



# Great Falls Trade Area Energy Market Assessment Executive Summary October 2024

## About RMI

**RMI is an independent, nonprofit organization of experts accelerating the clean energy transition.** Driven by deep analytics, we aim to transform the energy system to support prosperous and healthy communities for all.



# Meet the RMI Team



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Hydrogen & eFuels

# Project Overview & Goals

## WHAT

### Energy Market Assessment



Transmission



Buildings



Hydrogen &  
eFuels



Industry

## WHO

### RMI, GFDA, + 30 local stakeholders



Government



Innovators



Financial  
Institutions



Data  
Analysts



Education  
& Capacity  
Building



Local  
Businesses

## WHY

### Enhance Regional Competitiveness

- To **determine market demand** for increased renewable energy production
- To **understand energy service business needs** including energy efficiency retrofits, wind and solar
- Providing basis for GFDA to **develop a strategy** to implement over the next 3-5 years to attract investment in our trade area.

# Objectives

- 1 Determine **energy baseline** in the Great Falls trade area.
- 2 Assess the demand for **increased energy production**.
- 3 Assess the demand for **increased energy service businesses**.
- 4 Assess the **strengths, weaknesses, opportunities, and threats**.
- 5 **Solution pathways and next steps**.

# Project Key Takeaways

## Competitiveness



The Great Falls trade area, and Montana at large, has historically benefitted from **fossil fuels**. And is **generally underprepared** to capitalize on the transition to clean energy.



The region's existing natural resource and economic assets point towards **wind, eFuels, and green buildings as competitive opportunities** going forward.

## Constraints



Lack of **transmission** and unstable **electricity prices**.



Slow population growth, **limited workforce availability and retention**, and lack of community buy-in.



Minimal access to **cheap, clean power**.



Lack of related existing industries.

## Coordination

**Transmission:** Increased capacity will lead to economic development opportunities.

**Hydrogen & eFuels:** Great Falls already has a foothold in the SAF market; it's time to build out the local supply chain.

**Buildings:** Need to connect homeowners and developers to federal funding and close information gaps and capacity constraints.



Objective #1:

**Determining Great Falls' Energy Baseline**

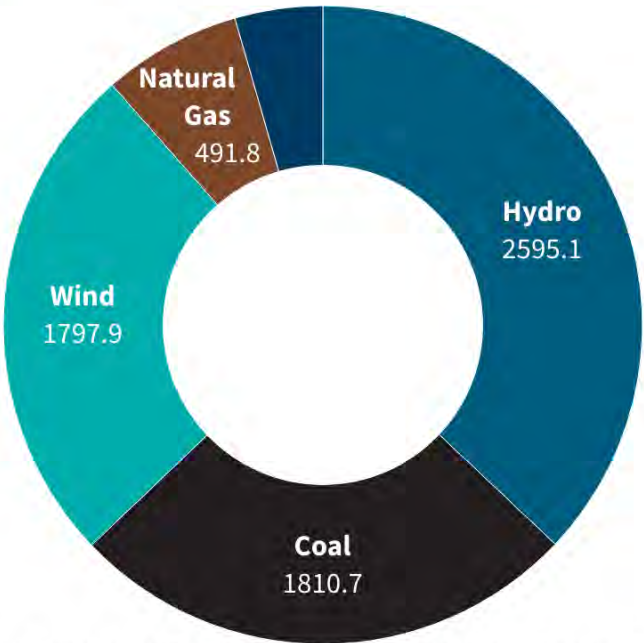
# Great Falls benefits from significant wind and hydro resources

## But electricity prices have been rising and competitiveness eroding

### Montana State Electricity Generation Capacity (MW)

All currently operating plants in the state

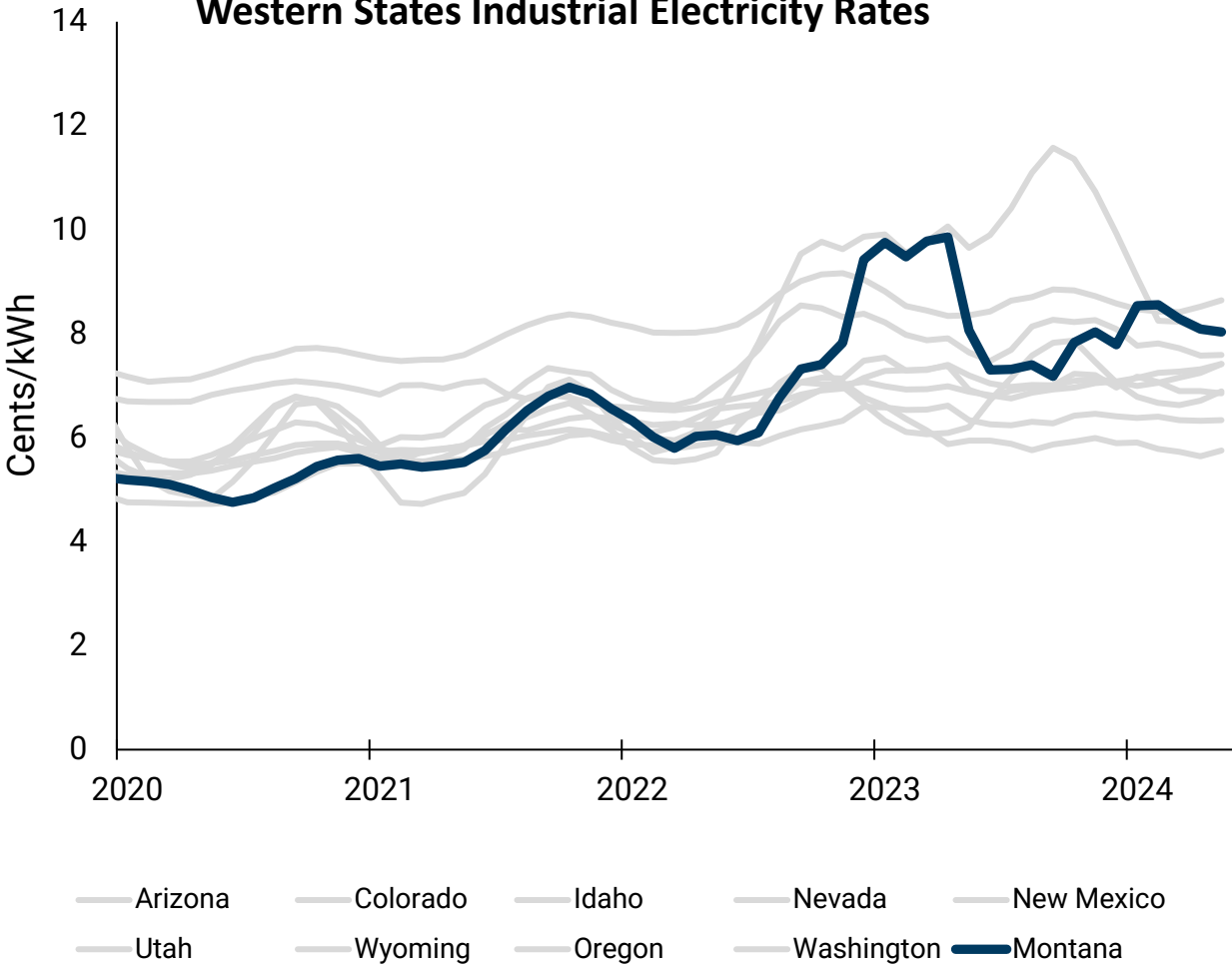
■ Hydro ■ Coal ■ Wind ■ Natural Gas ■ Other



"All Other" includes landfill gas, petroleum coke, and all others sources of energy generation.

