DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

Commission Investigation of Montana Resource Adequacy And Risk Profile	)))	REGULATORY DIVISION DOCKET NO. 2022.09.087

Comments of Renewable Northwest

Pursuant to the Notice of Investigative Docket and Opportunity to Comment issued on September 20, 2022, Renewable Northwest ("Commenter") submits the following for the Montana Public Service Commission's consideration given renewed activity in the Docket, and particularly in response to discussion around wind, solar, and storage's potential contribution to resource adequacy in Montana.

(a) Historical and potential future contribution of wind and energy storage resources to resource adequacy in Montana

Commenter recommends examining wind generation in the NorthWestern Energy Balancing Authority Area (BAA) when reviewing the historical and potential future contribution of wind generation to peak loads in Montana. Although only a tiny fraction of Montana's potential wind resource is developed, 0.18%[1], wind actively generating in the BAA provides a greater sample size than only wind contracted by NorthWestern Energy to serve its native load, and therefore provides an improved, yet insufficient, indication of the potential contribution wind generation can make to NorthWestern Energy customers.

Even though wind is not dispatchable and must be paired with energy storage to supply clean, low-cost energy on demand, if we consider its instantaneous contribution during peak loads, we see there was significant wind generation in the BAA during several peaking hours over the last two peak load periods. In fact, wind generation approximated or exceeded natural gas generation in several peak hours (Figures 1 and 2).

[1] NREL, 2012, U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis

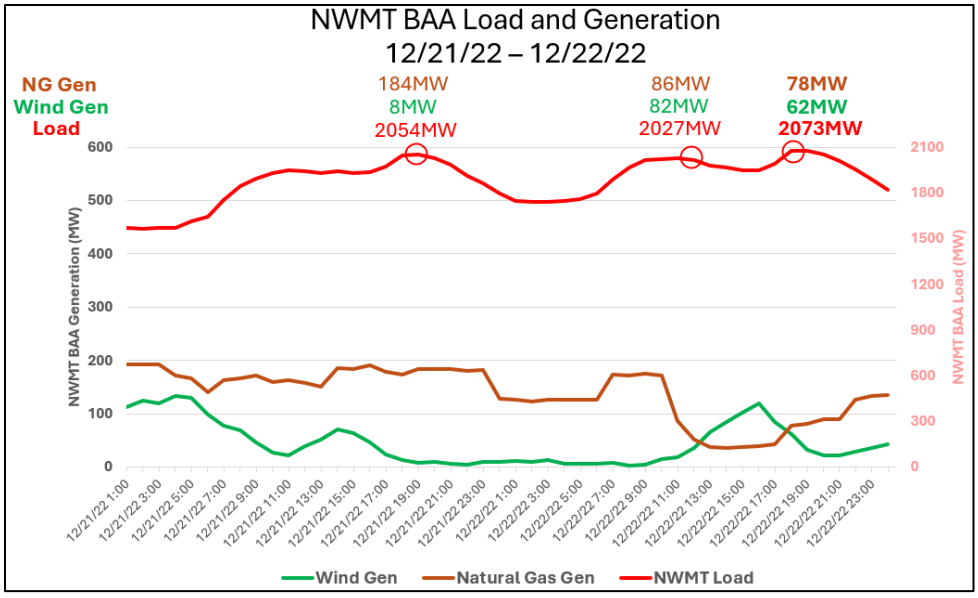

Figure 1. Wind provided substantial generation several peak hours during the December 2022 event

