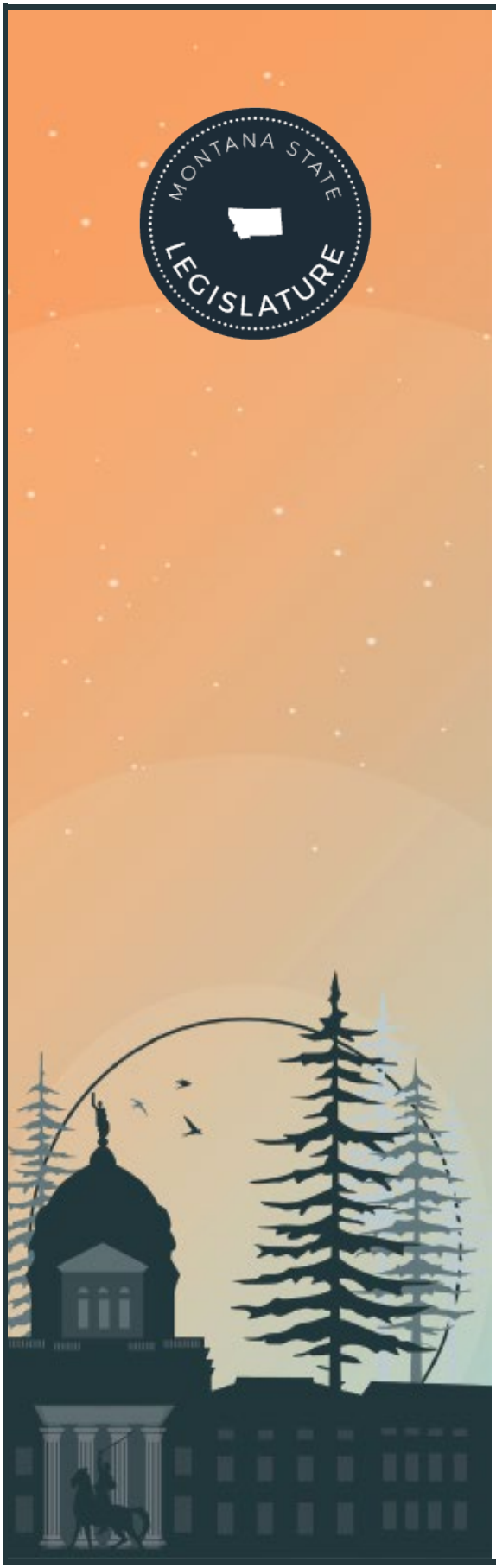

HJ6 : STUDY OF ELECTRIC POWER RESERVES

DRAFT REPORT TO THE 69TH MONTANA LEGISLATURE

Energy and Telecommunciations Interim Committe

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2023-2024

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This report is a summary of the work of the Energy and Telecommunications Interim Committee specific to the Energy and Telecommunications Interim Committee's 2023-2024 study as outlined in the Energy and Telecommunications Interim Committee's 2023-24 work plan and House/Senate Joint Resolution HJ 6 (2023). Members received additional information and public testimony on the subject, and this report is an effort to highlight key information and the processes followed by the Energy and Telecommunications Interim Committee (ETIC) in reaching its conclusions. To review additional information, including audio minutes, and exhibits, visit the ETIC website: www.leg.mt.gov/committees/interim/etic/.

A full report, including links to the documents referenced in this print report, is available at the ETIC website: https://leg.mt.gov/committees/interim/etic/.

HJ 6: ELECTRIC POWER RESERVE STUDY

OVERVIEW

House Joint Resolution No. 6 directed ETIC to study requirements regarding utility and wholesale generating supplier electric power reserve requirements. The study sought to:

- study electric power reserves;
- determine whether to require utilities and wholesale electric generation suppliers to have, contract for, or participate in a pool for electric power generation reserves;
- determine when reserves should be made available to the balancing authority managing an electric load in order to decrease the probability of service interruptions and enhance reliability while remaining in compliance with North American Electric Reliability Corporation standards; and
- examine the feasibility and efficacy of providing an alternative option to wholesale electric transmission customers to enable temporary reductions to a portion or all electric load instead of contracting additional electric generation reserves at times when load-shedding is required by the balancing authority to ensure uninterrupted service to ratepayers.

