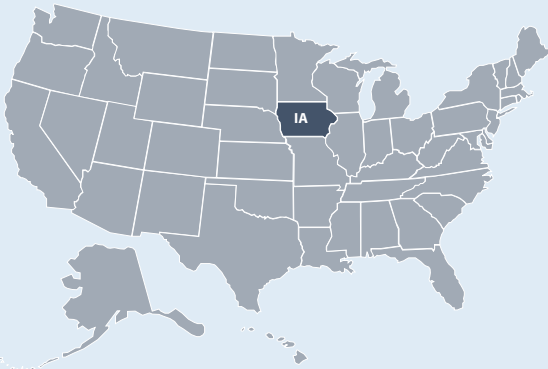




State of Iowa ENERGY SECTOR RISK PROFILE



Iowa State Facts



POPULATION

3.16 M



HOUSING UNITS

1.41 M



BUSINESS ESTABLISHMENTS

0.08 M

ENERGY EMPLOYMENT: 33,979 jobs
PUBLIC UTILITY COMMISSION: Iowa Utilities Board
STATE ENERGY OFFICE: Iowa Energy Office
EMERGENCY MANAGEMENT AGENCY: Iowa Department of Homeland Security and Emergency Management
AVERAGE ELECTRICITY TARIFF: 8.92 cents/kWh
ENERGY EXPENDITURES: \$4,418/capita
ENERGY CONSUMPTION PER CAPITA: 496 MMBtu (5th highest out of 50 states and Washington, D.C.)
GDP: \$189.7 billion

Data from 2020 or most recent year available.
 For more information, see the Data Sources document.

ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 51,210 GWh

COAL: 18,700 MSTN

NATURAL GAS: 431 Bcf

MOTOR GASOLINE: 29,100 Mbbbl

DISTILLATE FUEL: 25,000 Mbbbl

ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 274 plants, 61.7 TWh, 15.9 GW total capacity

Coal: 13 plants, 22.2 TWh, 5.8 GW total capacity

Hydro: 3 plants, 0.8 TWh, 0.1 GW total capacity

Natural Gas: 43 plants, 7.7 TWh, 4.2 GW total capacity

Nuclear: 1 plant, 5.2 TWh, 0.7 GW total capacity

Petroleum: 98 plants, 0.2 TWh, 0.9 GW total capacity

Wind & Solar: 110 plants, 25.3 TWh, 9.9 GW total capacity

Other sources: 6 plants, 0.2 TWh, 0.0 GW total capacity

COAL: 0 MSTN

NATURAL GAS: 0 Bcf

CRUDE OIL: 0 Mbbbl

ETHANOL: 98,000 Mbbbl

Data from EIA (2018, 2019).

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

Iowa Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Flooding** at \$48 million per year (leading cause nationwide at \$12 billion per year).
- Iowa had 317 Major Disaster Declarations, 0 Emergency Declarations, and 0 Fire Management Assistance Declarations for 15 events between 2013 and 2019.
- Iowa registered 1% greater Heating Degree Days and 3% greater Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Des Moines.