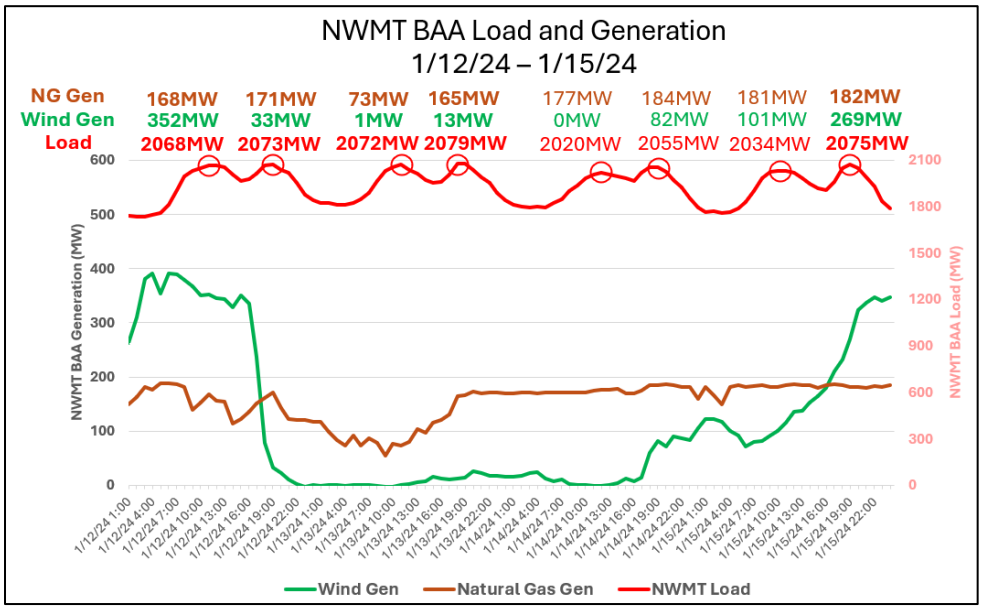

Figure 2. Wind provided substantial generation for many of the peak hours during the January 2024 event

We have also observed exceptional wind generation in advance of cold weather events in Montana. For an extended period leading up to the previous two peak events examined above, the limited wind developed in Montana produced substantial energy, demonstrating the potential for wind in Montana to generate clean, low-cost energy which can be stored to serve Montana customers during peak hours (Figures 3 and 4).

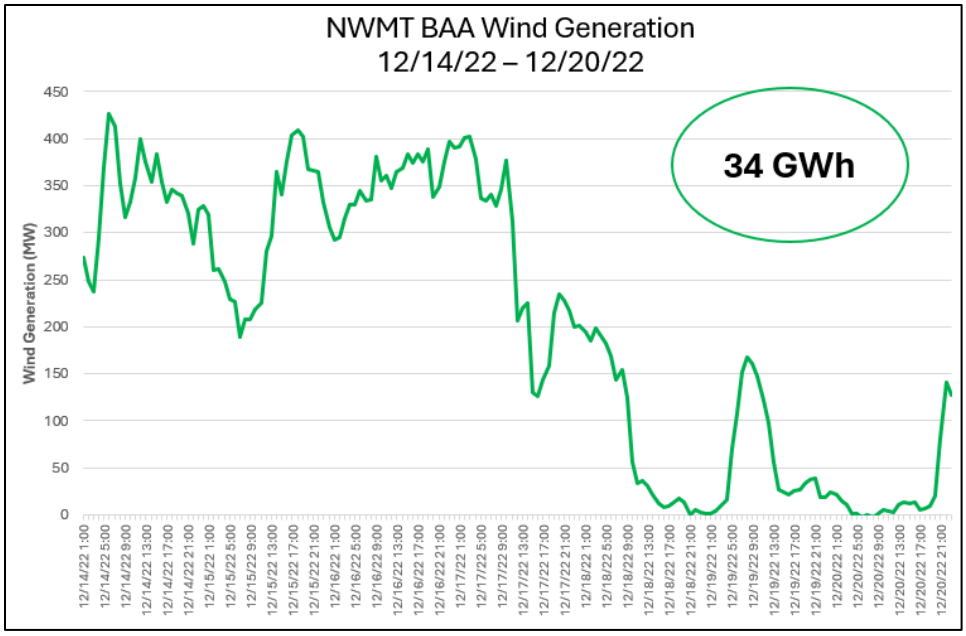

Figure 3. Exceptional wind generation preceding the December 2022 event.