ETIC members conducted extensive panel discussions to gather a better understanding of electric power generation reserves and demand/load constraints utilities face during extreme weather events. The Committee recognized that these issues are nationwide, and not unique to Montana. COMMITTEE RECOMMENDATIONS PLACERHOLDER, IF ANY

COLD SNAPS & ELECTRICITY SUPPLY

In the last few years, Montana and the rest of the nation has experienced record-breaking low temperatures during the winter. With record-breaking temperatures, Montana utilities are experiencing record-breaking system peaks, and struggling to sustain load. This is a new problem for Montana. In the past, the state has had more than sufficient baseload electricity generation available for use, and available power from outside the state. Baseload generation has not kept up with the demand for power.

In February 2021, winter storm Uri affected much of the United States causing a major power crisis in Texas. Millions of Texans were left without power for days or even weeks due to the rolling blackouts. With a lack of sufficient reserves, all types of generating assets failed to produce enough power leading to prolonged outages.

Montana was also affected by the artic blast of February 2021. Delivery of electricity supply to NorthWestern Energy for certain transmission customers was interrupted, and the utility was nearly unable to meet its electricity delivery obligations to its other customers, including electric cooperatives, nearly causing rolling blackouts in eastern Montana. Roughly 900 residents of Jordan and Circle were left without power for 30 minutes. Jordan and Circle residents were members of an electric cooperative that participated in the Southwest Power Pool (SPP), a 17-state wholesale electric grid, and power market primarily based in the Central United States. SPP could not

produce enough power for its service area nor rely on neighboring energy markets as supplementation leading to the 30-minute outage.[1]

The problem Montana faced occurred when generation pledged to the balancing authority (BA) (BA, described in detail on page 3) didn't make it into the system. Extreme weather in parts of the region caused certain generation to become unavailable to serve Montana's demand. Some power scheduled into Montana never made it into the state because a portion of the transmission system in another state tripped. In addition, Federal Energy Regulatory Commission (FERC) regulations do not provide for replacement power if pledged generation doesn't arrive. The BA wasn't immediately aware of the problem because there are multiple deliveries from multiple generation sources across transmission paths. To prevent blackouts, the BA had to quickly secure alternate generation from other sources in the West and Midwest. The BA was within 30 minutes of having to curtail load to its transmission customers had it not been successful in its last-minute efforts. Load curtailment would have caused blackouts in freezing weather.

With Texas' power crisis, and Montana's brief outage, this sparked conversation surrounding energy generating types and their reliability during extreme temperatures. With Texas as a cautionary tale, the Montana Electric Cooperatives' Association and Northwestern Energy advocated for the legislature to examine possible solutions to avoid future service interruptions. With cold snaps occurring in 2022, 2023, and 2024, ETIC was presented on the most up-to-date data to drive the discussion.

> *January 11 and 16, 2024, Northwestern Energy experienced its highest ever sustained load over a six-day period. -NWE Response to PSC Docket No. 2022.09.087*

STUDY PROCESS

With HJ 6, the committee focused on education and discussion surrounding power reserves, balancing authority operations, electricity markets & regional transmission organizations, and resource adequacy. Educational presentations were provided by the Montana's Electric Cooperatives Association, NorthWestern Energy, the Montana Large Customer Group, Basin Electric Power Cooperative, regional transmission organization representatives, and additional stakeholders.