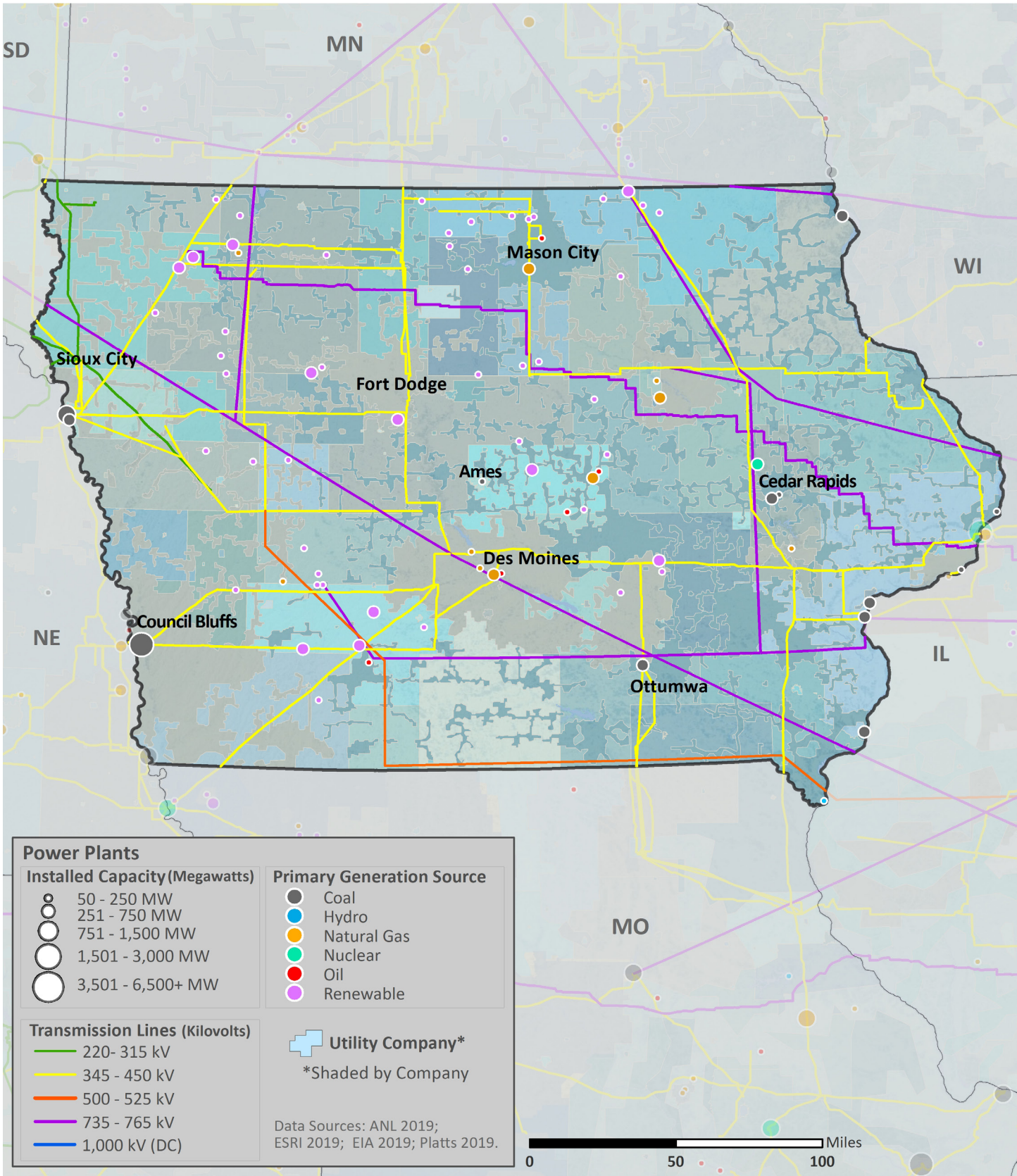
Annualized Frequency of and Property Damage Due to Natural Hazards, 2009–2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	6	\$0
Earthquake (≥ 3.5 M)	0	\$0
Extreme Heat	4	\$1
Flood	74	\$48
Hurricane	0	\$0
Landslide	0	\$0
Thunderstorm & Lightning	128	\$24
Tornado	29	\$38
Wildfire	1	\$0
Winter Storm & Extreme Cold	43	\$12

Data Sources: NOAA and USGS



ELECTRIC









Electric Infrastructure

- Iowa has 179 electric utilities:
 - 3 Investor owned
 - 39 Cooperative
 - 135 Municipal
 - 2 Other utilities
- Plant retirements scheduled by 2025: 9 electric generating units totaling 982 MW of installed capacity.

