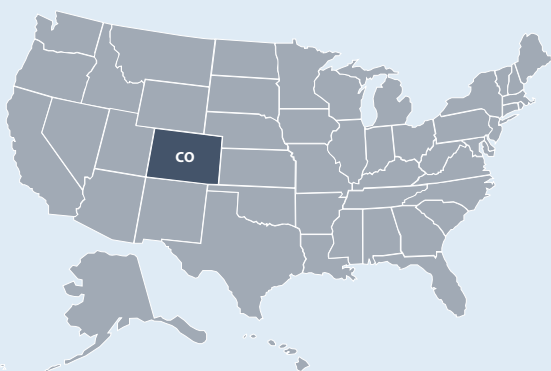




# State of Colorado ENERGY SECTOR RISK PROFILE



## Colorado State Facts



POPULATION

5.70 M



HOUSING UNITS

2.42 M



BUSINESS ESTABLISHMENTS

0.17 M

ENERGY EMPLOYMENT: 93,585 jobs

PUBLIC UTILITY COMMISSION: Colorado Public Utilities Commission

STATE ENERGY OFFICE: Colorado Energy Office

EMERGENCY MANAGEMENT AGENCY: Colorado Division of Homeland Security and Emergency Management

AVERAGE ELECTRICITY TARIFF: 10.02 cents/kWh

ENERGY EXPENDITURES: \$2,919/capita

ENERGY CONSUMPTION PER CAPITA: 261 MMBtu (35th highest out of 50 states and Washington, D.C.)

GDP: \$371.7 billion

Data from 2020 or most recent year available.

For more information, see the Data Sources document.

## ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 56,450 GWh

COAL: 15,400 MSTN

NATURAL GAS: 427 Bcf

MOTOR GASOLINE: 55,700 Mbbbl

DISTILLATE FUEL: 20,900 Mbbbl

## ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 223 plants, 56.3 TWh, 13.6 GW total capacity

Coal: 8 plants, 25.3 TWh, 4.8 GW total capacity

Hydro: 46 plants, 1.8 TWh, 0.7 GW total capacity

Natural Gas: 29 plants, 17.1 TWh, 7.8 GW total capacity

Nuclear: 0 plants

Petroleum: 13 plants, 0.0 TWh, 0.2 GW total capacity

Wind & Solar: 114 plants, 12.1 TWh, 4.4 GW total capacity

Other sources: 13 plants, 0.0 TWh, 0.6 GW total capacity

COAL: 15,000 MSTN

NATURAL GAS: 1,990 Bcf

CRUDE OIL: 189,600 Mbbbl

ETHANOL: 3,100 Mbbbl

Data from EIA (2018, 2019).

This State Energy Risk Profile examines the relative magnitude of the risks that the state of Colorado'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.

## Colorado Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Thunderstorms & Lightning** at \$421 million per year (2nd leading cause nationwide at \$2.8 billion per year).
- Colorado had 35 Major Disaster Declarations, 15 Emergency Declarations, and 13 Fire Management Assistance Declarations for 13 events between 2013 and 2019.
- Colorado registered 1% fewer Heating Degree Days and 53% greater Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Lakewood.

