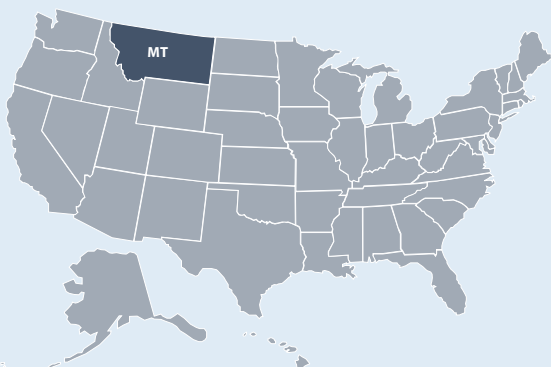




State of Montana

ENERGY SECTOR RISK PROFILE



Montana State Facts



POPULATION

1.06 M



HOUSING
UNITS

0.52 M



BUSINESS
ESTABLISHMENTS

0.04 M

ENERGY EMPLOYMENT: 15,530 jobs

PUBLIC UTILITY COMMISSION: Montana Public Service Commission

STATE ENERGY OFFICE: Montana Energy Office

EMERGENCY MANAGEMENT AGENCY: Montana Division of Disaster and Emergency Services

AVERAGE ELECTRICITY TARIFF: 8.84 cents/kWh

ENERGY EXPENDITURES: \$4,347/capita

ENERGY CONSUMPTION PER CAPITA: 399 MMBtu
(12th highest out of 50 states and Washington, D.C.)

GDP: \$50.3 billion

Data from 2020 or most recent year available.

For more information, see the Data Sources document.

ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 17,880 GWh

COAL: 9,000 MSTN

NATURAL GAS: 81 Bcf

MOTOR GASOLINE: 17,200 Mbbl

DISTILLATE FUEL: 14,800 Mbbl

ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 61 plants, 27.8 TWh,
6.7 GW total capacity

Coal: 6 plants, 14.1 TWh, 2.6 GW total capacity

Hydro: 23 plants, 10.0 TWh, 2.7 GW total capacity

Natural Gas: 6 plants, 0.5 TWh, 0.5 GW total capacity

Nuclear: 0 plants

Petroleum: 1 plant, 0.5 TWh, 0.1 GW total capacity

Wind & Solar: 21 plants, 2.4 TWh, 0.8 GW total capacity

Other sources: 4 plants, 0.3 TWh, 0.1 GW total capacity

COAL: 35,200 MSTN

NATURAL GAS: 50 Bcf

CRUDE OIL: 23,000 Mbbl

ETHANOL: 0 Mbbl

Data from EIA (2018, 2019).

This State Energy Risk Profile examines the relative magnitude of the risks that the state of Montana's energy infrastructure routinely encounters in comparison with the probable impacts. Natural and man-made hazards with the potential to cause disruption of the energy infrastructure are identified. Certain natural and adversarial threats, such as cybersecurity, electromagnetic pulse, geomagnetic disturbance, pandemics, or impacts caused by infrastructure interdependencies, are ill-suited to location-based probabilistic risk assessment as they may not adhere to geographic boundaries, have limited occurrence, or have limited historic data. Cybersecurity and other threats not included in these profiles are ever present and should be included in state energy security planning. A complete list of data sources and national level comparisons can be found in the Data Sources document.

Montana Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Thunderstorms & Lightning** at \$8 million per year (2nd leading cause nationwide at \$2.8 billion per year).
- Montana had 66 Major Disaster Declarations, 0 Emergency Declarations, and 18 Fire Management Assistance Declarations for 20 events between 2013 and 2019.
- Montana registered 3% greater Heating Degree Days and 7% fewer Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Helena.