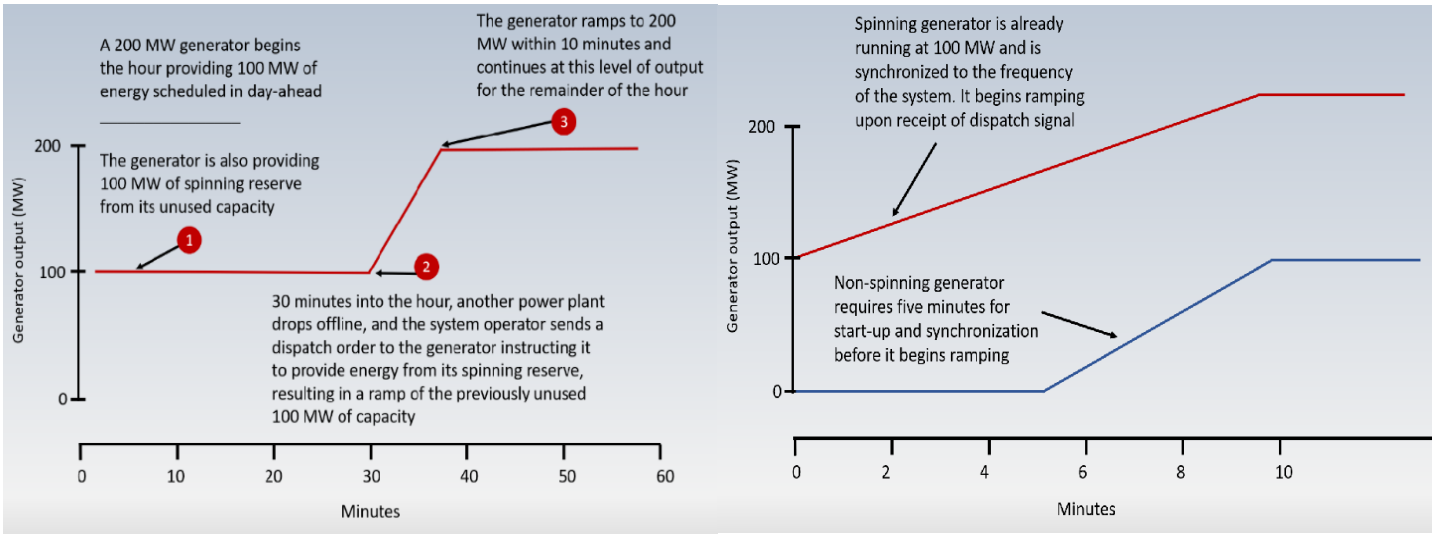
POWER RESERVES 101

Operating reserves maintain the reliability of the grid when system conditions can't accurately be predicted. If a generating asset fails, a power line goes down or a cold snap comes in, utilities need reserve. Operating reserves are the backup capacity (generation and responsive load availability) of energy production. Operating reserves can be considered Spinning or Non-Spinning.[2]

[1] Southwest Power Pool, *Report on February 2021 Winter Weather Event.*
[2] National Renewable Energy Laboratory, *Operating Reserves and Variable Generation.*

- Spinning reserves- Electric generation that is already operating and can provide energy quickly due to loss of supply.[3]
- Non-spinning Reserves- Resources that are not currently on during a lapse but can be dispatched within 10 minutes.[4]