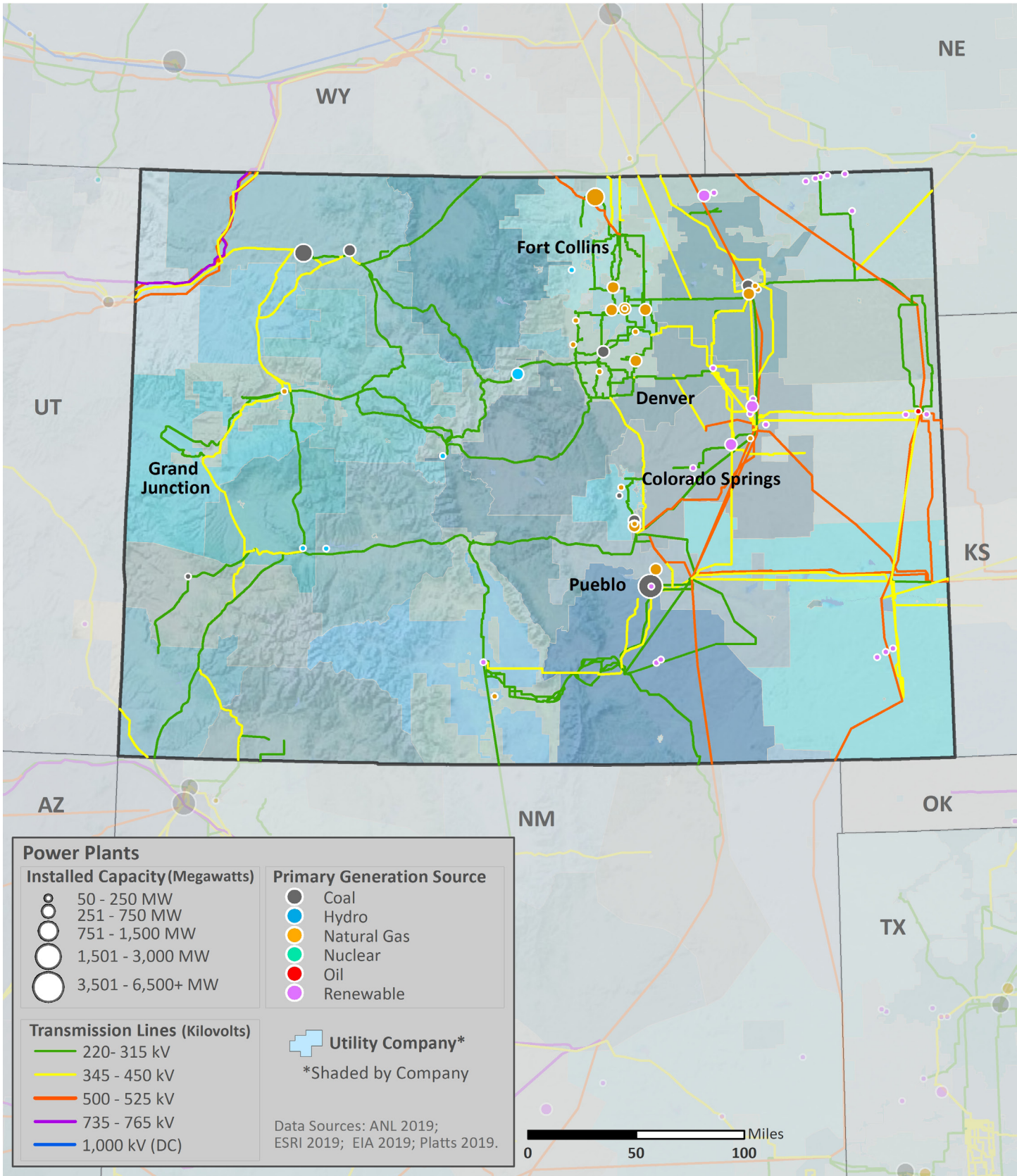
## Annualized Frequency of and Property Damage Due to Natural Hazards, 2009–2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	10	\$0
Earthquake (≥ 3.5 M)	3	\$0
Extreme Heat	<1	\$0
Flood	34	\$74
Hurricane	0	\$0
Landslide	15	\$0
Thunderstorm & Lightning	146	\$421
Tornado	24	\$0
Wildfire	16	\$141
Winter Storm & Extreme Cold	89	\$0

Data Sources: NOAA and USGS



# ELECTRIC









## Electric Infrastructure

- Colorado has 57 electric utilities:
  - 2 Investor owned
  - 23 Cooperative
  - 28 Municipal
  - 4 Other utilities
- Plant retirements scheduled by 2025: 7 electric generating units totaling 1,339 MW of installed capacity.

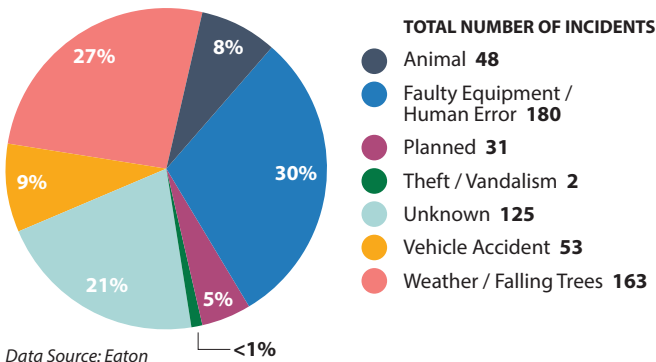
- In 2018, the average Colorado electric customer experienced 1 service interruption that lasted an average of 1.9 hours.
- In Colorado, between 2008 and 2017:
  - The greatest number of electric outages occurred in **October** (5th for outages nationwide)
  - The leading cause of electric outages was **Faulty Equipment or Human Error** (2nd leading cause nationwide)
  - Electric outages affected 245,050 customers on average