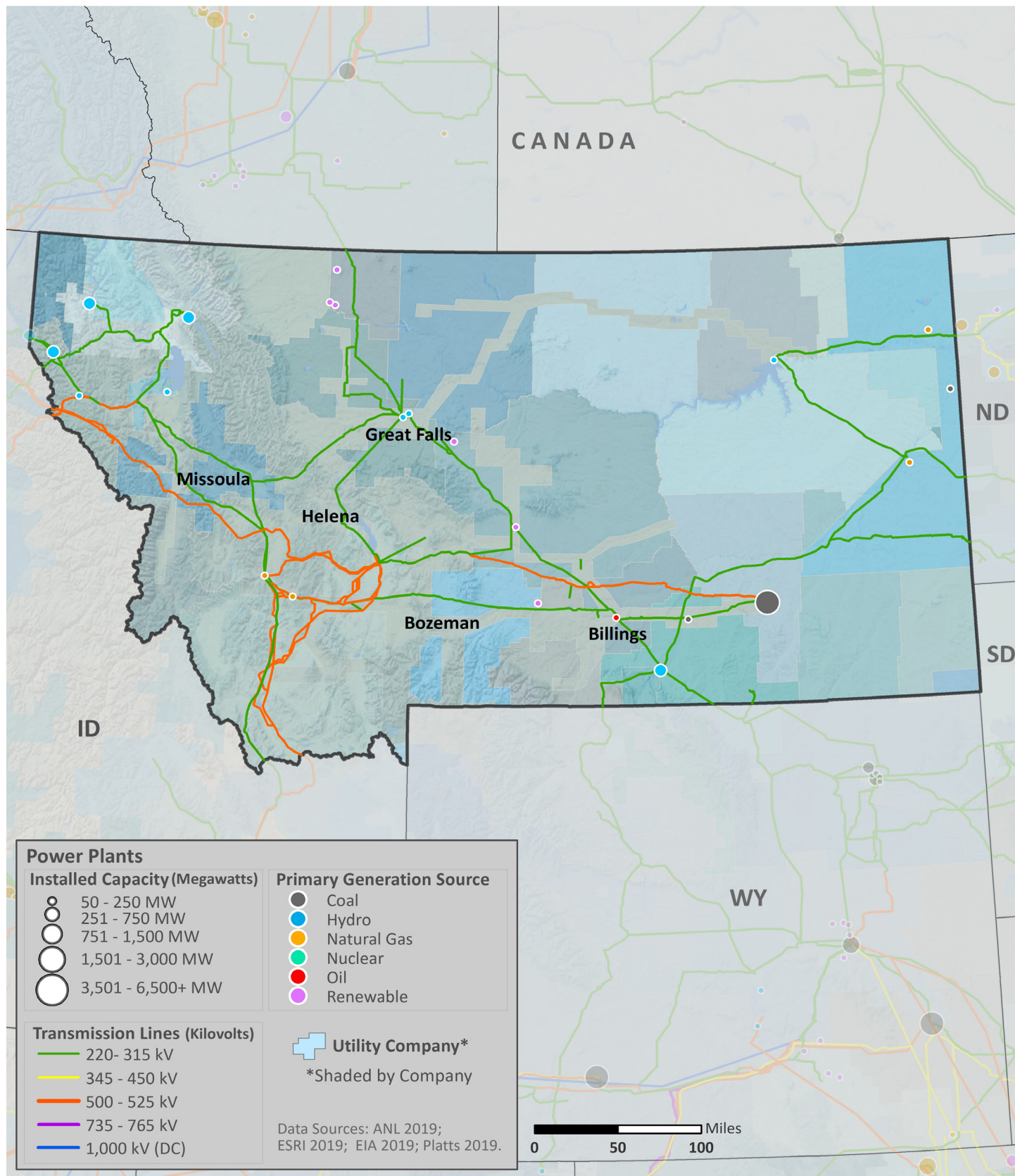
Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	1	\$0
Earthquake (≥ 3.5 M)	6	\$0
Extreme Heat	<1	\$0
Flood	24	\$3
Hurricane	0	\$0
Landslide	3	\$0
Thunderstorm & Lightning	129	\$8
Tornado	9	\$7
Wildfire	4	\$0
Winter Storm & Extreme Cold	67	\$1