Source: EIA

### Western States Industrial Electricity Rates

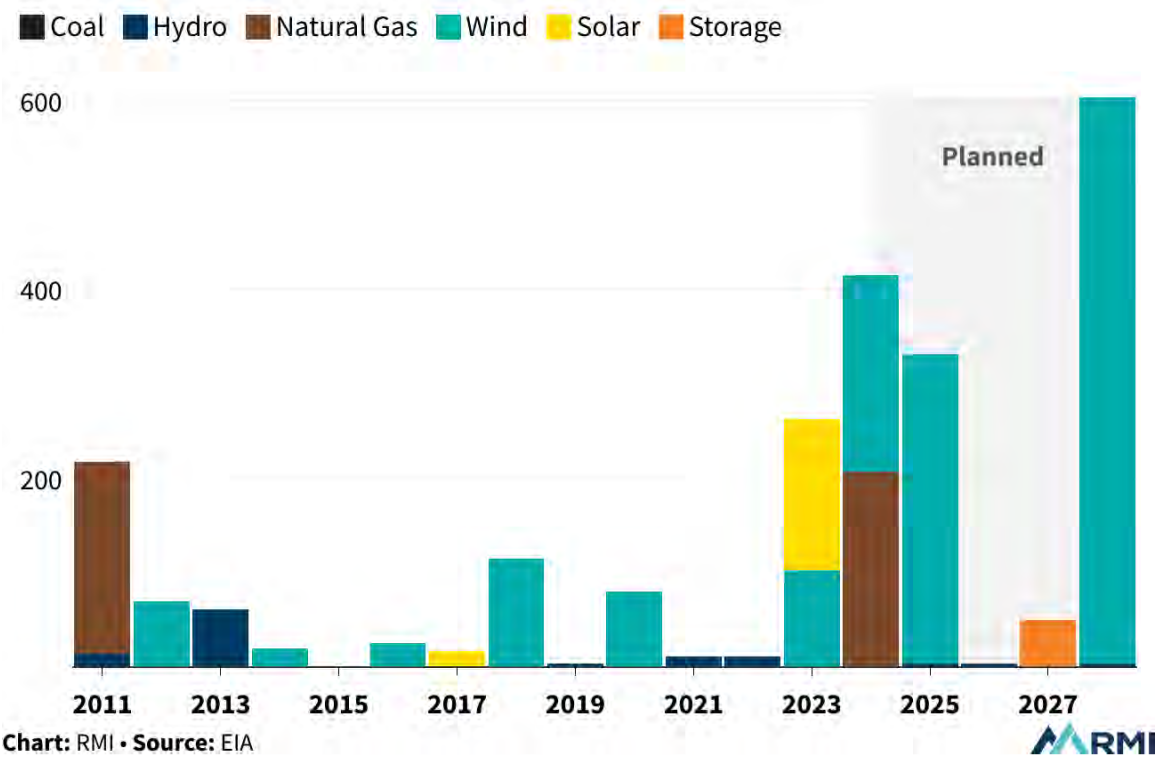


# Great Falls' grid is becoming increasingly reliant on renewables

And its economy specializes in areas like utilities and construction which can leverage this transition

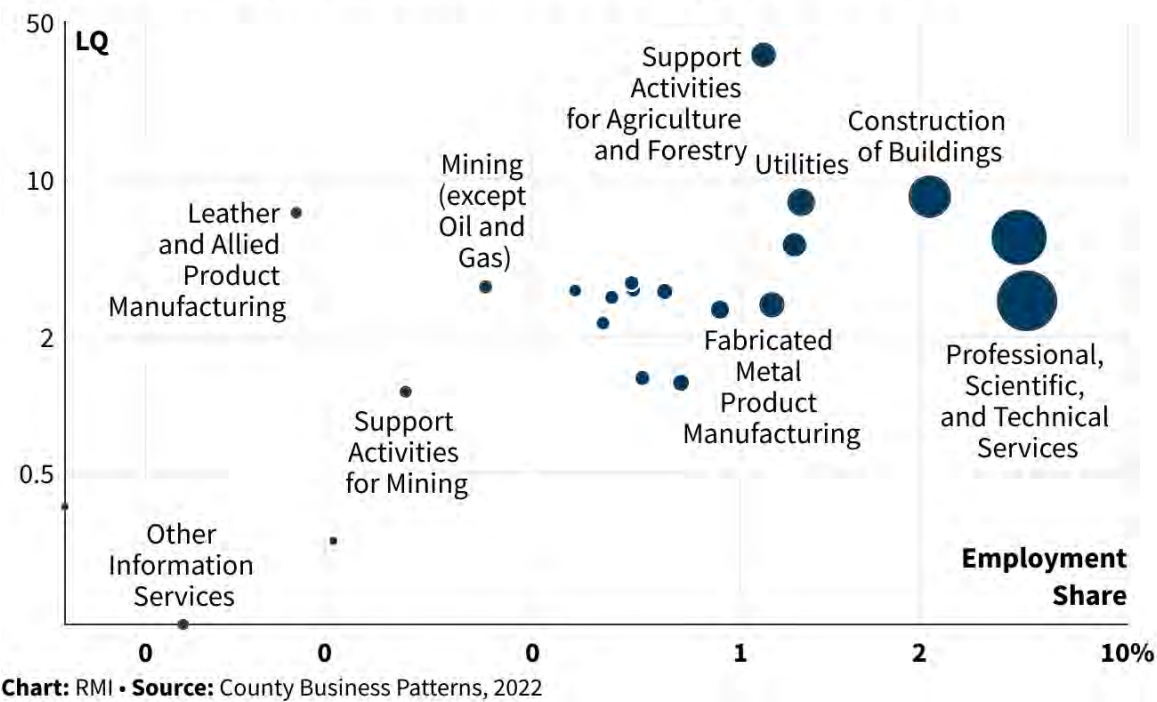
## Northwestern Electricity Capacity Additions

The overwhelming majority of existing and planned capacity additions in the Northwestern Balancing Authority are onshore wind turbines.



## Employment in Energy Transition-Related Sectors in Great Falls

Great Falls specializes in several industries that are important to the energy transition, such as mining, utilities, metal product manufacturing, and construction.

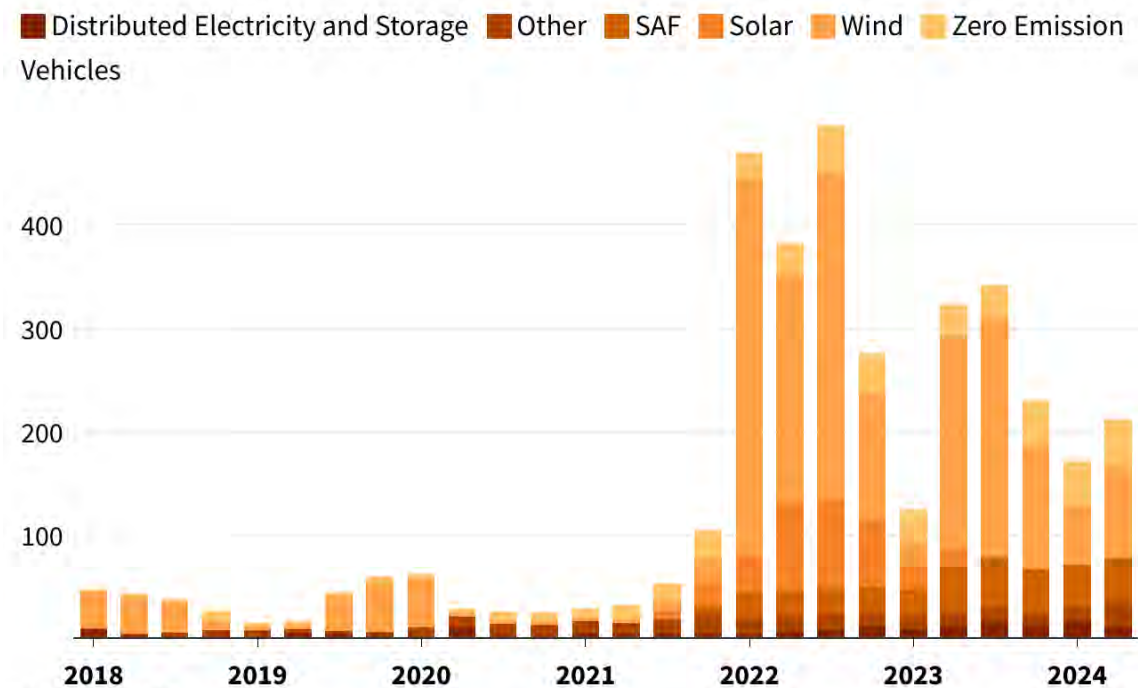


# Wind and Sustainable Aviation Fuels have been the bright spots for clean energy investment

Across the state and within Great Falls

## Clean Energy Investment across Montana

Wind has attracted the most investment, while SAF and ZEVs have grown in recent years