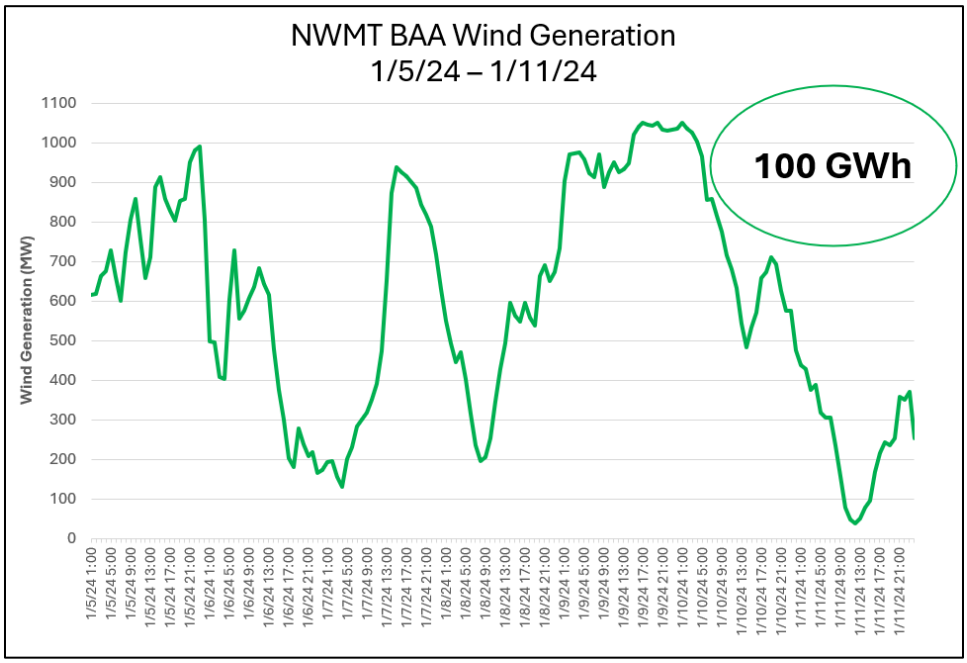

Figure 4. Exceptional generation preceding the January 2024 cold snap. Most of the increase in energy produced preceding this event versus December 2022 is attributable to a single new wind facility[2].

[2] NextEra Energy Resources, 2023, https://www.nexteraenergyresources.com/clearwater-wind/project-overview.html

(b) Historical and potential future contribution of natural gas resources to resource adequacy in Montana

The two previous peak events have also shown consistent reduced performance of natural gas generators in the NorthWestern Energy BAA. NorthWestern Energy has cited limited fuel supply, labor to replace oil lines and cover water lines with blankets, generators tripping off due to extremely cold air intake, and fuel switching to diesel resulting in a 10-15% degradation in production[3]. Despite substantial labor required to sustain reduced generator performance and numerous outages, NorthWestern describes the generators as performing "very, very well" during these events[4]. Figure 5 below shows natural gas generators' contribution to peak loads during the most recent peak events.

If this level of performance during peak periods is expected for natural gas generation, as NorthWestern Energy indicates and has been consistently observed during winter events across the United States[5], Commenter recommends applying an unforced capacity (UCAP) or effective load carrying capability (ELCC) methodology to capacity accreditation which captures the likelihood of correlated outages for natural gas generators during peak loads such as we have observed in the previous two peak events. These methodologies would provide a more accurate estimate of natural gas generators' potential contribution to Montana's peak loads. This approach would also align with the methodology used by the Western Resource Adequacy Program ("WRAP"), in which NorthWestern Energy is a participant.[6]

[3] MT PSC Information Meeting – NorthWestern Energy Presentation – January Cold Weather Event, March 6, 2024
[4] MT PSC Information Meeting – NorthWestern Energy Presentation – January Cold Weather Event, March 6, 2024
[5] Union of Concerned Scientists, 2024, Gas Malfunction: Calling into Question the Reliability of Gas Power Plants
[6] WRAP, 2023, Western Resource Adequacy Program Detailed Design; WRAP is currently in a non-binding phase but is expected to become binding in Summer 2025.

