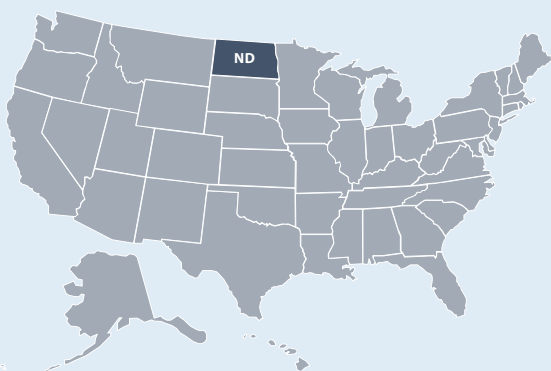




State of North Dakota ENERGY SECTOR RISK PROFILE



North Dakota State Facts



POPULATION

0.76 M



HOUSING UNITS

0.38 M



BUSINESS ESTABLISHMENTS

0.02 M

ENERGY EMPLOYMENT: 36,392 jobs
PUBLIC UTILITY COMMISSION: North Dakota Public Service Commission
STATE ENERGY OFFICE: North Dakota Department of Commerce Division of Community Services
EMERGENCY MANAGEMENT AGENCY: North Dakota Department of Emergency Services
AVERAGE ELECTRICITY TARIFF: 8.91 cents/kWh
ENERGY EXPENDITURES: \$7,087/capita
ENERGY CONSUMPTION PER CAPITA: 836 MMBtu (3rd highest out of 50 states and Washington, D.C.)
GDP: \$56.1 billion

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

ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 20,670 GWh

COAL: 29,800 MSTN

NATURAL GAS: 78 Bcf

MOTOR GASOLINE: 9,200 Mbbl

DISTILLATE FUEL: 18,400 Mbbl

ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 60 plants, 41.1 TWh, 9.1 GW total capacity

Coal: 8 plants, 25.2 TWh, 4.1 GW total capacity

Hydro: 1 plant, 3.2 TWh, 0.6 GW total capacity

Natural Gas: 4 plants, 1.5 TWh, 0.8 GW total capacity

Nuclear: 0 plants

Petroleum: 8 plants, 0.0 TWh, 0.1 GW total capacity

Wind & Solar: 36 plants, 11.2 TWh, 3.5 GW total capacity

Other sources: 3 plants, 0.1 TWh, 0.0 GW total capacity

COAL: 28,800 MSTN

NATURAL GAS: 1,060 Bcf

CRUDE OIL: 518,900 Mbbl

ETHANOL: 11,600 Mbbl

Data from EIA (2018, 2019).

This State Energy Risk Profile examines the relative magnitude of the risks that the state of North Dakota’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.

North Dakota Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Flooding** at \$22 million per year (leading cause nationwide at \$12 billion per year).
- North Dakota had 86 Major Disaster Declarations, 6 Emergency Declarations, and 0 Fire Management Assistance Declarations for 8 events between 2013 and 2019.
- North Dakota registered 5% greater Heating Degree Days and 7% fewer Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Bismarck.