SPINNING **NON-SPINNING**

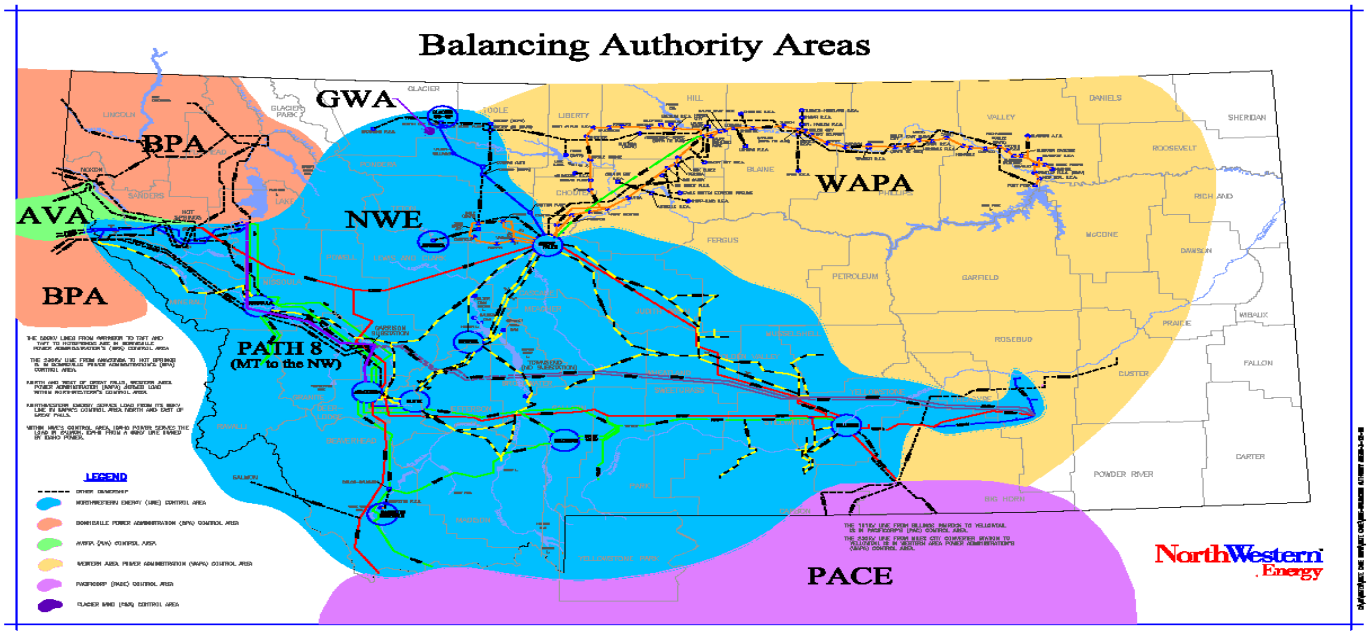


BALANCING AUTHORITIES

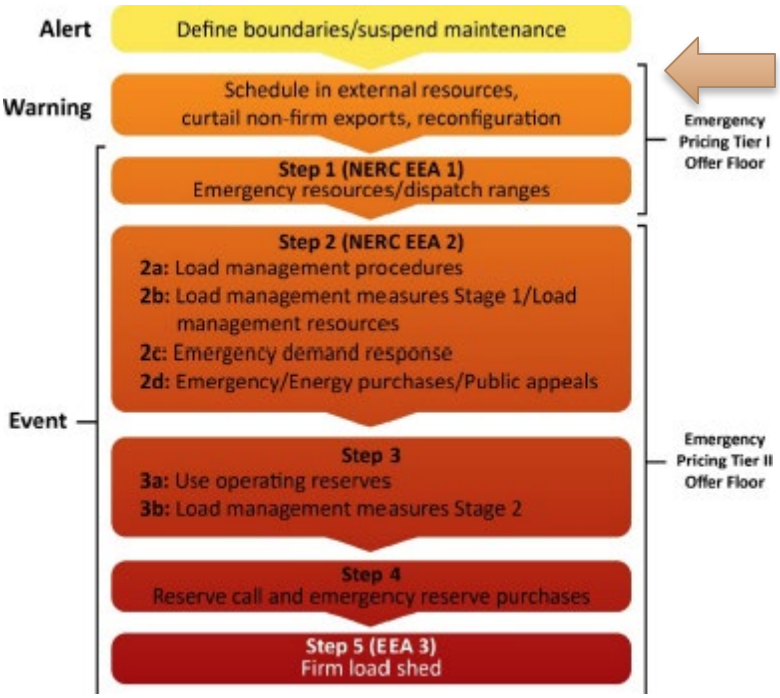
Balancing authorities (BA's) ensure that power system demand and supply are balanced to maintain safe and reliable operation of power systems. If supply falls below demand, it may cause a drop in frequency below the stable system frequency, risking permeant physical damage to electrical equipment, and prolonged grid-wide blackouts. In the event this occurs, a balancing authority may to direct load shedding to bring supply and demand into balance.[5]

In addition, BA's oversee transfers of electricity with other BA's and use economic dispatch to optimize the use of various generating units to reduce costs. BA' s maintain operating conditions under reliability standards prescribed by the North American Electric Reliability Corporation and approved by the U.S. Federal Energy Regulatory Commission.[6]

[3] Ibid.
[4] Ibid.
[5] U.S Department of Energy, *How it Works: The Role of a Balancing Authority*
[6] *Ibid, 2*.