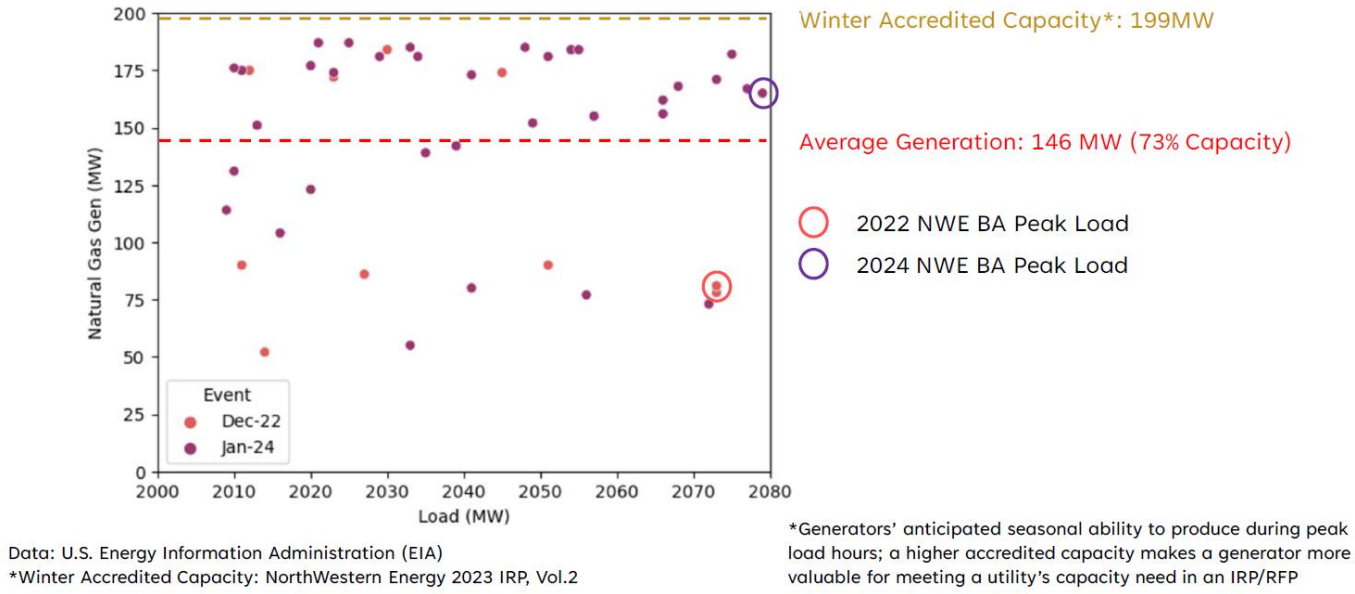

Figure 5. NorthWestern Energy BAA natural gas generation during the previous two peak events where load exceeded 2000 MW. Average generation during these hours was only 73% of winter accredited capacity.

(c) Selecting economically efficient supply resources for resource adequacy in Montana

Commenter disputes marginal coal and natural gas generation will be an efficient hedge for market exposure and resource adequacy. Fuel price volatility[7], restricted fuel supply for generators and cold weather reliability concerns[8], carbon pricing[9], pollution regulation[10], and declining cost of wind, solar, and batteries[1112] all suggest capital expenditure on fossil fuel assets is more likely to cost Montana consumers more than it saves.