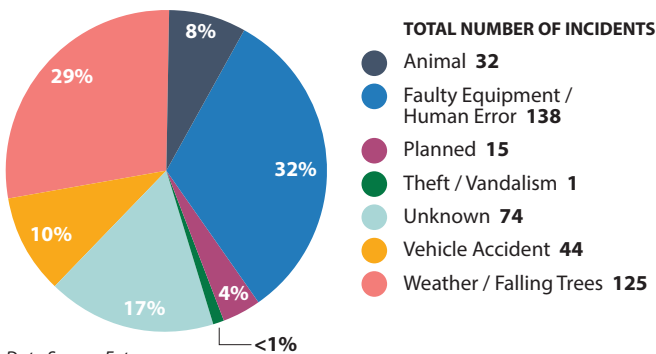
- In 2018, the average Iowa electric customer experienced 1 service interruption that lasted an average of less than 1 hour.
- In Iowa, between 2008 and 2017:
 - The greatest number of electric outages occurred in **June** (2nd for outages nationwide)
 - The leading cause of electric outages was **Faulty Equipment or Human Error** (2nd leading cause nationwide)
 - Electric outages affected 116,467 customers on average

Electric Customers and Consumption by Sector, 2018

	 CUSTOMERS	 CONSUMPTION
Residential 	85%	29%
Commercial 	15%	24%
Industrial 	<1%	47%
Transportation 	<1%	<1%