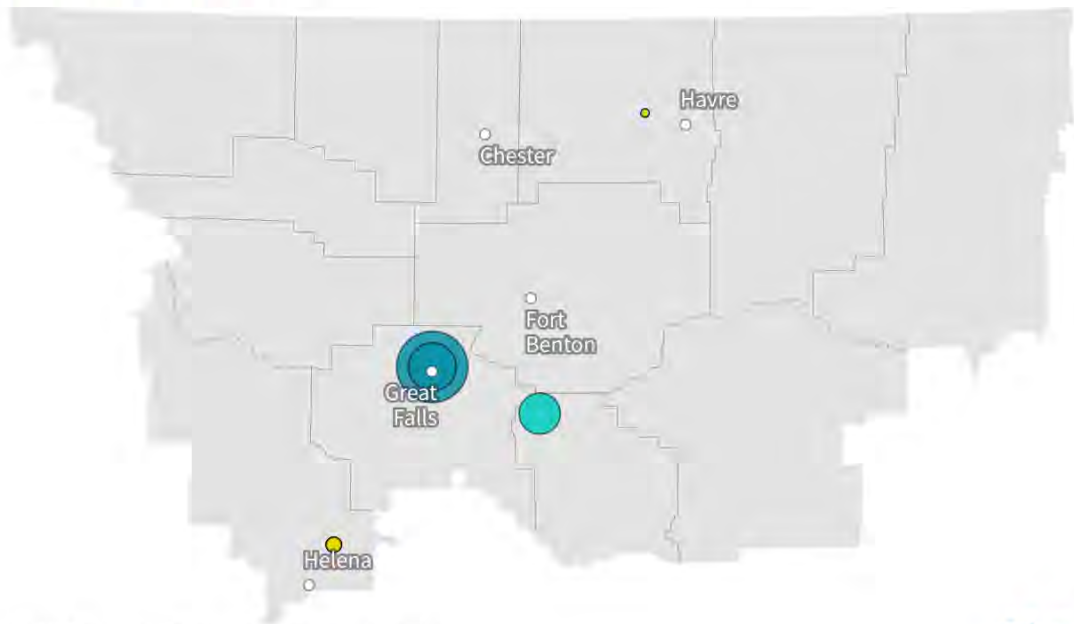
in Millions of USD

Source: Clean Investment Monitor

## Great Falls has seen few major clean energy projects since 2018

However, the area can build on momentum in SAF and wind

Other SAF Wind



Map: RMI • Source: Clean Investment Monitor





Objectives #2 & #3:

**Demand for increased energy production**

# The clean energy economy is booming

Nationally, clean energy investment has grown almost 5 times since 2018, with battery and solar manufacturing leading the way since mid-2022

## Clean energy investment in the U.S. is almost 5x that of 2018

In the Plains, investment has more than doubled since the passage of the IRA in 2022, totaling about \$2.9 billion USD.

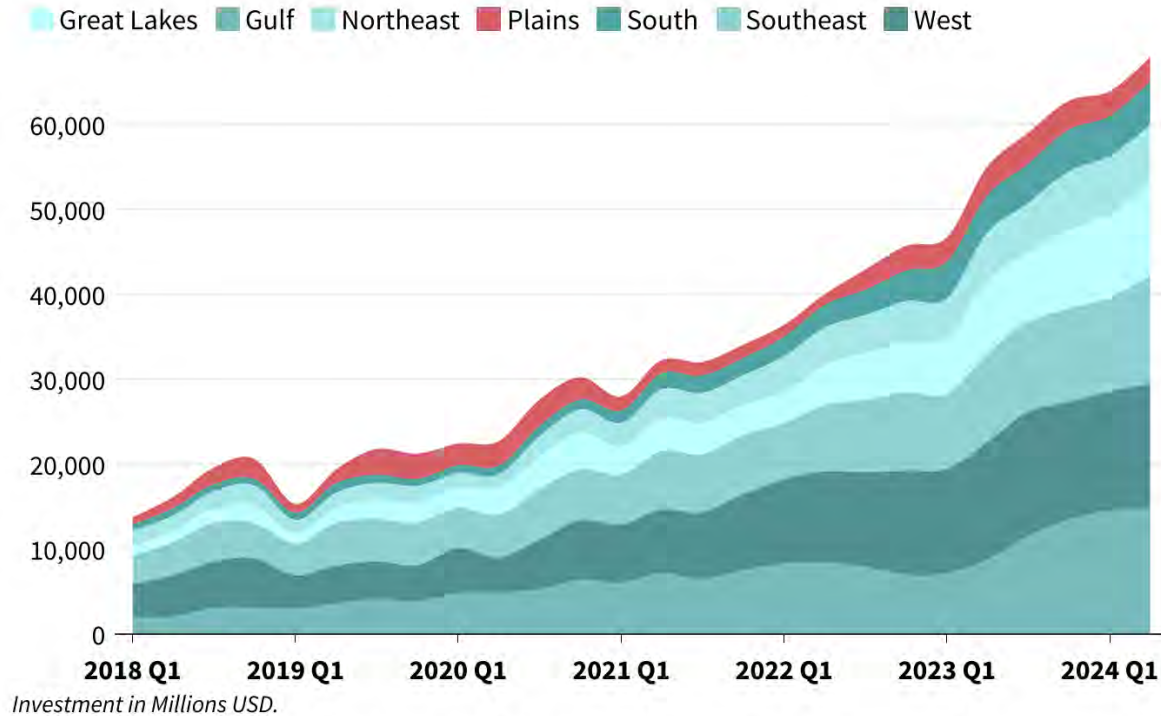


Chart: RMI Graphic • Source: Clean investment Monitor • Created with Datawrapper

RMI – Energy. Transformed.

## Hydrogen, SAF and battery manufacturing have been big winners since the passage of the Inflation Reduction Act (IRA)

Growth in cumulative investment since 2018, indexed to Q2-2022. (2022-Q2=100)

