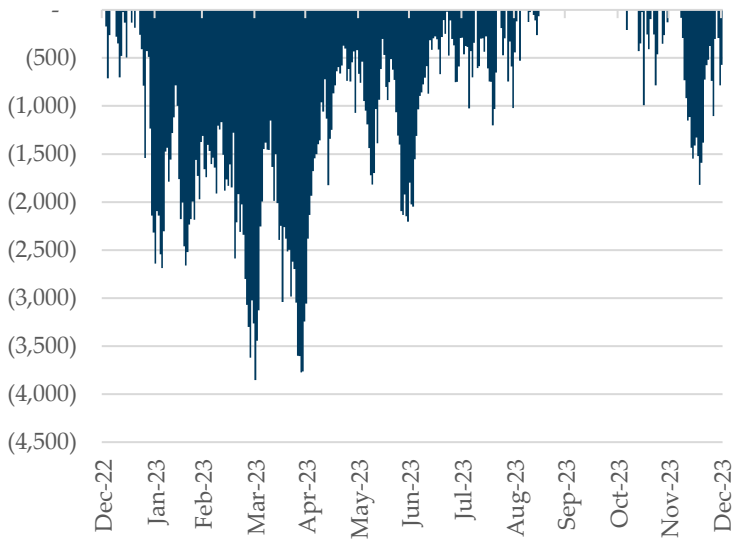


Figure 12: NWPP-NW Demand-at-Risk Hours Magnitude and Timing with $PRMI_{Fixed}$ for 2023 (MW)

The PRMIODITY for the NWPP-NW subregion is expected to be 24.9% for 2023. This is a slight increase over the 2021 assessment. Over the next decade the PRMIODITY declines to 23.6%. As the peak demand increases each year, the PRMI as a percentage decreases; however, the PRMI, as measured in megawatts, will remain the same, based on current expectations for demand and resources.

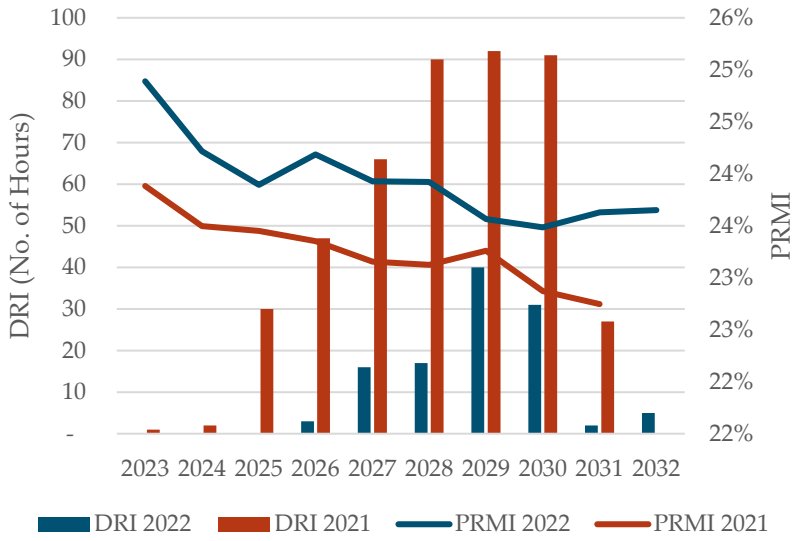


Figure 13: Comparison of NWPP-NW DRI and PRMIODITY 2023-2032