For instance, we see the *unsubsidized*, total levelized cost of energy (LCOE) for clean, dispatchable resources such as wind or solar plus storage is already often less expensive than the operating cost of coal generation with a modest carbon price of $20-40/Ton or natural gas peaking generation with or without a carbon price (Figure 6). Dispatchable clean resources do not pollute, provide capacity on demand, and are the preferred

[7] CAISO, 2024, Winter Conditions Report for January 2024
[8] Union of Concerned Scientists, 2024, Gas Malfunction: Calling into Question the Reliability of Gas Power Plants
[9] Lazards, 2023, Levelized Cost of Energy Analysis
[10] EPA, 2023, EPA-HQ-OAR-2023-0072: New Source Performance Standards for GHG Emissions from New and Reconstructed EGUs; Emissions Guidelines for GHG Emissions from Existing EGUs
[11] Lazards, 2023, Levelized Cost of Energy Analysis
[12] NREL, 2023, Cost Projections for Utility-Scale Battery Storage

resources for our nation's major load centers, including industrial load. This suggests there is already significant risk of coal or gas investments being stranded in the near term. Furthermore, industry-leading cost forecasts for battery energy storage systems (BESS) show a 40% cost reduction from 2023-2025 (Figure 7 and 8). Consequently, to the extent they are not already, we estimate building *and* operating clean resources will rapidly become less expensive than operating polluting resources.

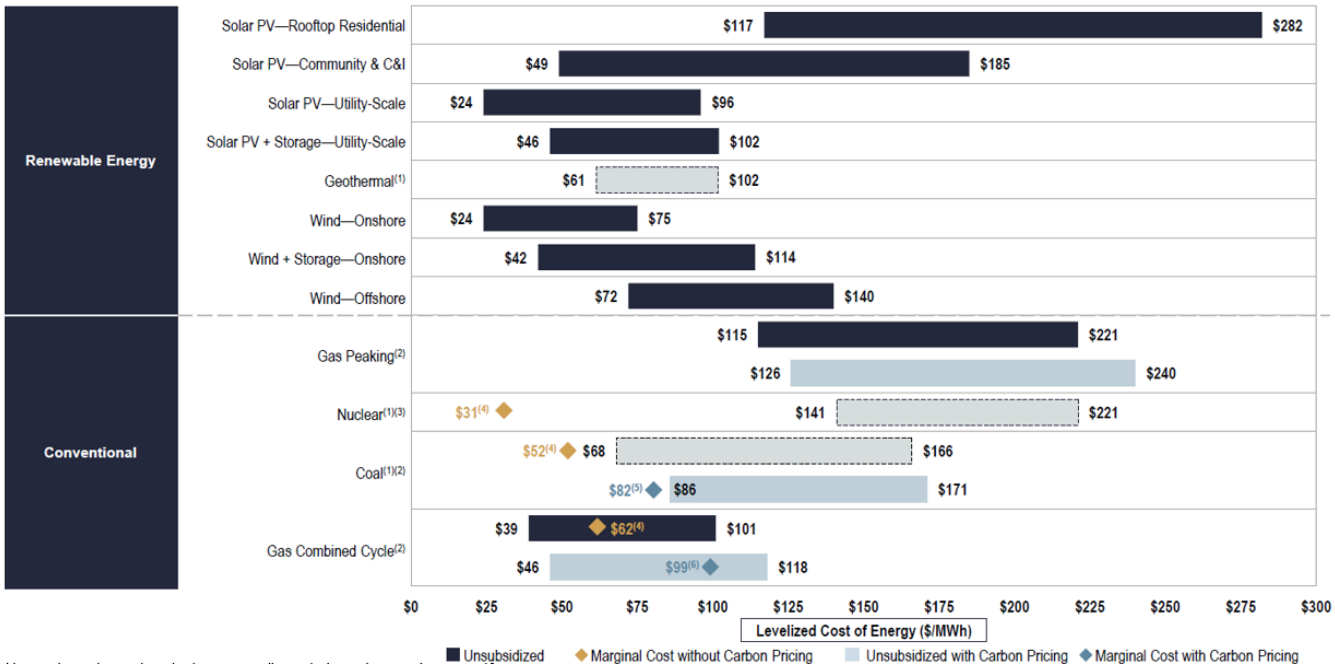

Figure 6. Lazards, 2023, Levelized cost of energy analysis. Dispatchable clean resources are already often less expensive than the operating cost of coal with a modest carbon price of $20-40/Ton or gas peaker generators in any scenario.