Data Sources: NOAA and USGS



ELECTRIC



Electric Infrastructure

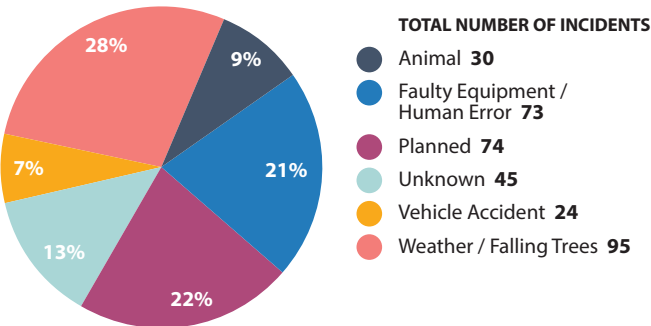
- Montana has 28 electric utilities:
 - 1 Investor owned
 - 25 Cooperative
 - 1 Municipal
 - 1 Other utility
- Plant retirements scheduled by 2025: 3 electric generating units totaling 766 MW of installed capacity.

Electric Customers and Consumption by Sector, 2018

		
	CUSTOMERS	CONSUMPTION
Residential 	81%	35%
Commercial 	17%	33%
Industrial 	2%	32%
Transportation 	<1%	<1%

Data Source: EIA

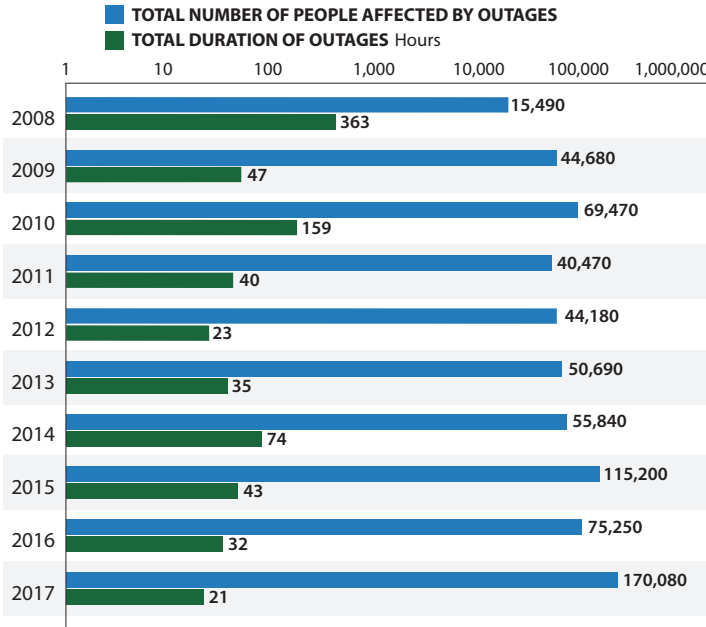
Electric Utility-Reported Outages by Cause, 2008 – 2017



Data Source: Eaton

- In 2018, the average Montana electric customer experienced 1.2 service interruptions that lasted an average of 2.4 hours.
- In Montana, between 2008 and 2017:
 - The greatest number of electric outages occurred in **October** (5th for outages nationwide)
 - The leading cause of electric outages was **Weather or Falling Trees** (leading cause nationwide)
 - Electric outages affected 68,135 customers on average