Courtesy of Northwestern Energy



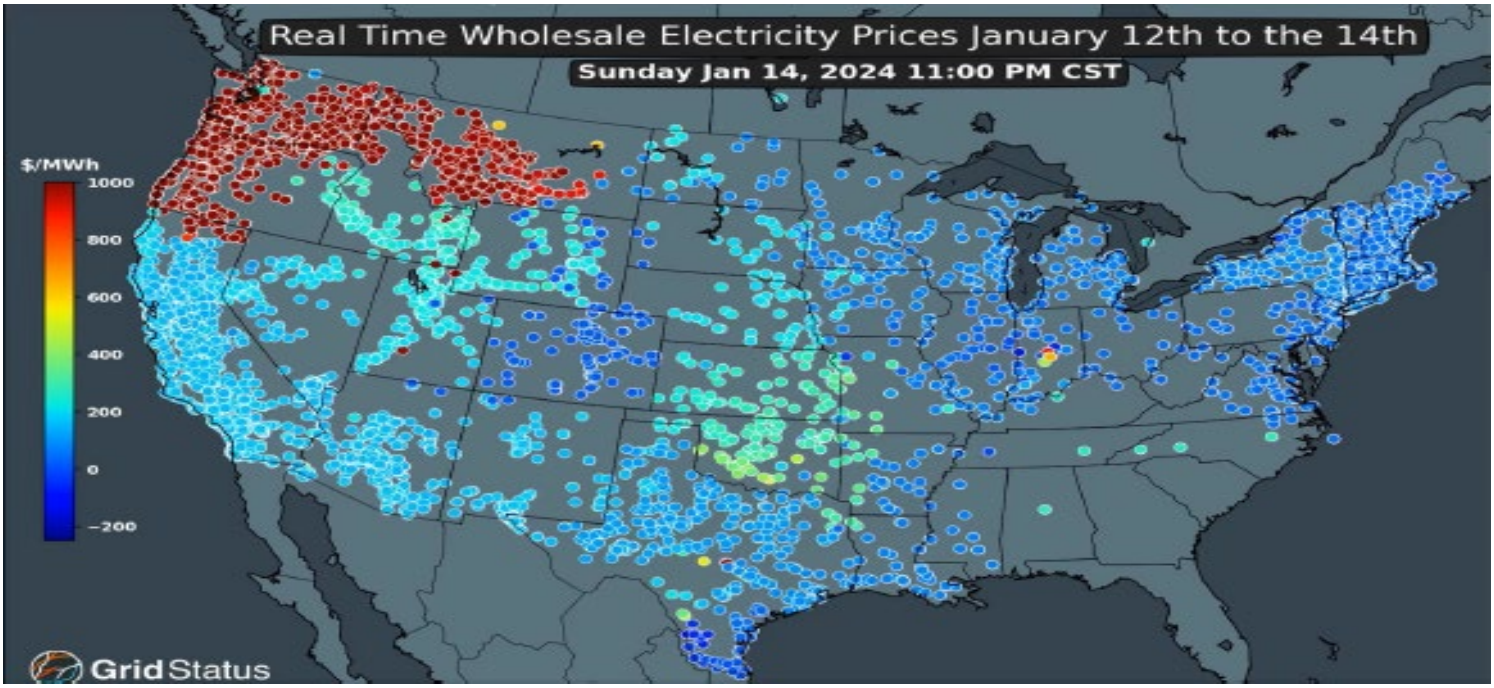
This figure from the U.S Department of Energy demonstrates the emergency measures a BA must take to prevent an event like Texas' power crisis.

Through the various alerts and procedures, BA's will go to the retail and wholesale markets to support demand, advocate for customers to shed load and decrease their consumption, and finally forced load shedding.[7]

MARKET PRICES DURING THE COLD

Montana exports more electricity than it imports. When generating assets are experiencing low output with no available reserves, utilities must purchase power from electricity markets to meet demand.

[7] Ibid.