### Electric Customers and Consumption by Sector, 2018

	 CUSTOMERS	 CONSUMPTION
Residential 	86%	34%
Commercial 	14%	37%
Industrial 	<1%	28%
Transportation 	<1%	<1%

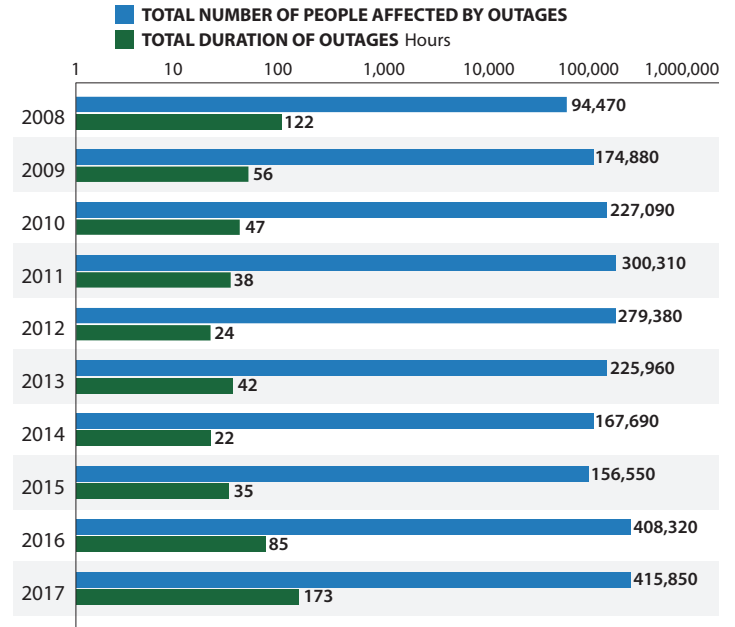
Data Source: EIA

### Electric Utility-Reported Outages by Cause, 2008 – 2017



Data Source: Eaton

### Electric Utility Outage Data, 2008 – 2017

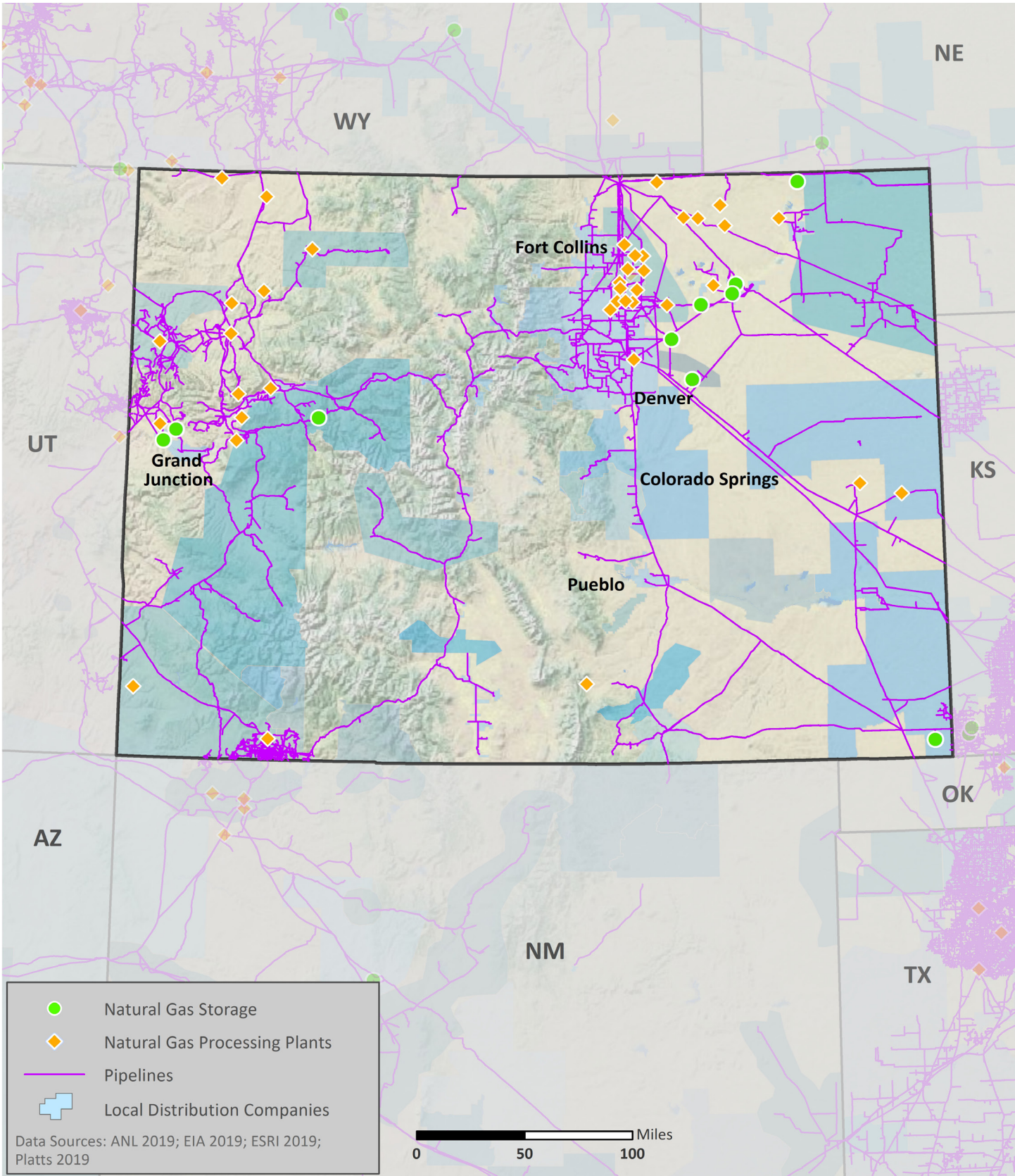


Note: This chart uses a logarithmic scale to display a very wide range of values.  
Data Source: Eaton



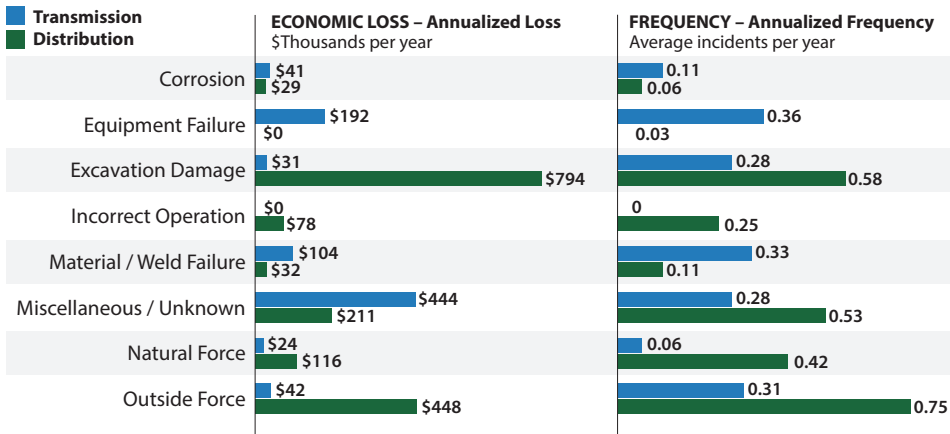


# NATURAL GAS



## Natural Gas Transport

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



Data Source: DOT PHMSA

- As of 2018, Colorado had:
  - 7,674 miles of natural gas transmission pipelines
  - 36,775 miles of natural gas distribution pipelines
- 39% of Colorado’s natural gas transmission system and 24% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Colorado’s natural gas supply was most impacted by:
  - **Miscellaneous or Unknown** events when transported by transmission pipelines (5th leading cause nationwide at \$16.77M per year)
  - **Excavation Damage** when transported by distribution pipelines (5th leading cause nationwide at \$16.56M per year)

## Natural Gas Processing and Liquefied Natural Gas

### Natural Gas Customers and Consumption by Sector, 2018

	CUSTOMERS	CONSUMPTION
Residential	92%	29%
Commercial	8%	13%
Industrial	<1%	20%
Transportation	<1%	<1%
Electric Power	<1%	37%
Other	<1%	<1%