Electric Utility Outage Data, 2008 – 2017

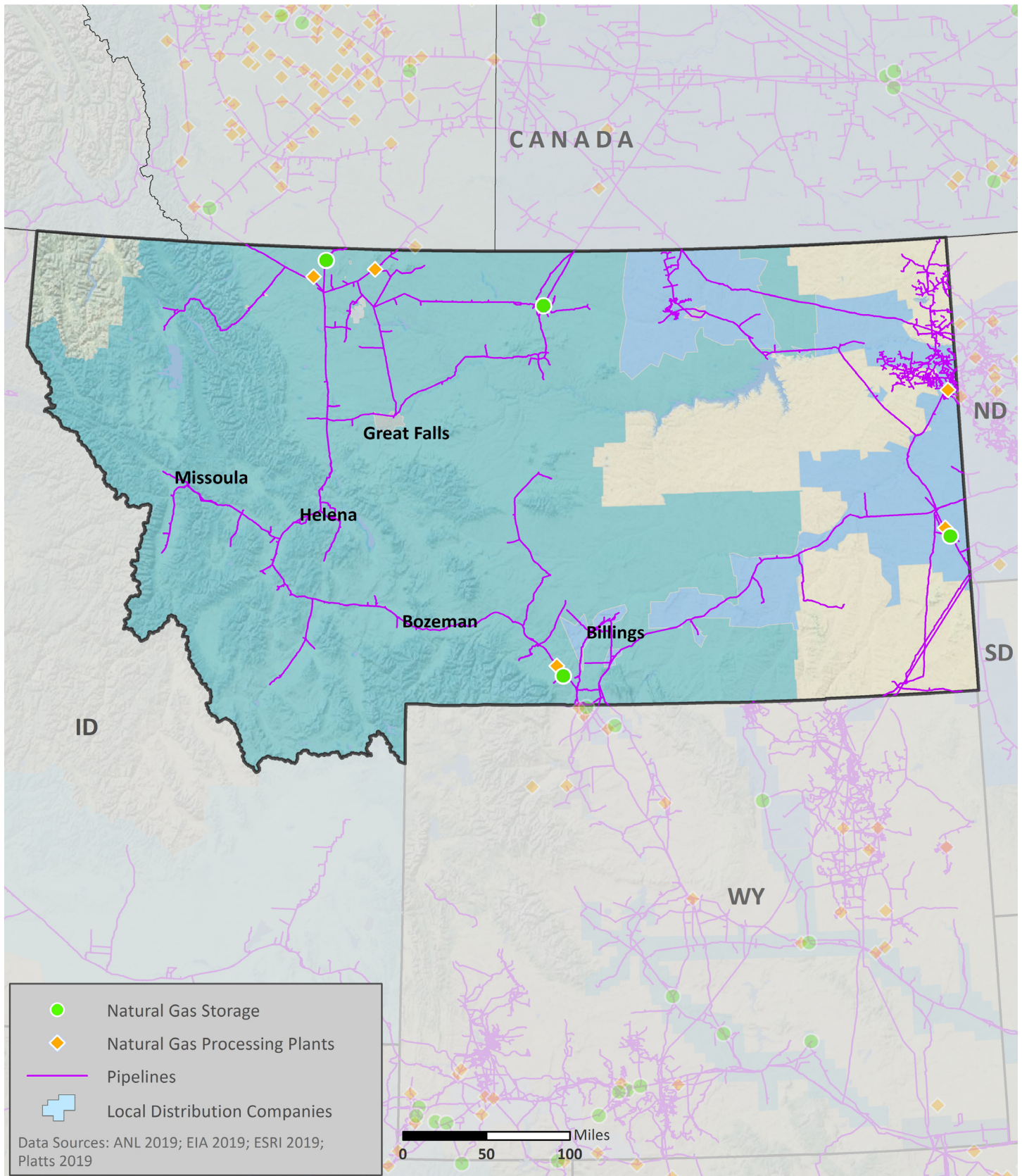


Note: This chart uses a logarithmic scale to display a very wide range of values.
Data Source: Eaton