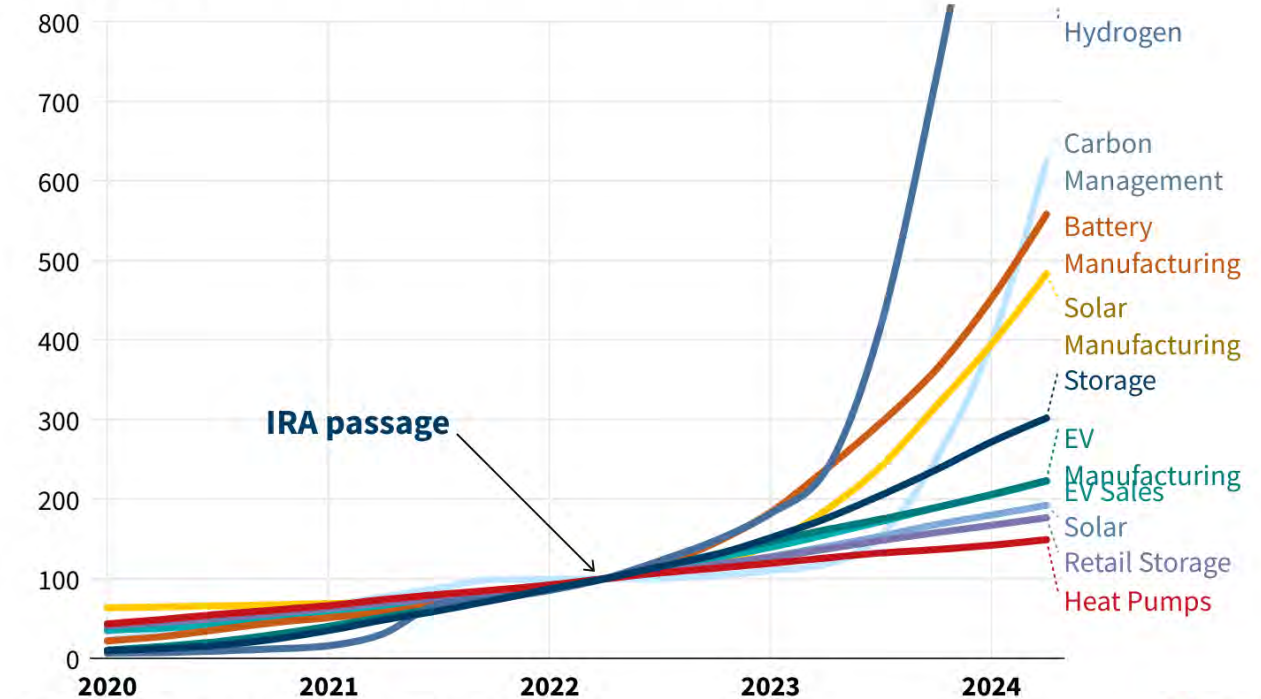


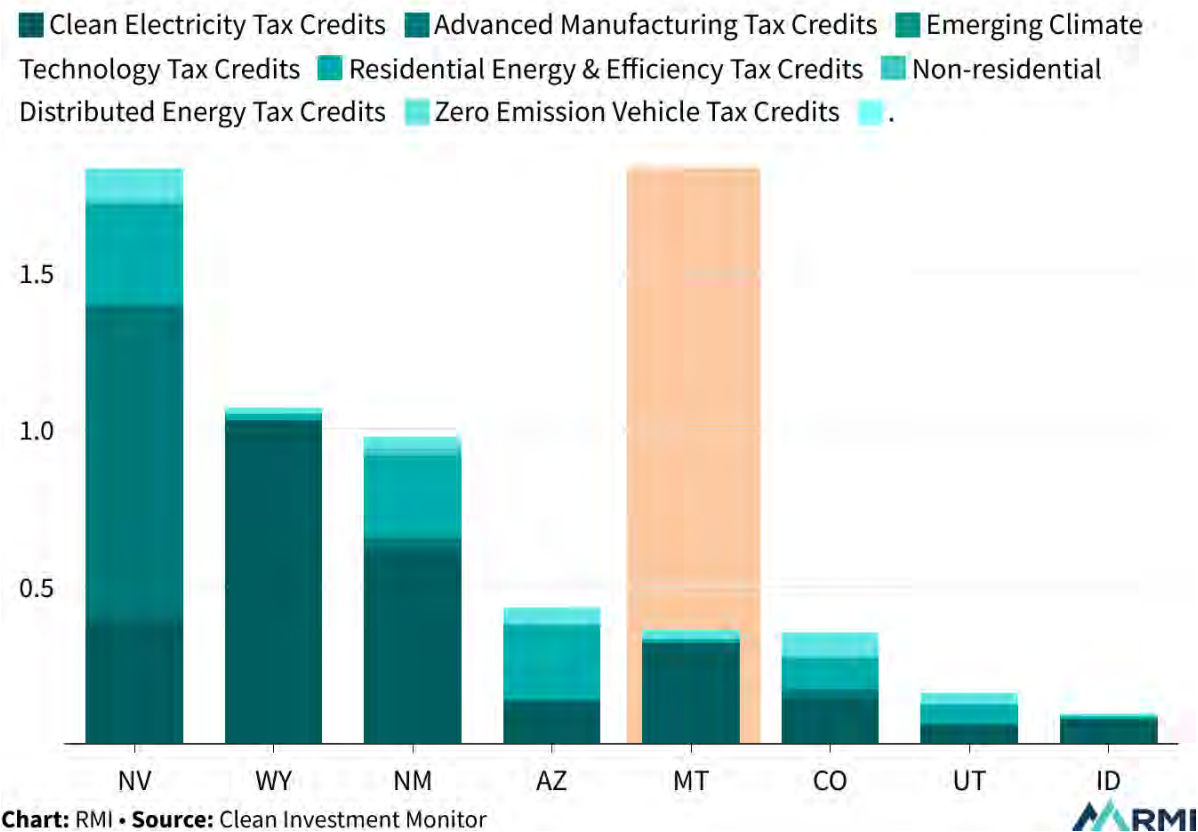
Chart: RMI Graphic • Source: Clean Investment Monitor



# Montana has already received nearly a quarter of a billion dollars in federal clean energy investments

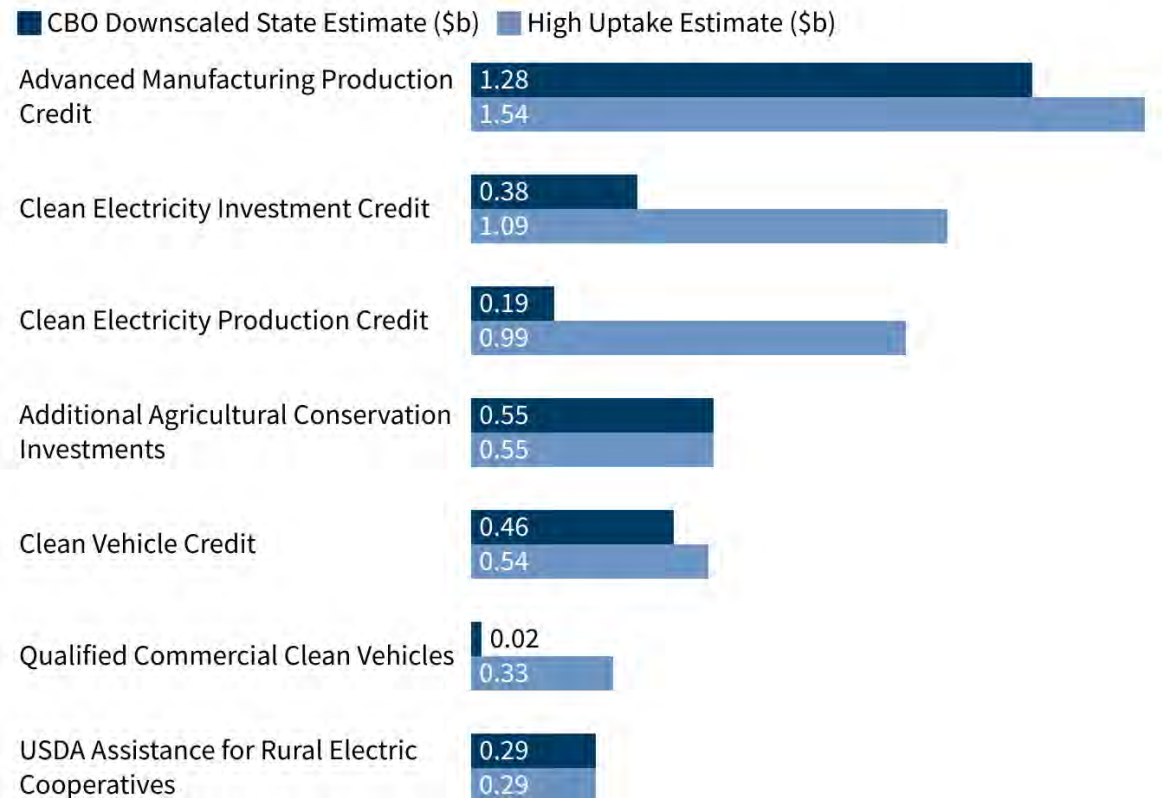
## Montana has received nearly 0.5% of its annual GDP in federal funding through the IRA