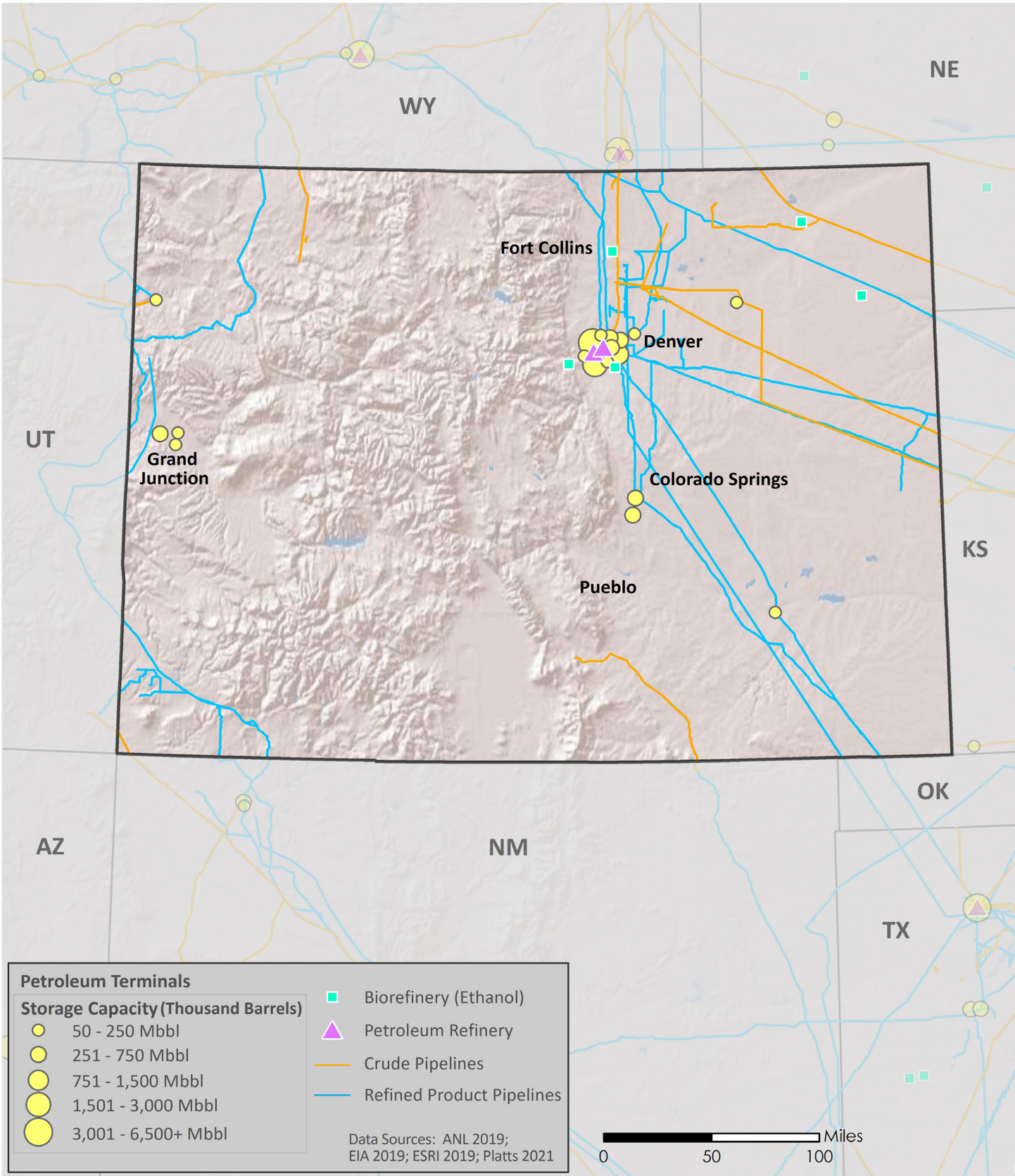
Data Source: EIA

- Colorado has 38 natural gas processing facilities with a total capacity of 6,628 MMcf/d.
- Colorado has 0 liquefied natural gas (LNG) facilities.