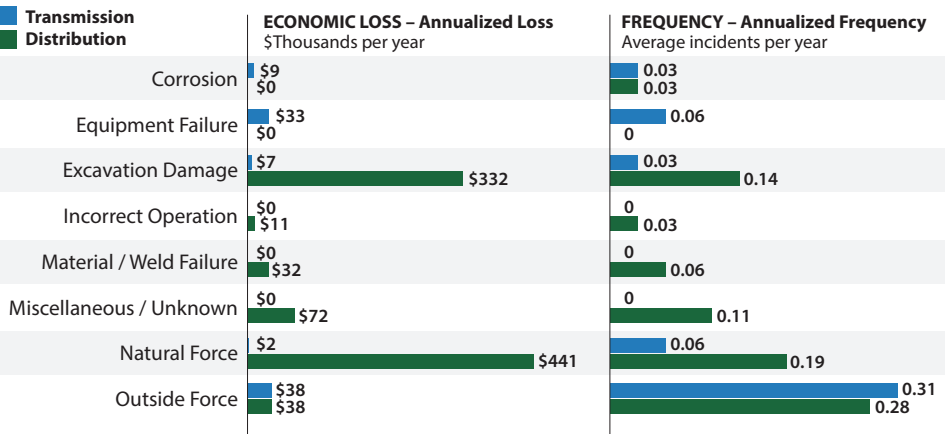


NATURAL GAS



Natural Gas Transport

Top Events Affecting Natural Gas Transmission and Distribution, 1984 – 2019



Data Source: DOT PHMSA

- As of 2018, Montana had:
 - 3,870 miles of natural gas transmission pipelines
 - 7,335 miles of natural gas distribution pipelines
- 57% of Montana’s natural gas transmission system and 31% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Montana’s natural gas supply was most impacted by:
 - **Outside Forces** when transported by transmission pipelines (3rd leading cause nationwide at \$20.65M per year)
 - **Natural Forces** when transported by distribution pipelines (4th leading cause nationwide at \$26.42M per year)

Natural Gas Processing and Liquefied Natural Gas

Natural Gas Customers and Consumption by Sector, 2018

	 CUSTOMERS	 CONSUMPTION
Residential 	88%	29%
Commercial 	12%	33%
Industrial 	<1%	32%
Transportation 	<1%	<1%
Electric Power 	<1%	6%
Other	<1%	<1%