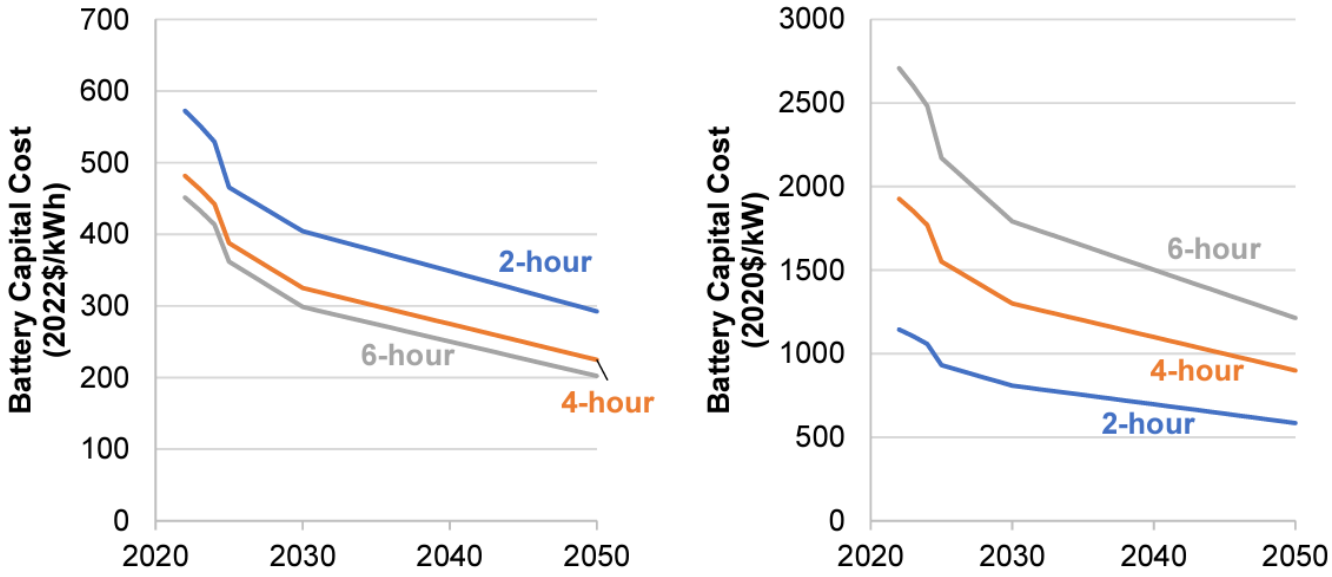

Figure 7. NREL Cost Projections for Utility-Scale Battery Storage: 2023 Update

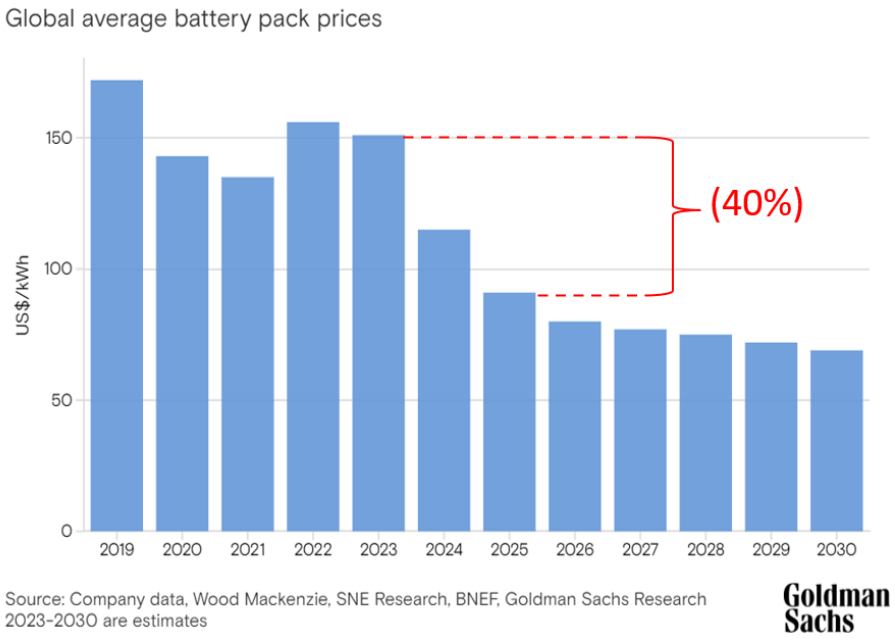

Figure 8. Wood Mackenzie, SNE Research, BNEF, Goldman Sachs Research, 2023. Near-term battery pack cost reductions are sufficiently large to affect a significant reduction in the cost of standalone storage and hybrid resources.

(d) Historical and potential future contribution of transmission capacity and market participation to reliable and economically efficient electricity service in Montana

Commenter recommends increasing transmission capacity on WECC paths in and out of Montana, whether by use of grid enhancing technologies (GETs) or construction of new lines. Montana consumers have already saved nearly $75 million since NorthWestern Energy joined the Western Energy Imbalance Market (WEIM) in summer 2021[13]. Sustained transmission development efforts by neighboring utilities and merchant developers is resulting in an interconnected West which will enable efficient resource trading across large geographies (Figure 9). During the January 2024 peak event, Palo Verde energy prices were only 16% of Mid-Columbia energy prices, suggesting abundant power available for dispatch from the desert southwest[14]. As the market expands and transmission connectivity increases across the West, Montana consumers can expect even greater savings[15].

Participation in the WEIM has improved NorthWestern Energy's ability to maintain reliable operations. Since joining the WEIM, NorthWestern Energy has seen substantial improvement in CPS1 performance and decrease in BAAL exceedances[16]. The WEIM also provided emergency energy to NorthWestern Energy equivalent to ~9% of load on January 14, 2024, in the middle of Montana's most recent peak event[17].

[13] CAISO, 2024, WEIM Benefits Report
[14] EIA, 2024, Wholesale Electricity and Natural Gas Market Data
[15] Brattle, 2023, Extended Day-Ahead Market Participation Benefits Study
[16] NorthWestern Energy, 2023, Presentation to the Energy and Telecommunications Interim Committee; https://leg.mt.gov/content/Committees/Interim/2023-2024/Energy-and-Telecommunications/Meetings/Sept-28-2023/NWE_BA_Transmission_ETIC_Presentation_09282023.pdf
[17] CAISO, 2024, Winter Conditions Report for January 2024