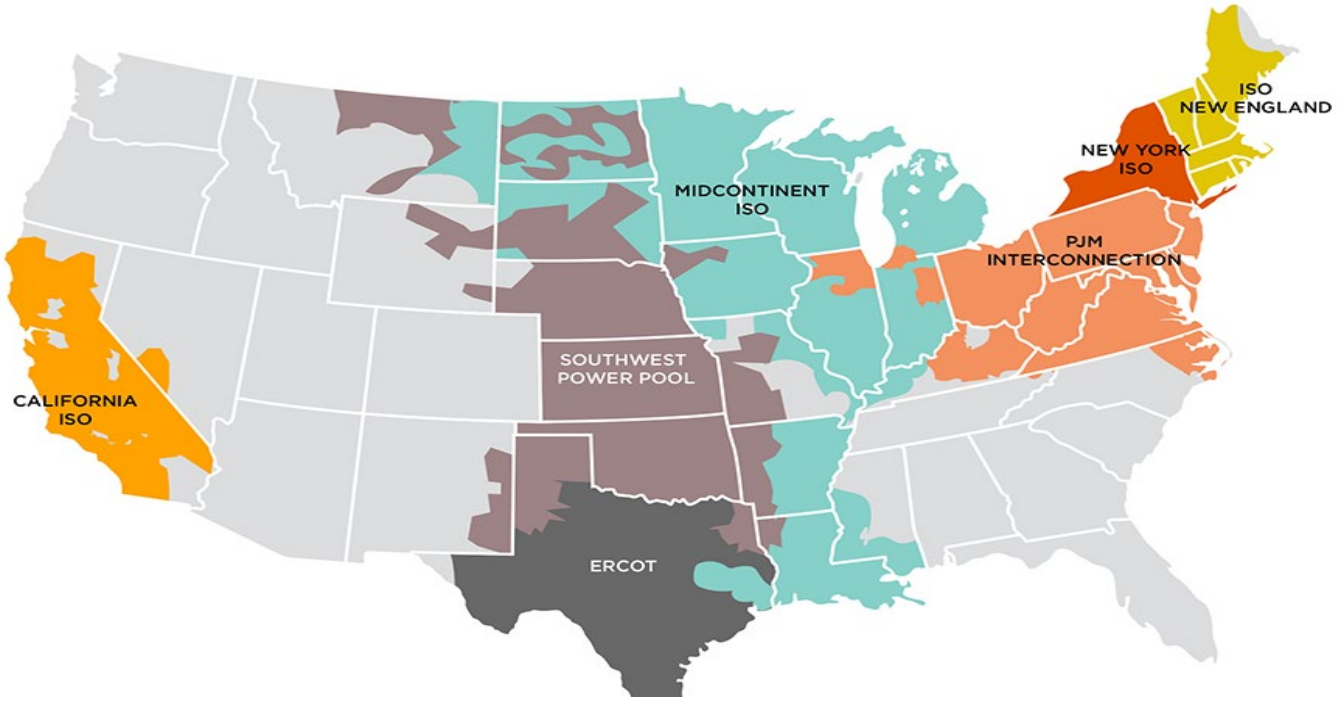
Market transactions during cold snaps are costing utilities millions of dollars to keep the lights on. In 2024, Northwestern Energy customers saw a 6.4% increase to their bill to repay these high-priced market transactions. [8] Between January 11 and 16, 2024, Northwestern Energy experienced its highest ever sustained load over the six-day period. Electric market prices in the Pacific Northwest were $600 to $1,000 per megawatt-hour. The Pacific Northwest experienced prices 8 to 14 times higher than the typical January.[9]

REGIONAL TRANSMISSION ORGANIZATIONS (RTO)

In recent years, ETIC has discussed and received frequent education on Electricity Markets & Transmission Organizations. One possible solution to avoid service interruptions could be RTO participation. RTO's manage energy spot markets, manage capacity markets to ensure electric supply meets future demand, provides transmission and long-term planning, and establishes an interconnection process amongst generation.

Currently, there are no RTOs in the west aside from California. The committee has been informed by many sources of the importance and the benefits that a western RTO could provide to the region. With a western RTO, advocates say Montana could lower costs and broaden the availability of resources to combat harsh winters. With some neighboring states enacting legislation requiring market and RTO membership, and existing RTOs expressing interest in expanding, the conversation in Montana is on-going.

[8] Northwestern Energy Response to PSC Docket No 2022.09.087, Feb. 20, 2024
[9] Ibid.