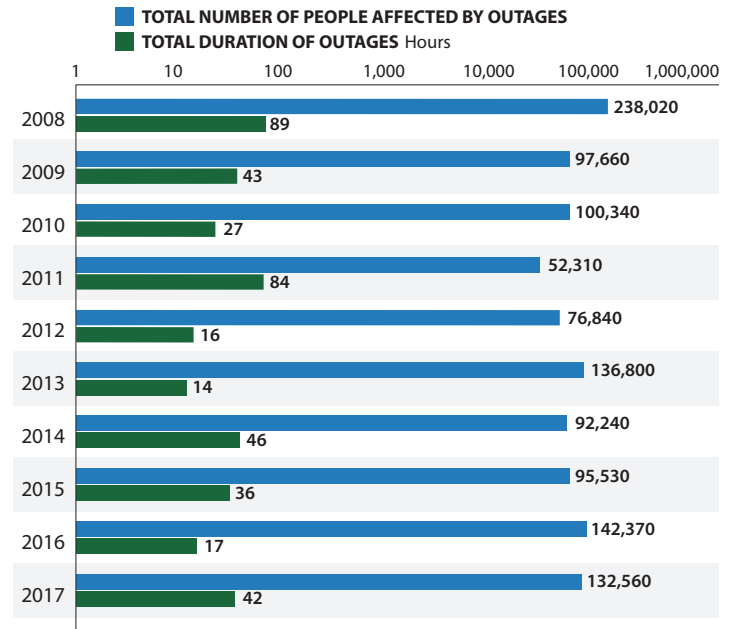
Data Source: EIA

Electric Utility-Reported Outages by Cause, 2008 – 2017



Data Source: Eaton

Electric Utility Outage Data, 2008 – 2017

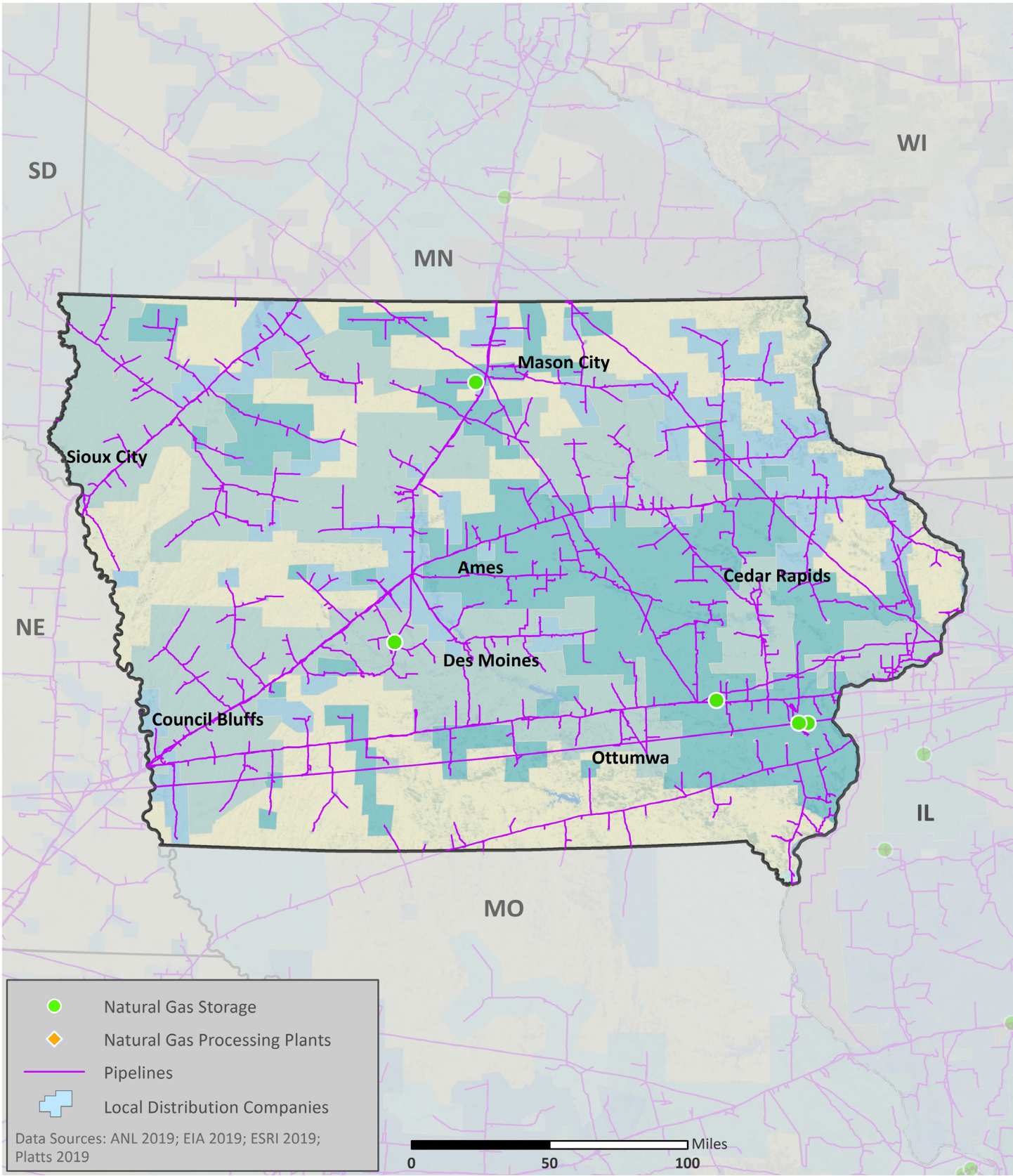


Note: This chart uses a logarithmic scale to display a very wide range of values.
Data Source: Eaton



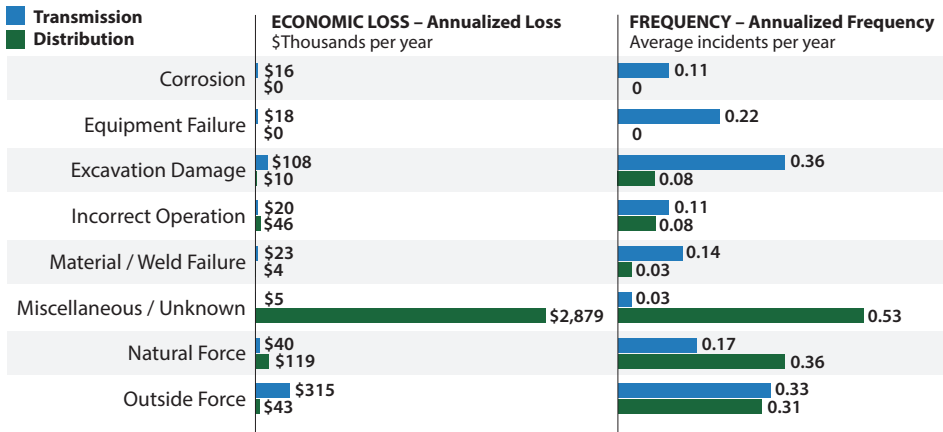


NATURAL GAS



Natural Gas Transport

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



Data Source: DOT PHMSA

- As of 2018, Iowa had:
 - 8,311 miles of natural gas transmission pipelines
 - 18,583 miles of natural gas distribution pipelines
- 70% of Iowa’s natural gas transmission system and 26% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Iowa’s natural gas supply was most impacted by:
 - **Outside Forces** when transported by transmission pipelines (3rd leading cause nationwide at \$20.65M per year)
 - **Miscellaneous or Unknown** events when transported by distribution pipelines (2nd leading cause nationwide at \$67.89M per year)