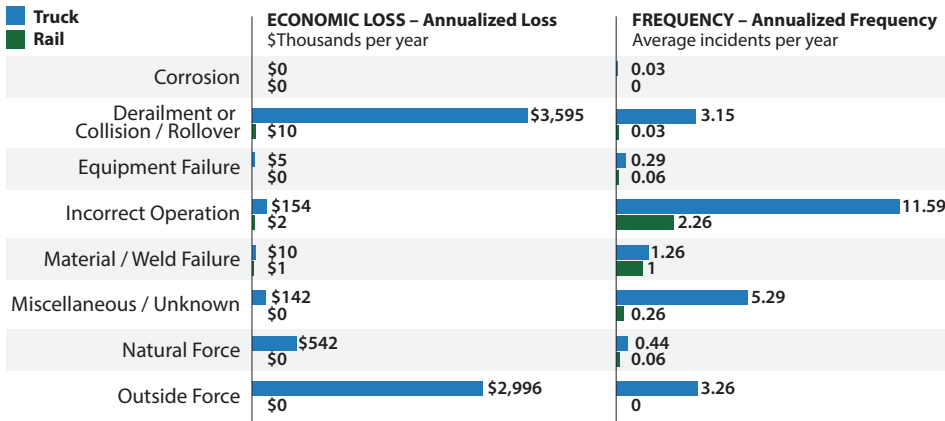


# PETROLEUM



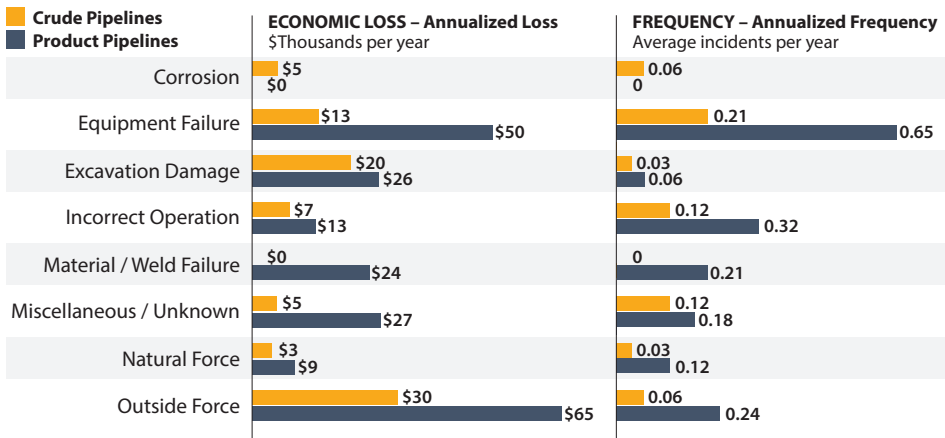
## Petroleum Transport

### 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



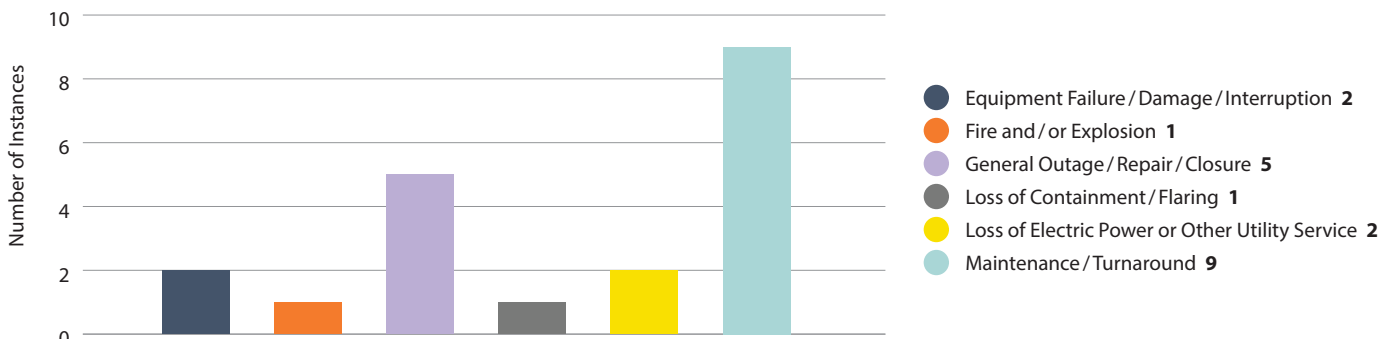
Data Source: DOT PHMSA

- As of 2018, Colorado had:
  - 1,475 miles of crude oil pipelines
  - 998 miles of refined product pipelines
  - 0 miles of biofuels pipelines
- 23% of Colorado’s petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Colorado’s petroleum supply was most impacted by:
  - **Derailments, Collisions, or Rollovers** when transported by truck (8th leading cause nationwide at \$0.07M per year)
  - **Derailments, Collisions, or Rollovers** when transported by rail (leading cause nationwide at \$19.71M per year)
  - **Outside Forces** when transported by crude pipelines (4th leading cause nationwide at \$8.71M per year)
  - **Outside Forces** when transported by product pipelines (leading cause nationwide at \$19.06M per year)
- Disruptions in other states may impact supply.

## Petroleum Refineries

- Colorado has 2 petroleum refineries with a total operable capacity of 103 Mb/d.
- Between 2009 and 2019, the leading cause of petroleum refinery disruptions in Colorado was:
  - **Maintenance** (2nd leading cause nationwide)

### Causes and Frequency of Petroleum Refinery Disruptions, 2009 – 2019



Data Source: Hydrocarbon Publishing