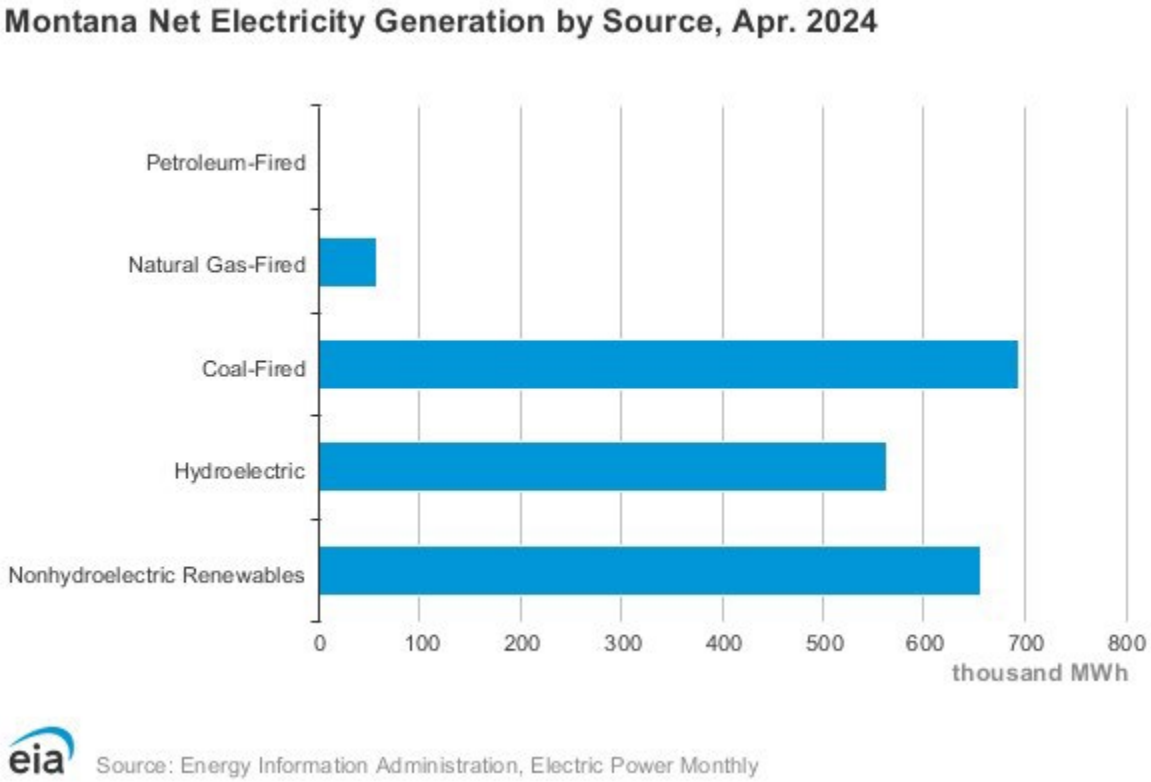
RESOURCE ADEQUACY

Resource adequacy is needed to meet supply and demand. Generating capacity supply must be ready to match the ever-increasing demand.[10] Generating capacity supply must come from reliable resources; however, which source is best is a reoccurring question.

Nationwide, there is a lot of pressure for states and utilities to decarbonize. Unlike Montana, many states have vowed to retire fossil fuels (coal, natural gas, oil), and rely solely on renewable energy (wind, hydro, solar). Montana is home to one the country's largest coal power plants still in operation, Colstrip Generating Plant. With Unit 3 & 4 still active, Colstrip has roughly 1500 megawatts of generation capability.

Colstrip's future and sustainability is a periodic discussion in the legislature. As a state, Montana is heavily reliant on the coal fired generation that Colstrip Generating Plant produces. Advocates for fossil-fuels want to continue that reliance, but recent federal standards, and looming sunset dates are jeopardizing the plant's future.

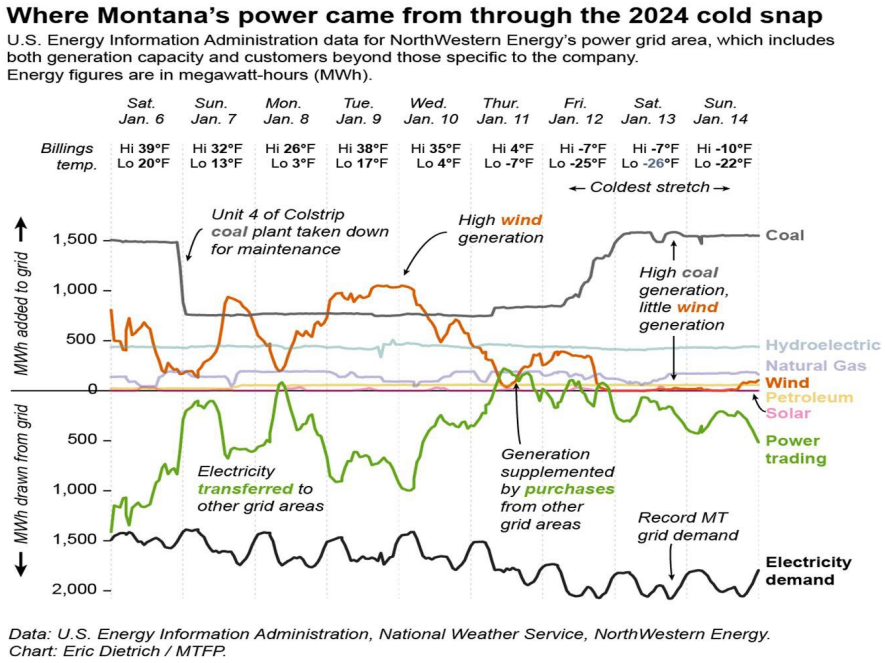
[10] US Department of Energy, *The Future of Resource Adequacy.*



Proponents of fossil fuel generation question the reability of renewable sources, especially during extreme weather conditions due to its intermittent nature. Although no source is perfectly reliable, ETIC was routinely presented on the differences throughout the interim. To compare generating sources, below is a highlight of their attributes, and weaknesses as presented by Jean Schafer, Basin Electric, to ETIC on September 28, 2023.