Natural Gas Processing and Liquefied Natural Gas

Natural Gas Customers and Consumption by Sector, 2018

	CUSTOMERS	CONSUMPTION
Residential	90%	16%
Commercial	10%	13%
Industrial	<1%	56%
Transportation	<1%	<1%
Electric Power	<1%	15%
Other	<1%	<1%

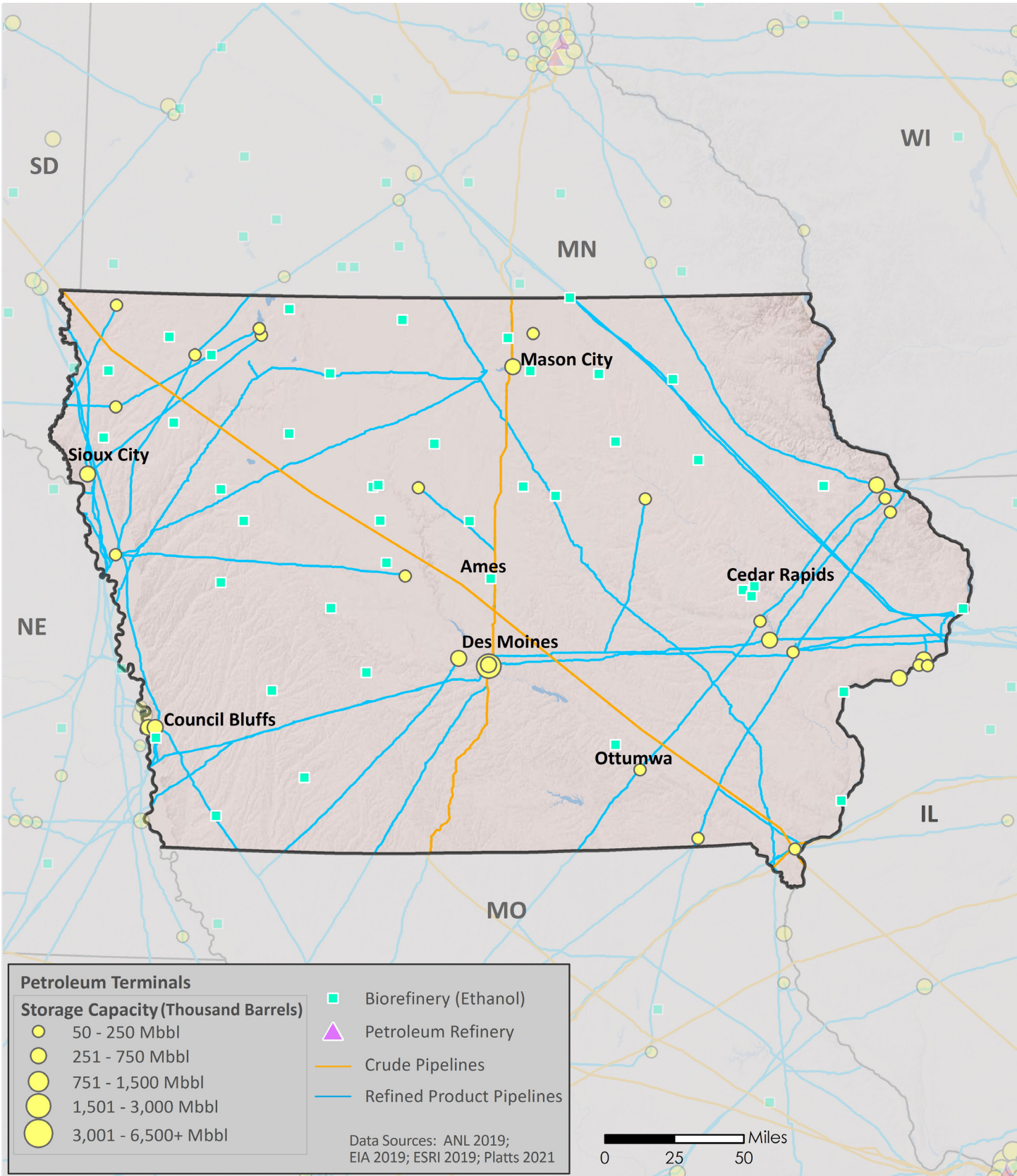
Data Source: EIA

- Iowa has 0 natural gas processing facilities.
- Iowa has 6 liquefied natural gas (LNG) facilities with a total storage capacity of 1,125,590 barrels.



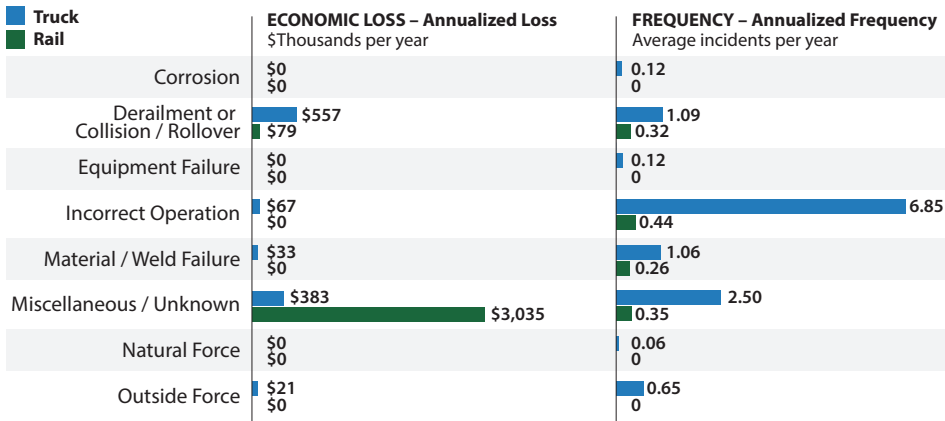


PETROLEUM



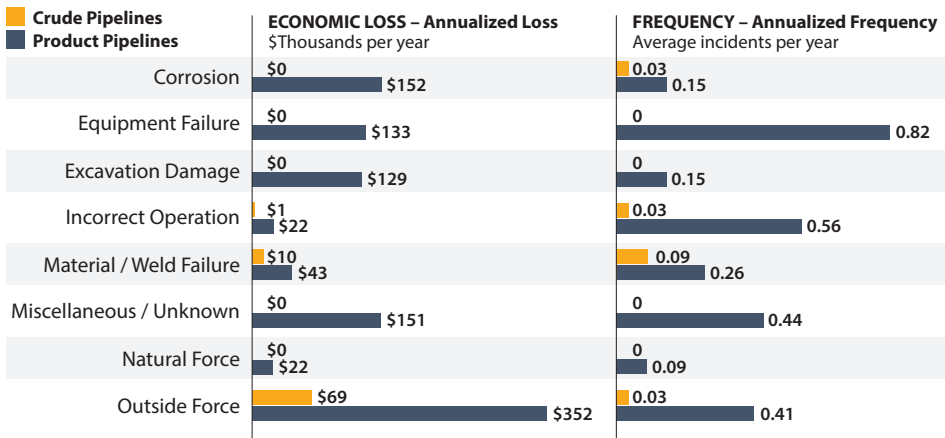
Petroleum Transport

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, Iowa had:
 - 786 miles of crude oil pipelines
 - 1,762 miles of refined product pipelines
 - 0 miles of biofuels pipelines
- 60% of Iowa’s petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Iowa’s petroleum supply was most impacted by:
 - **Derailments, Collisions, or Rollovers** when transported by truck (8th leading cause nationwide at \$0.07M per year)
 - **Miscellaneous or Unknown** events when transported by rail (3rd leading cause nationwide at \$6.11M 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

- There are no operating petroleum refineries in Iowa.