Estimated federal funding through the IRA since 2022, relative to GDP

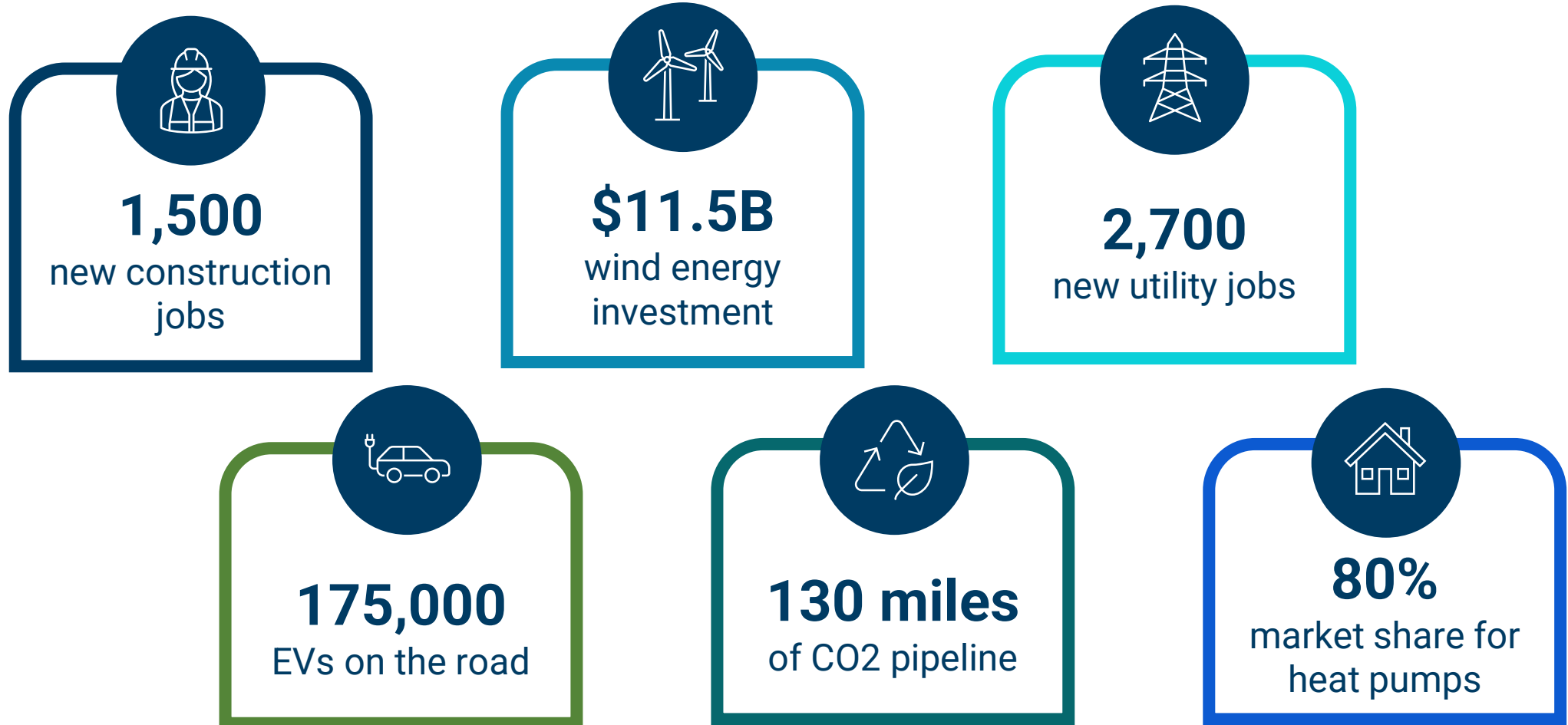


## Montana Could Attract Over \$7 Billion in Federal Funding by 2031

Estimates of Total Federal Funding to Montana by 2031 in a business-as-usual (CBO) scenario and a high-uptake scenario, in billions of USD



# In a high-uptake scenario, by 2035, Great Falls trade area has an additional...



# Montana can expect to see significant growth in wind, electrification, and EVs.

Even in a Business-as-Usual scenario, with no further policy changes.

## Clean Electricity Generation

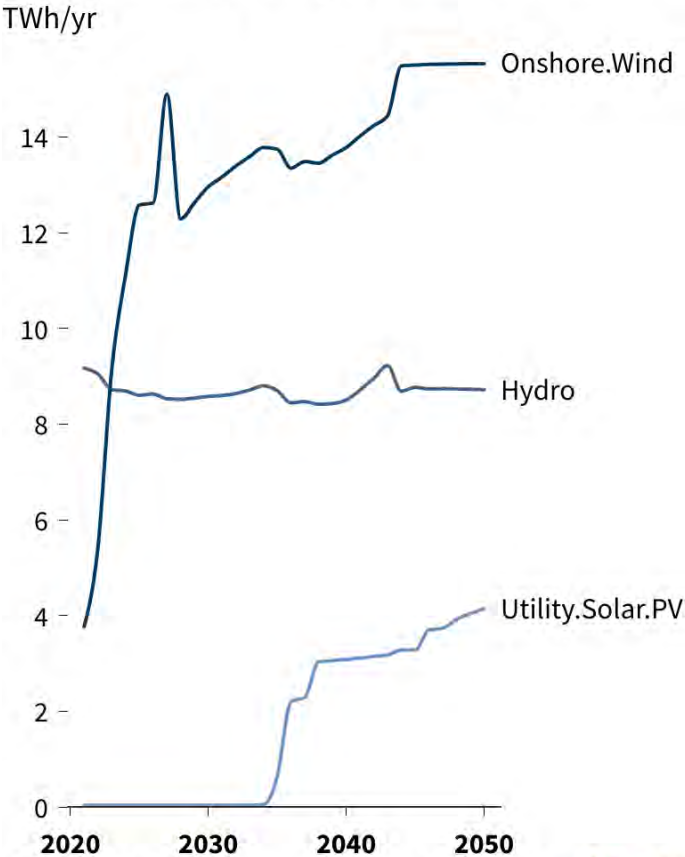


Chart: RMI • Source: Energy Policy Simulator



## Electricity Demand by Sector

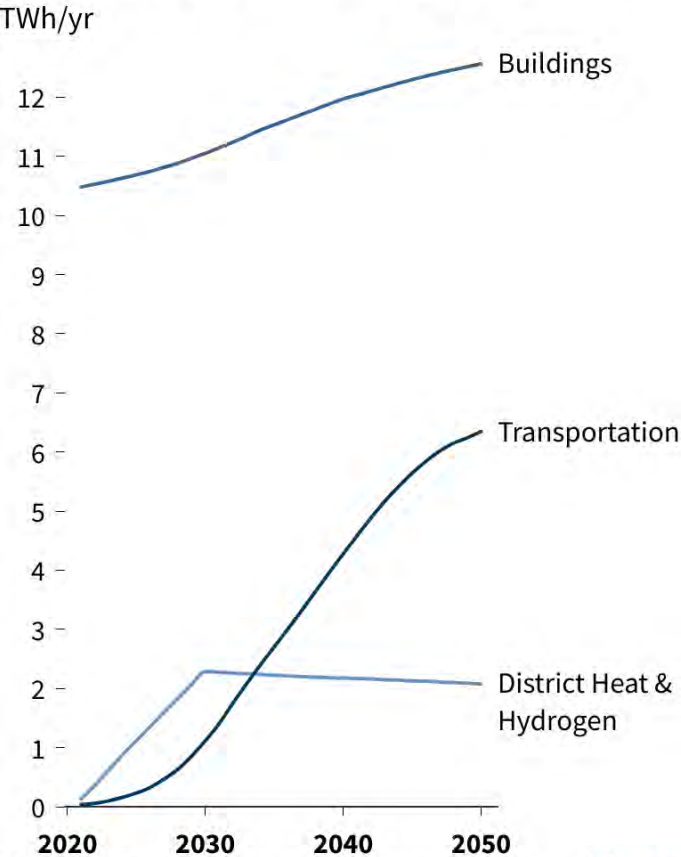


Chart: RMI • Source: Energy Policy Simulator



## Car & SUV Sales

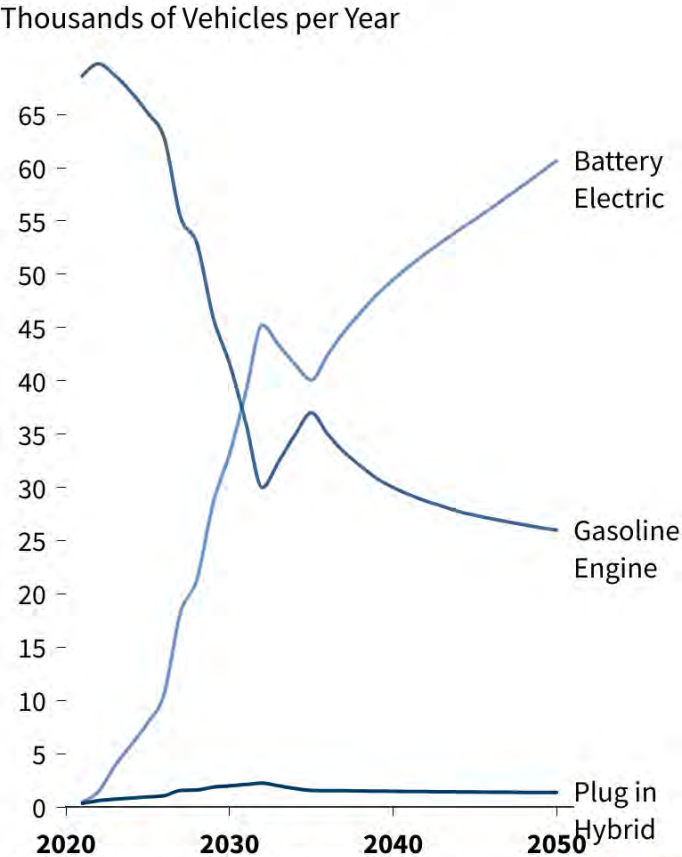


Chart: RMI • Source: Energy Policy Simulator



# A Demand for eFuels

All of Montana Renewables 30 million gallons of annual SAF production is under an offtake agreement with Shell – sold for higher value in West Coast markets

