MONTANA’S ELECTRICITY SUPPLY

Adequate for How Long?

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The Montana Electricity Reliability Initiative (MERIT)

- A first of its kind project – commissioned and conducted entirely by the BBER
- Texas and California power disruptions revealed that too many people were unaware of the profound challenges of electricity reliability
- Project is intended to examine reliability from the perspective of the economy
Goals of MERIT

- Conduct a fresh analysis of reliability that is comprehensible to a lay audience
- Take a statewide perspective
- Use publicly available data
- Make a wider audience aware of the issues facing Montana so that they can be engaged in important debates.
PETER LARSEN, PhD

Peter Larsen is a Research Fellow at the University of Montana Bureau of Business and Economic Research and Leader of the Electricity Markets and Policy Department at Lawrence Berkeley National Laboratory.
Montana’s Load Serving Entities (LSE’s): Not Just Utilities

Customer Counts, Montana LSEs, 2021

Note: Eight LSEs reporting less than 1,000 customers have not been displayed in this graphic.
Montana customers spend less on electricity than other states in our region

Source: U.S. EIA (2022)
Montana customers experience more frequent, but shorter power disruptions than our region.

Count of Power Disruptions for Typical Customer

Total Minutes Interrupted for Typical Customer

Source: U.S. EIA (2022); Larsen et al. (2020)
Montana’s electricity sales and peak demand have been increasing

Source: U.S. EIA (2021)

Source: U.S. FERC (2021)
Some drivers of demand point to long-term growth

**GDP and Population**

Source: U.S. Census Bureau (2021); U.S. BEA (2021)

**Electric Vehicles**

Source: E.V Hub (2022); MVD (2022)
Customer-sited renewable energy and commercial energy efficiency programs are driving demand lower.

**Customer Installations of Renewable Energy**

Source: U.S. EIA (2022)

**Energy Efficiency Program Savings**

Source: U.S. EIA (2022)
But participation in demand side management programs is limited

Energy efficiency and demand response peak savings

Source: U.S. EIA (2021)
Overall, peak demand and electricity sales suggest growth into the future

Sales

Source: U.S. EIA (2021); BBER Est. (2022)

Peak Demand

Source: U.S. FERC (2021); BBER Est. (2022)
Electricity generated by Montana’s power plants is decreasing and little new capacity of utility-scale generation has been built.

**Source:** U.S. EIA (2021)
Some resources provide little supply during times of peak demand.

Net Plant Load at Peak Hours

Source: U.S. EIA (2021); U.S. FERC (2022)
Capacity and Loading at Peak Hour, 2010-20

Source: U.S. EIA (2021); U.S. FERC (2022)

- **Nameplate Capacity: 2010-2020 (avg)**
- **Net Load on Plants at Peak Hour: 2010-2020 (avg)**
- **%: Load Factor at Peak Hour: 2010-2020 (avg)**

Note: Natural gas units are primarily providing "important ancillary services to the grid" during times of peak demand (Hines 2022)

Source: U.S. EIA (2021); U.S. FERC (2022)
Investor-owned utilities (IOUs) identify significant resource needs, but it is unclear if/when these resources will be built...

Planned Retirements and Resource Needs Identified by Major IOUs

Source: NWE (2020); MDU (2021)
Independent power producers (IPP) are proposing a significant amount of new capacity, but past proposals are often withdrawn…

Source: U.S. EIA (2021); Rand et al. (2021)
Over 7,000 MW of region’s coal-fired generation could retire within next two decades.

Planned Retirements of Coal-fired Power Plants

Source: U.S. EIA (2021)
Montana is trending towards becoming a net *importer* of electricity...

Electricity Sent from (to) Montana

Source: U.S. EIA (2021)
Most transmission pathways serving Montana already show signs of being congested throughout the year...

<table>
<thead>
<tr>
<th>Path</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
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<td>36.9%</td>
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<tr>
<td>WECC Average</td>
<td>6.9%</td>
<td>5.8%</td>
<td>6.9%</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

Source: WECC (2018)
The proposed amount of new transmission lines will not keep pace with Montana’s needs...

Planned Transmission by Year

Planned Transmission by State

Source: NERC (2020)
Emerging threats...

Drought Conditions Reduce Hydroelectric Capacity

Source: U.S. EIA (2021); NOAA (2022)

Burn Likelihood and Transmission Lines

Source: Scott et al. (2020); U.S. EIA (2021)
Additional emerging threats...

Cyber and Physical Attacks on Grid Infrastructure

Source: ABC News (2022); GW Group (2022)

Electricity Shortages Across Regional Markets

Source: NERC (2022)
Purchasing power from regional markets increases the risk of high electricity prices...

Daily Prices at MISO-MDU Trading Zone

Source: MISO (2022)

Daily Prices at Mid-C Wholesale Market

Source: U.S. EIA (2022)
Inability to deliver electricity from out-of-state could lead to costly power disruptions...

**Annual Power Interruption Costs for Montana**

**Interruption Costs by Customer Type: 2010-2020**

Source: ICE Calculator (2022); U.S. EIA (2022); Larsen et al. (2020)
A new threat to electric resource adequacy?

- Mercury and Air Toxics Standard (MATS) Revision
- Revoked 2020 rule
- Lowers mercury emissions from coal-fired power plants by 90 percent
- Could be implemented by 2027

- New greenhouse gas emission rules for fossil-fuel burning power plants
- Revokes Trump Administration rule
- Requires 90 percent reduction in GHG emissions by 2040
- EPA says Carbon Capture and Storage and hydrogen fuel switching are economic to achieve standards
Thank You!

BUREAU OF BUSINESS AND ECONOMIC RESEARCH
UNIVERSITY OF MONTANA