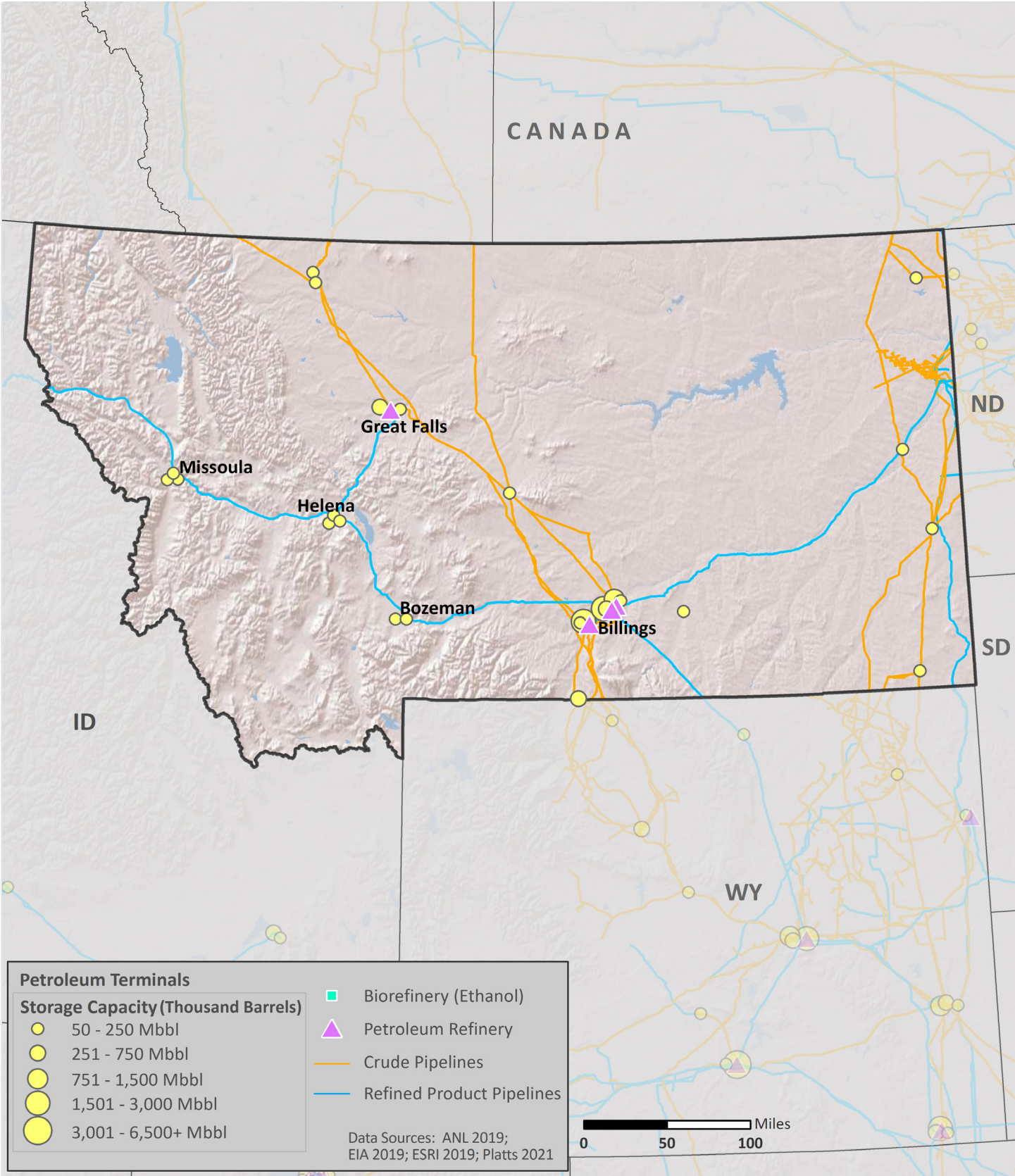
Data Source: EIA

- Montana has 5 natural gas processing facilities with a total capacity of 655 MMcf/d.
- Montana has 1 liquefied natural gas (LNG) facility with a total storage capacity of 1,310 barrels.