Three major US carriers have offtake agreements for over 5.8 billion gallons



Offtake agreements mainly driven by demand from corporate customers:

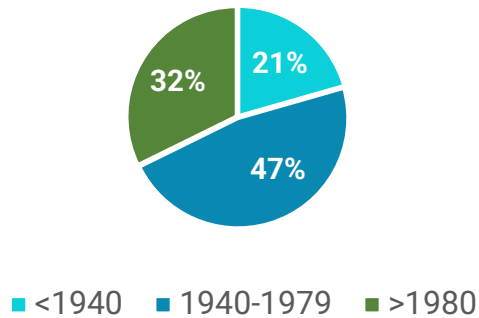


# A need for building energy efficiency and a market for solar

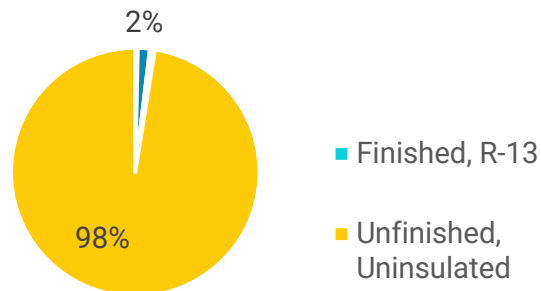
With a high uptake scenario, homeowners and renters could save \$1.6M in energy savings per year collectively and 84% of roofs in Cascade County are solar viable

## Aging building stock needs better insulation

Single Family Vintage



Single Family Roof Insulation



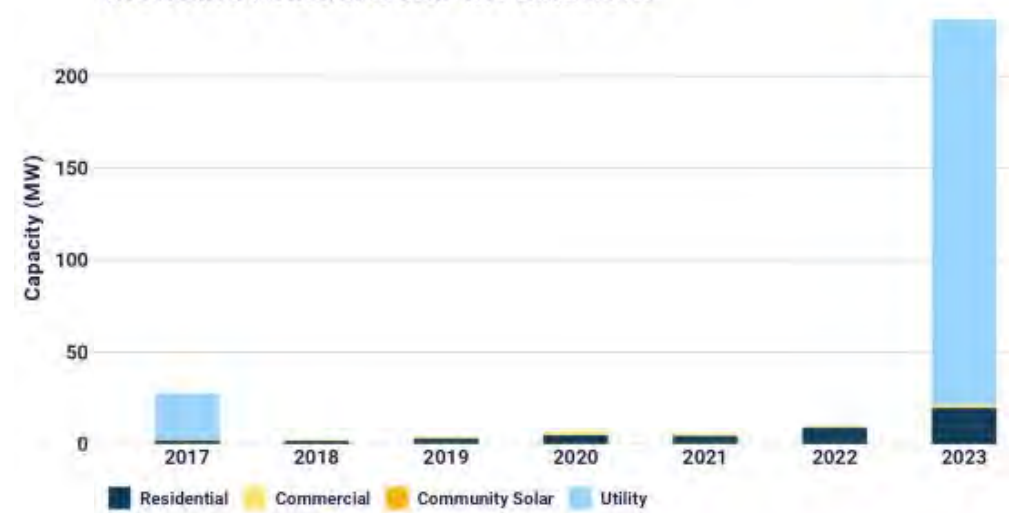
Source: <https://resstock.nrel.gov/page/typology>; SEIA

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## Residential and commercial rooftop solar potential is high

- Montana's solar resource is 26% greater than the national average BUT currently ranks 41st for total installed solar capacity.
- Solar can generate up to 80% of a home's electricity needs.

Montana Annual Solar Installations



Source: SEIA



Objectives #4:

**Strengths, weaknesses, opportunities, and threats**

# Great Falls’ existing industrial makeup aligns with related clean energy industries

Particularly in green buildings, transmission construction, and electricity generation

Top 10 Feasible Industries in Great Falls, MT for Clean Energy Employment

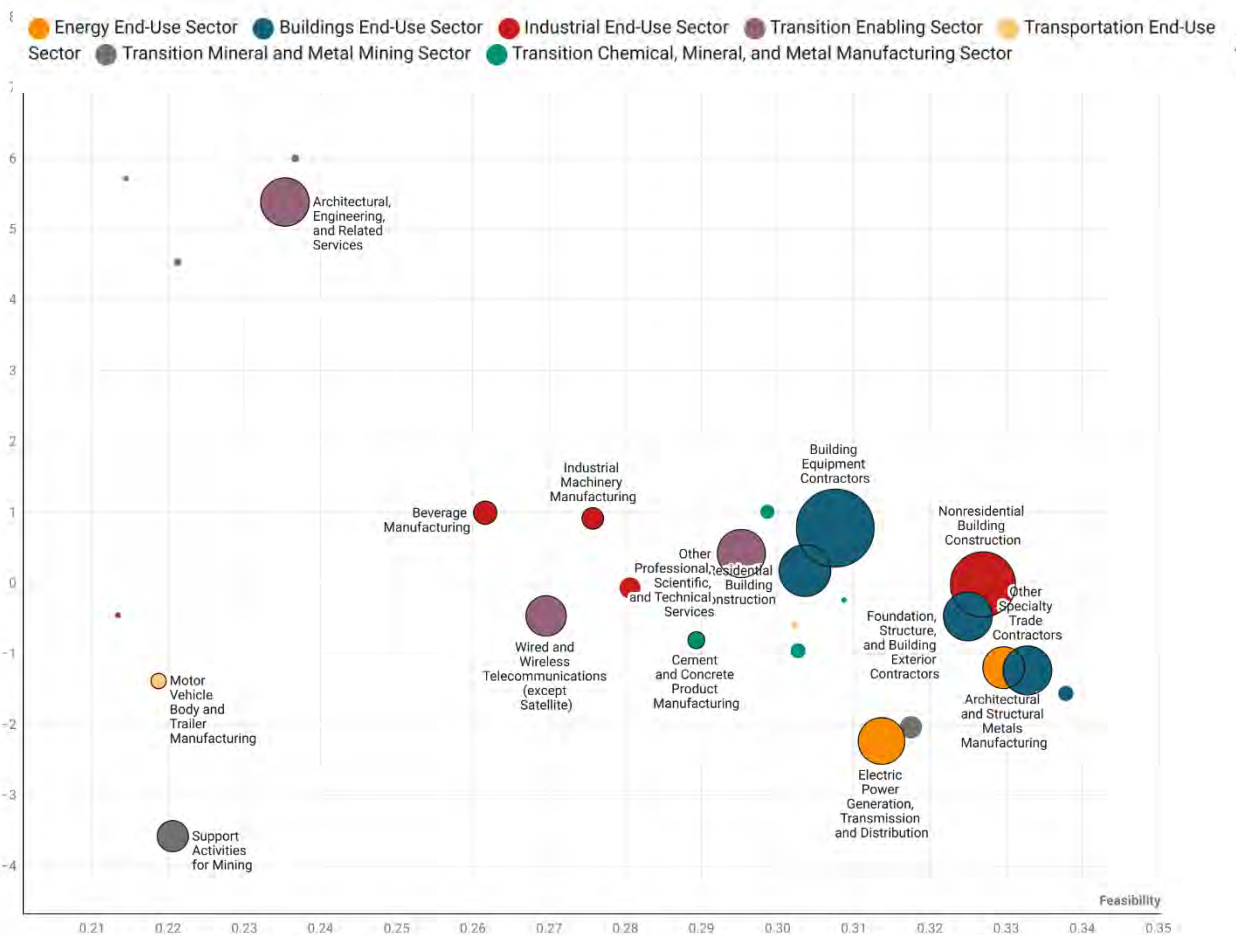
Industry	Feasibility	Complexity	Good Jobs	Jobs
Other Wood Product Manufacturing	0.34	-1.56	0.33	27
Other Specialty Trade Contractors	0.33	-1.24	0.37	312
Architectural and Structural Metals Manufacturing	0.33	-1.20	0.49	228
Nonresidential Building Construction	0.33	-0.02	0.37	557
Foundation, Structure, and Building Exterior Contractors	0.32	-0.47	0.37	310
Nonmetallic Mineral Mining and Quarrying	0.32	-2.04	0.60	62
Electric Power Generation, Transmission and Distribution	0.31	-2.24	0.77	285
Other Fabricated Metal Product Manufacturing	0.31	-0.24	0.47	0
Building Equipment Contractors	0.31	0.77	0.37	797
Residential Building Construction	0.30	0.17	0.37	348

Additional 10 rows not shown.