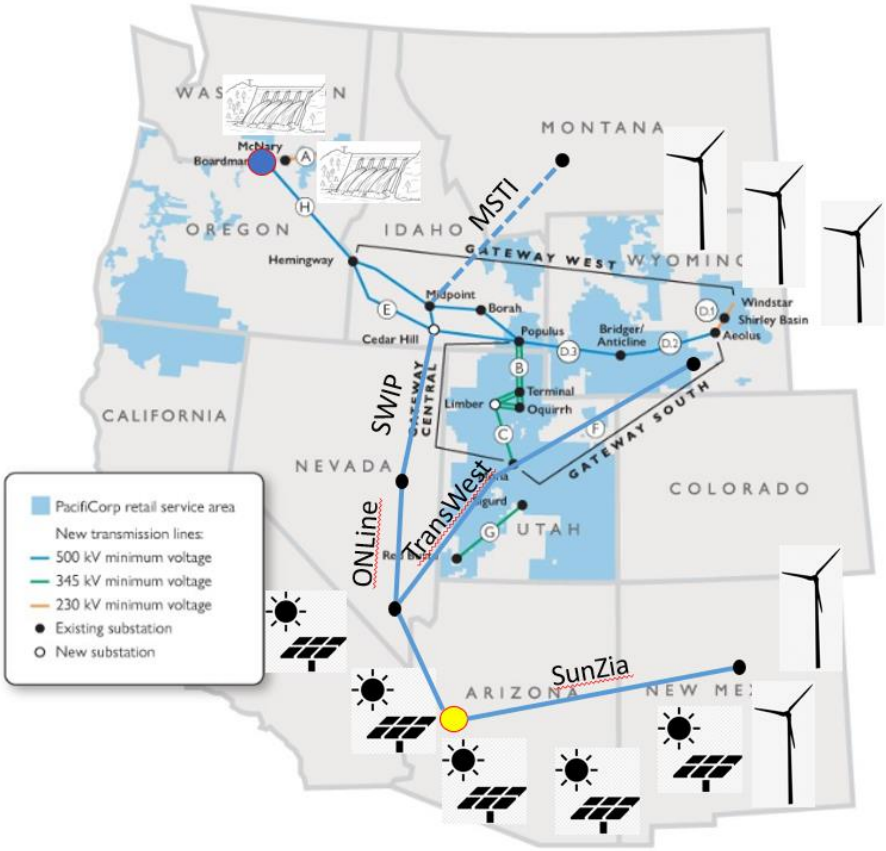

Figure 9. States and utilities throughout the West are planning and building the transmission infrastructure required to enable interregional trading of low cost, clean energy across the western interconnection. January 2024 cold snap on-peak pricing at Mid-Columbia (blue dot) and Palo-Verde (yellow dot) trading hubs was $886 and $140, respectively, indicating tremendous value in relieving transmission congestion from the desert southwest to the pacific northwest.

In addition to reducing costs and improving operational reliability for Montana's consumers, increasing Montana's transmission capacity will help address resource adequacy concerns for Montana and the region (Figure 10) in multiple ways. Increased transmission capacity would:

- Allow more of the 22,349 MW of capacity in Montana's interconnection queues as of 2023[18] to be developed;
- Enable access to new capacity options sufficient for WRAP's forward showing capacity and transmission requirements[19];
- Enable access to new supply options for current and prospective industrial energy demand in Montana.

The economic and reliability benefits to Montana consumers of increasing transmission connectivity to enhance participation in the growing western market will likely far exceed the cost.

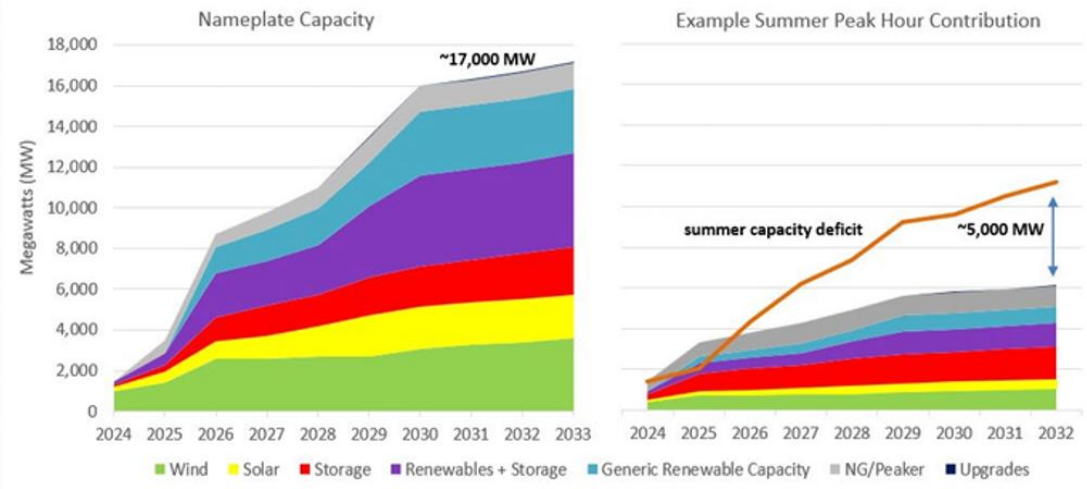

Figure 10. PNUCC Northwest Regional Forecast, 2023, Planned new resources. Many resources are planned, more are needed.

[18] S&P Global Market Intelligence, 2023, US Interconnection Queues Analysis
[19] WRAP, 2023, Western Resource Adequacy Program Detailed Design