Attributes and Weaknesses

Coal	Natural Gas	Wind & Solar
Quickly Dispatchable	Peaking, Intermediate, Renewable Support	High Generation Potential in Montana
Abundant	5-90% Capacity Factor	Inexpensive
Fixed Fuel Costs	Low Cost & Fast Response	Tax Incentives
Long Startup/Shutdown Time	Risks of Transportation Interruptions	Intermittent & Lack of Storage



Data: U.S. Energy Information Administration, National Weather Service, NorthWestern Energy.
Chart: Eric Dietrich / MTFP.

As indicated in this snapshot of January 2024's Coldsnap, all sources contribute to the sustainment of load. Planned maintenance, low flow of water, intermittent wind & solar can cause lapses in generation.

To address resources adequacy issues and the lack of a western RTO, the committee was informed of the newly created Western Resource Adequacy Program (WRAP) during its September 2023 meeting. As of April 2023, 22 western utilities have volunteered to participate in the program. Some utility participants include NorthWestern Energy, Bonneville Power Administration, Puget Sound Energy, and PacifiCorp.[11]

As the first regional planning and compliance program in the West, WRAP aims to accurately forecast, months in advance, any pitfalls or potential lapses in generation with the goal of remedying the issues before a peak season. WRAP calls this process "Forward Showing".

[11] Western Power Pool, *WRAP FAQs*

WRAP also has an operational component. Participants in WRAP may share resources when grid conditions are strained. Through the forward showing process, a participant may have a surplus in generation, and that surplus can be shared to a participant that is lacking.[12]

At this time, WRAP is still in its beginning stages, and not operationally employed to its participants. As soon as summer 2025, binding participants may start to see the benefits of this program. The committee and regional utilities will closely monitor WRAP's efficacy during its infancy.

UTILITY RECOMMENDATIONS

In conjunction with their educational presentations to ETIC, the Montana Electric Cooperative's Association, Northwestern Energy, and the Montana Large Customer Group established an internal working group to further examine the issues related to this study. The working group sought to find possible solutions to avoid service interruptions to retail customers and wholesale transmission customers, and make recommendations, as appropriate. Throughout the course of the interim period, the working group provided routine progress reports to ETIC.

After significant discussions, the stakeholders agreed to propose revisions to NorthWestern Energy's Network Operating Agreements (NOA) with its transmission customers, which are required by FERC's Open Access Transmission Tariff (OATT). The NOA requires NorthWestern Energy to develop additional load schedule curtailment and shedding procedures. These actions would be initiated by the BA when a loss of power supply or contingencies on the transmission system could threaten reliability and or cause outages. The resolution requires NorthWestern Energy, and its role as BA and transmission provider, to follow current OATT provisions, such as re-dispatching of resources, curtailments, and load shedding when there are transmission system contingencies. Specifically, the following changes to the existing NOA are proposed which would require FERC approval:

- The transmission provider will curtail transmission service reservations and/or schedules on a pro-rata basis with the lowest priority load curtailed first, unless otherwise required by circumstances beyond the control of the transmission provider;
- When curtailments fail to address the problem or if there is not adequate time to enact them to address the problem, the transmission provider will establish load shedding procedures that apply to transmission customers that will be executed only as a last resort and on a non-discriminatory basis when there are localized or system-wide transmission issues;

[12] Ibid.

- During system-wide reliability issues or when there is a shortage of energy supply to the balancing authority, network customers that are not members of the Western Resource Adequacy Program or its equivalent and are not supplying sufficient energy to the balancing authority, will be directed by the balancing authority to shed its own load until the issue is resolved; and
- If the network customer is unable to shed its load or if there is inadequate time for that option to address the issue, the transmission provider shall shed the loads of its network customers on a rotating geographic basis.

These suggested provisions to the NOA do not require action by the Montana Legislature or the Montana Public Service Commission.

APPENDIX A:
ENERGY AND TELECOMMUNICATIONS INTERIM COMMITTEE MEMBERS

Before the close of each legislative session, House and Senate leadership appoint lawmakers to interim committees. The members of the ETIC like most other interim committees, serve one 20-month term. Members who are reelected to the Legislature, subject to overall term limits and if appointed, may serve again on an interim committee. This information is included in order to comply with 2-15-155, MCA.

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