Employment figures from Occupational Employment and Wage Statistics (OEWS) data

Source: Clean Growth Tool • Created with Datawrapper

Most Feasible Industries in Great Falls, MT for Clean Energy Employment



Source: Clean Growth Tool • Created with Datawrapper

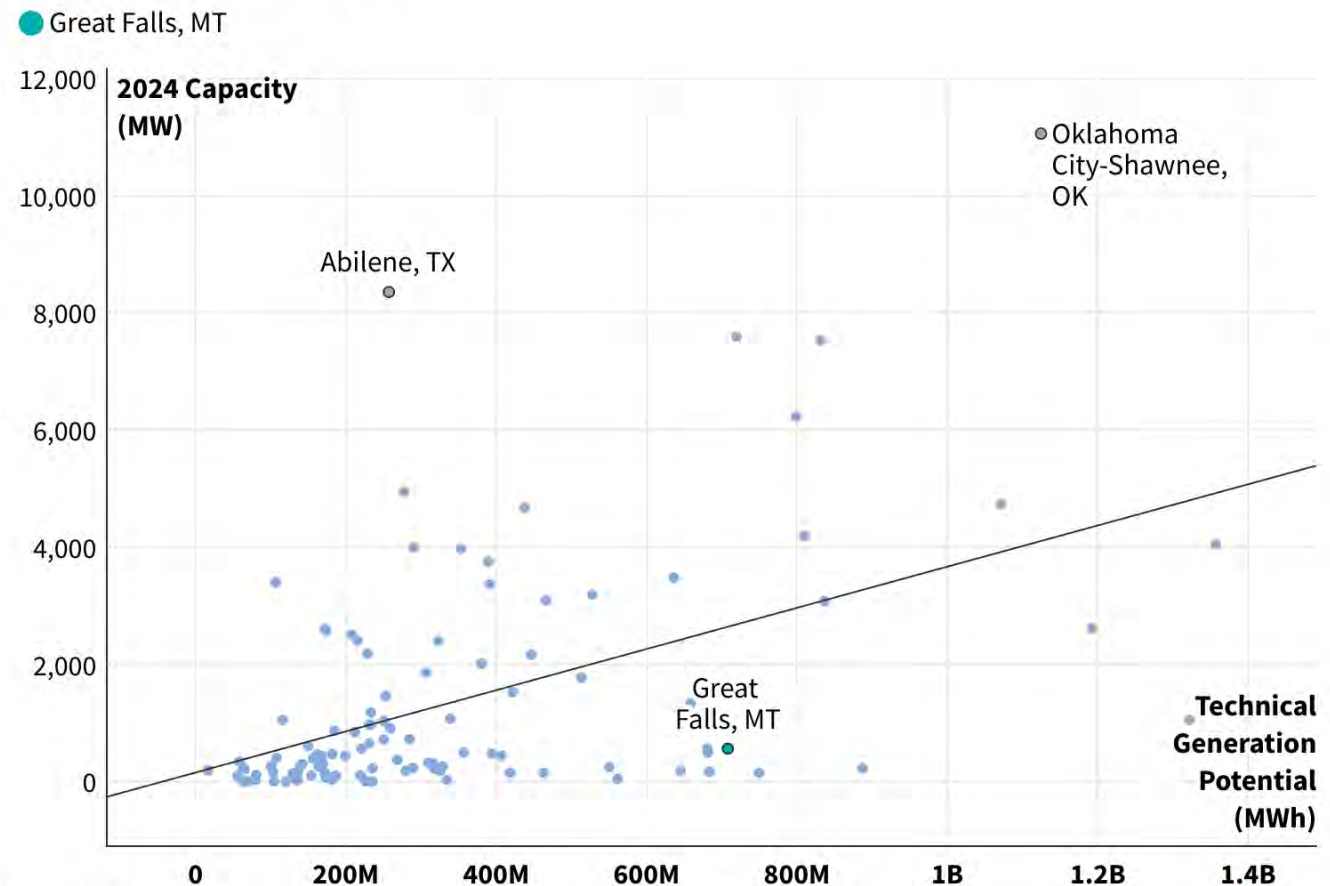
# The Great Falls region has excellent potential to generate wind energy for the West

## Great Falls wind is highly valuable to the Western grid

- Abundant, over a large geography
- High-capacity factor
- Exceptionally diverse compared to solar in the desert southwest and wind in other states.

When the sun goes down in the West, it's usually still windy in Montana.

## The Great Falls Region's Wind Resources are Well Below its Technical Potential



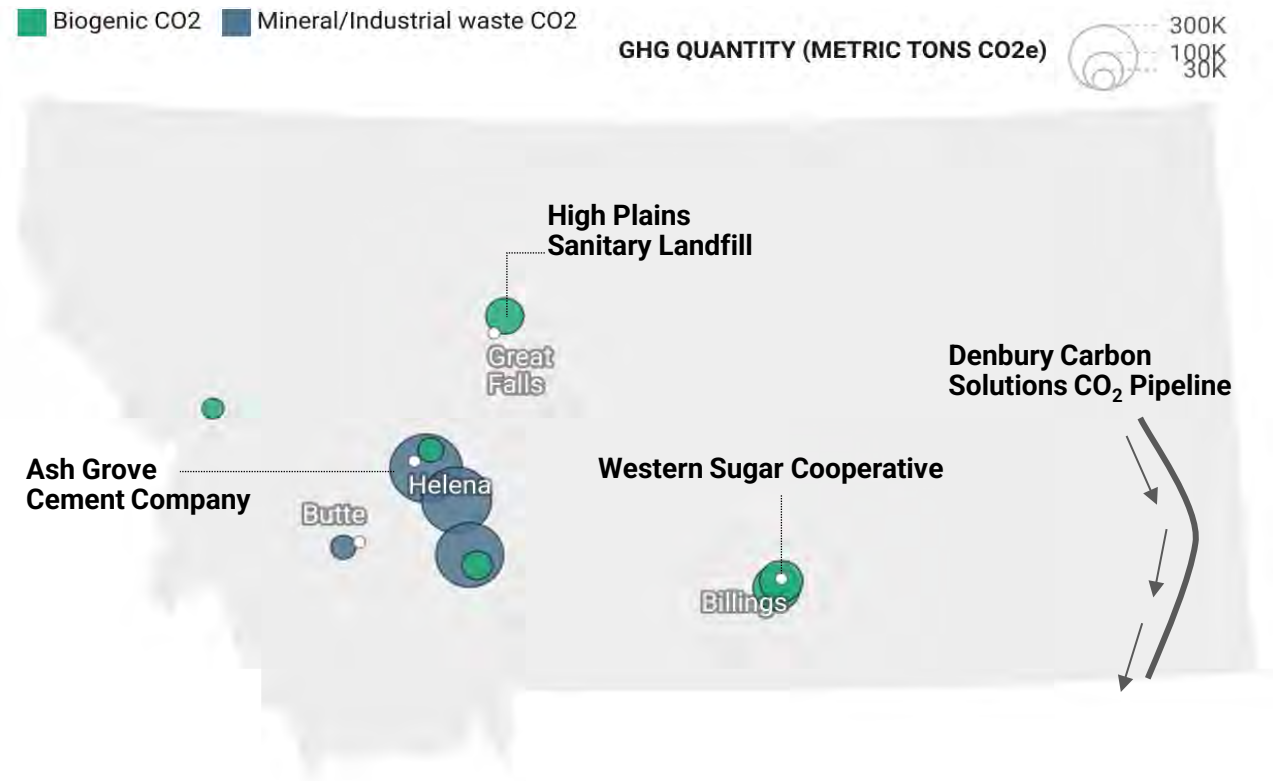
# Great Falls has options to tap into for eFuel deployment

Various resources within the state can support a foundational eFuels landscape

## Tapping into local sources of CO<sub>2</sub> expands the options for hydrogen and eFuels.

- Hydrogen can utilize CO<sub>2</sub> pipelines, like the Denbury Carbon Pipeline, to sequester CO<sub>2</sub> into Eastern Montana's sequestration wells, creating a valuable blue hydrogen.
- SAF and renewable diesel are produced with hydrogen and CO<sub>2</sub> from industry or waste.
- Landfills and other facilities with biomass have large volumes of biomethane, or renewable natural gas. It can be injected into existing gas lines and purchased on a crediting basis.