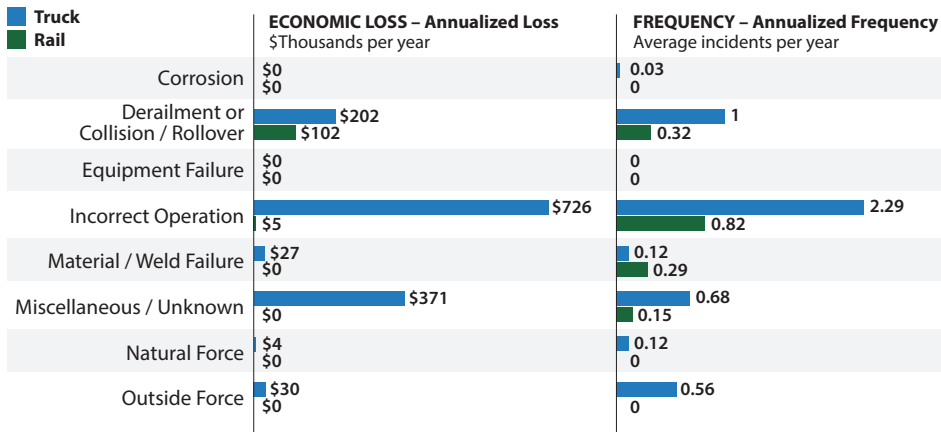


PETROLEUM



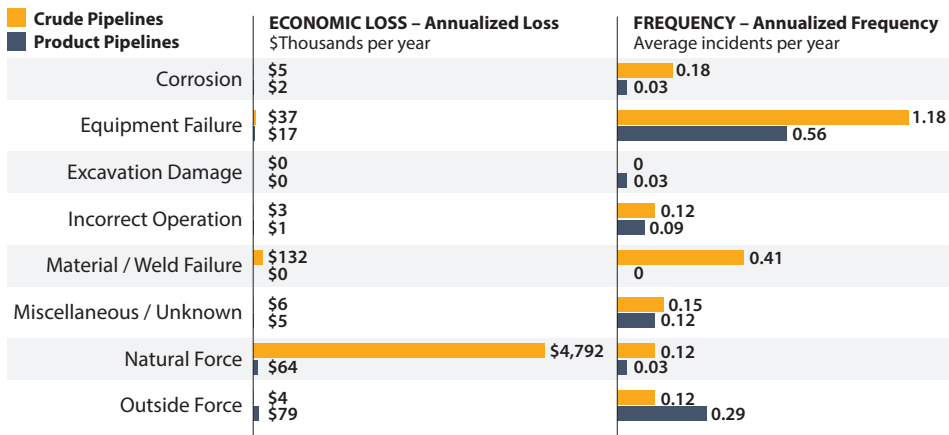
Petroleum Transport

Top Events Affecting Petroleum Transport by Truck and Rail, 1986 – 2019



Data Source: DOT PHMSA

Top Events Affecting Crude Oil and Refined Product Pipelines, 1986 – 2019



Data Source: DOT PHMSA

- As of 2018, Montana had:

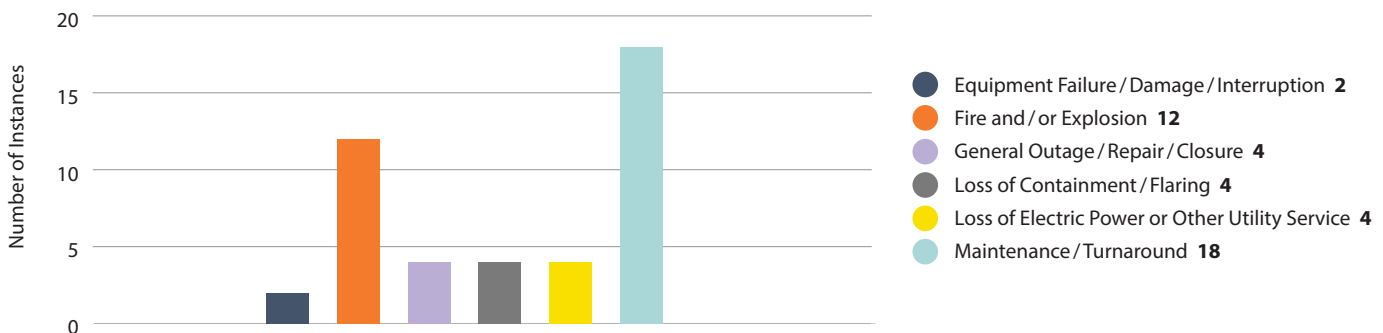
- 2,657 miles of crude oil pipelines
- 877 miles of refined product pipelines
- 0 miles of biofuels pipelines

- 45% of Montana's petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Montana's petroleum supply was most impacted by:
 - **Incorrect Operations** when transported by truck (5th leading cause nationwide at \$11.01M per year)
 - **Derailments, Collisions, or Rollovers** when transported by rail (leading cause nationwide at \$19.71M per year)
 - **Natural Forces** when transported by crude pipelines (2nd leading cause nationwide at \$15.24M per year)
 - **Material Failures** when transported by product pipelines (4th leading cause nationwide at \$9.47M per year)
- Disruptions in other states may impact supply.

Petroleum Refineries

- Montana has 4 petroleum refineries with a total operable capacity of 214.7 Mb/d.
- Between 2009 and 2019, the leading cause of petroleum refinery disruptions in Montana was:
 - **Maintenance** (2nd leading cause nationwide)

Causes and Frequency of Petroleum Refinery Disruptions, 2009 – 2019



Data Source: Hydrocarbon Publishing