## Montana Sources of CO<sub>2</sub> for eFuel production



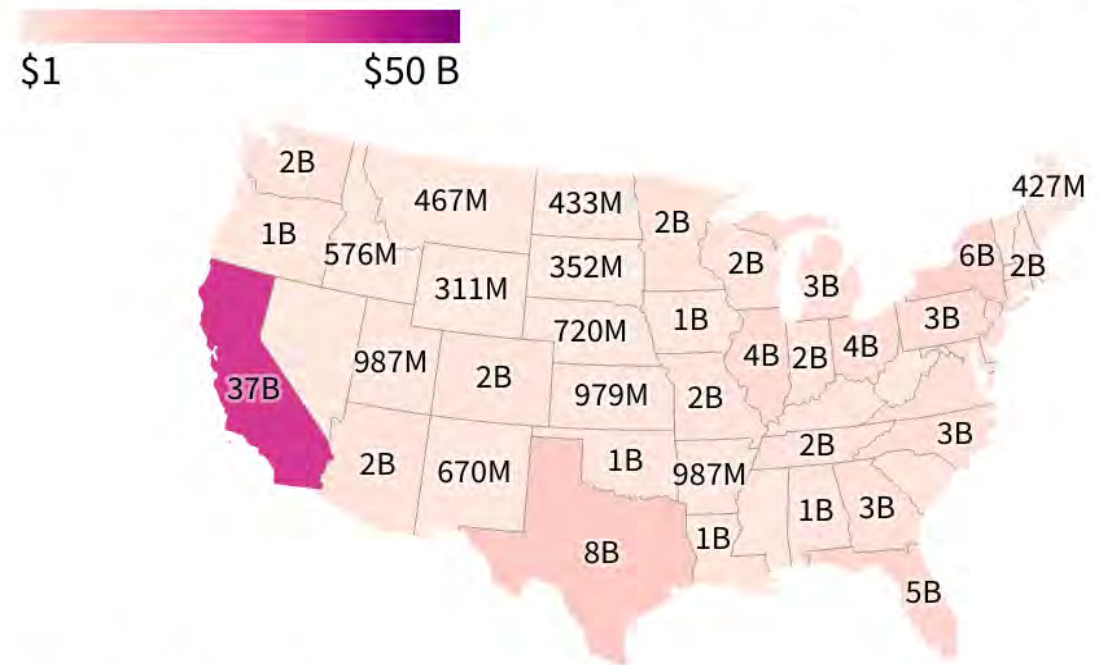
# The IRA is a game-changer for buildings

**The full potential is \$467M allocated for building sector projects in Montana state-wide**

**There's never been a better time to invest in green buildings. These policies present unprecedented opportunities for states and localities across the country.**

- \$71M for home electrification and efficiency
- \$27B in the Greenhouse Gas Reduction Fund (GGRF) nationally.
  - \$43.7M for Solar for All across Montana
  - For market building activities, program assistance, capitalization funding, and technical assistance related to green building projects.
- Tax credits for renewable energy systems and efficiency projects

According to RMI's Full Potential scenario, the contiguous U.S. can receive \$121 Billion in IRA funding for buildings sector projects.



**Source:** RMI Analysis





# Objective #4 continued:

## **Stakeholder Engagement**

# Transmission is essential to grow industry.

**“Available transmission capacity is zero, on a long-term basis it’s all committed.”**

– Utility Representative

**“Interconnection upgrade costs are huge barriers to large scale wind.”**

– Public Service Commission

**“Great Falls is an island.”**

– Energy Consultant

**“Opportunities for growth have been constrained because of infrastructure.”**

– Energy Consultant

# Investment should continue in the biofuels and eFuels sector.

**“There is potential to develop more renewable products, like the naphtha component, which could be used for hydrogen or cogeneration.”**

- Biofuels Businessperson

**“Crushing camelina locally would be great. Transportation is very expensive.”**

– Local Biofuels Consultant

# Resilient power, affordable housing, and good jobs are critical.

**“We need more secure and redundant power streams for Great Falls, especially given the military presence.”**

– City Official

**“Old housing stock needs energy-efficient upgrades to reduce energy bills and enhance resilience.”**

– Housing Development Expert

**“Housing has become a key issue in attracting clean energy jobs.”**

– Economic Development Stakeholder

**“We need to focus on developing a highly skilled workforce that aligns with clean energy and automation.”**

– County Official



Objective #5:

**Solution pathways and next steps**

# GFDA's Role

## Enhancing Regional Competitiveness



### Industry Facilitation

**Actions:**

- Lead and support awareness campaigns
- Convene key stakeholders around competitive improvements
- Attract new investments



### Business Growth

**Actions:**

- Coach existing and emerging businesses
- Match make between demand and supply
- Advocate for new business growth
- Support workforce development



### Financial Support

**Actions:**

- Provide gap financing and bridge loans when appropriate
- Support funding pathways with partners like MT DEQ, Clearwater, and Bonneville



### Program Advising

**Actions:**

- Advise on program IRA fund distribution
- Advocate and support the development and implementation of programs

# Transmission Key Takeaways

## Competitiveness



**Transmission enables new energy and industrial infrastructure**

New or upgraded transmission lines nearly always pay for themselves



Transmission improves reliability and hedges against costly fuel spikes or extreme weather events

Transmission can enable increased competition for energy supply

## Constraints



Industrial users in Montana are required to go to an increasingly tight market for energy and transmission.



Transmission takes too long to plan, permit, & build. Often 15+ years.



It's "Nobody's job" to plan inter-state transmission.

States often disagree about how to split transmission's cost.

## Coordination

**Unlock additional transmission capacity** on existing lines. GFDA can work with Montana Alberta Tie Line (MATL) to build industrial hubs around northern substations

**Work alongside a coalition to support transmission** throughout the state. GFDA can participate in a statewide coalition of related industry stakeholders to push for more transmission in the region.

# Hydrogen & eFuels Key Takeaways

## Competitiveness



Hydrogen and other alternative fuels have the attention of investors and IRA incentives.

Great Falls has access to resources for expanding efuel production.



Jobs & economic development

Local supply chains support value-added products, like biofuels.

## Constraints



Low supply of renewable energy and transmission capacity to refinery sites



Regulatory bottlenecks in permitting and high electricity prices

Canadian natural gas is leaky; fuels refined from it are not as competitive



Renewable natural gas has not been explored

CO2 infrastructure is concentrated in eastern Montana

## Coordination

**Support increased transmission capacity**, ease permitting hurdles for renewable energy, and enable co-located projects.

**Facilitate industry cooperation** and resource planning to accelerate renewable electricity, carbon capture, and clean fuel production.

**Expand local supply chain**, including, agricultural feedstock processing, farmer participation, and workforce capacity

# Energy Efficient Buildings Key Takeaways

## Competitiveness



Great Falls has an aging building stock that needs energy efficiency upgrades.

There's a need for new energy efficient, healthy worker housing.



IRA funding for retrofits & high-performance new construction

Good jobs through workforce training in specific trades

## Constraints



Demand isn't driving industry growth. Upfront costs perceived as prohibitive. Questions about technology. Public isn't bought into benefits.

Lack of private sector support. One energy auditor in Montana. Contractors talk people out of certain technologies.



Incentive programs are not yet accessible/promoted. Lobbying against solar tax credits. Gap funding is still an issue.

## Coordination

**Support Business Development:** Staff training, local working group to help energy efficiency and solar companies, development of low-embodied carbon industry.

**Support New Programs:** Facilitate heat pump water heater program, rooftop solar, and a whole building retrofit.

**Support with Financing:** Work on funding streams for new energy efficient housing, coordinate with Clearwater, provide gap financing.



**Questions?**  
**Thank you!**



# Appendix

# Stakeholder Conversations

- City of Great Falls
- MREA
- Public Service Council
- Liberty Electric, Inc
- AE2S
- NeighborWorks Great Falls
- TD&HE
- WET
- PowerGas
- Energy West
- Outback Power
- MT Energy Bureau
- Calumet
- Energy Keepers, Inc
- NorthWestern
- BHE Montana
- Cascade County
- Great Falls Airport
- Montana State University
- Susoils
- Loenbro
- Sletten