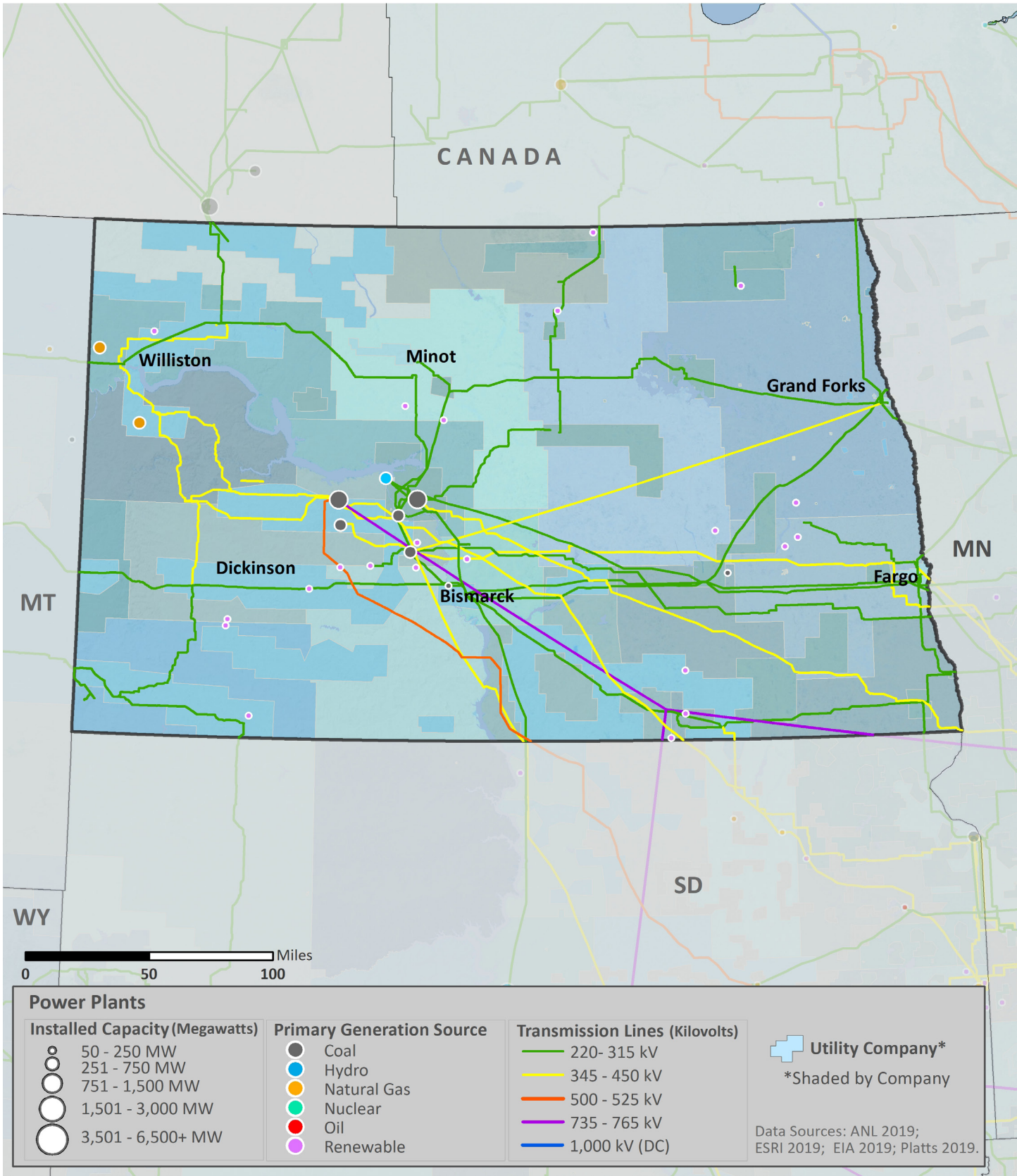
Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	1	\$0
Earthquake (≥ 3.5 M)	0	\$0
Extreme Heat	<1	\$0
Flood	14	\$22
Hurricane	0	\$0
Landslide	0	\$0
Thunderstorm & Lightning	68	\$16
Tornado	20	\$5
Wildfire	1	\$1
Winter Storm & Extreme Cold	24	\$7

Data Sources: NOAA and USGS



ELECTRIC









Electric Infrastructure

- North Dakota has 32 electric utilities:
 - 1 Investor owned
 - 19 Cooperative
 - 11 Municipal
 - 1 Other utility
- Plant retirements scheduled by 2025: 2 electric generating units totaling 115 MW of installed capacity.

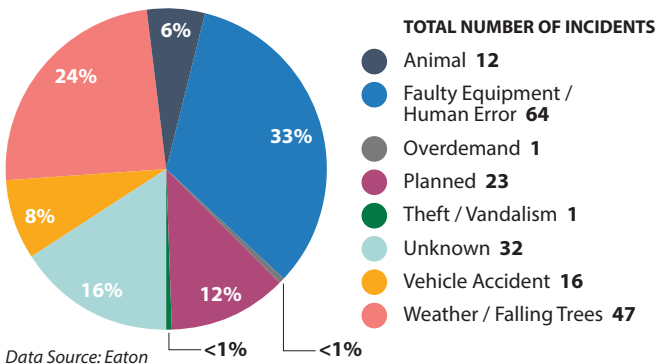
- In 2018, the average North Dakota electric customer experienced 0.9 service interruptions that lasted an average of 1.6 hours.
- In North Dakota, between 2008 and 2017:
 - The greatest number of electric outages occurred in **August** (3rd for outages nationwide)
 - The leading cause of electric outages was **Faulty Equipment or Human Error** (2nd leading cause nationwide)
 - Electric outages affected 40,861 customers on average

Electric Customers and Consumption by Sector, 2018

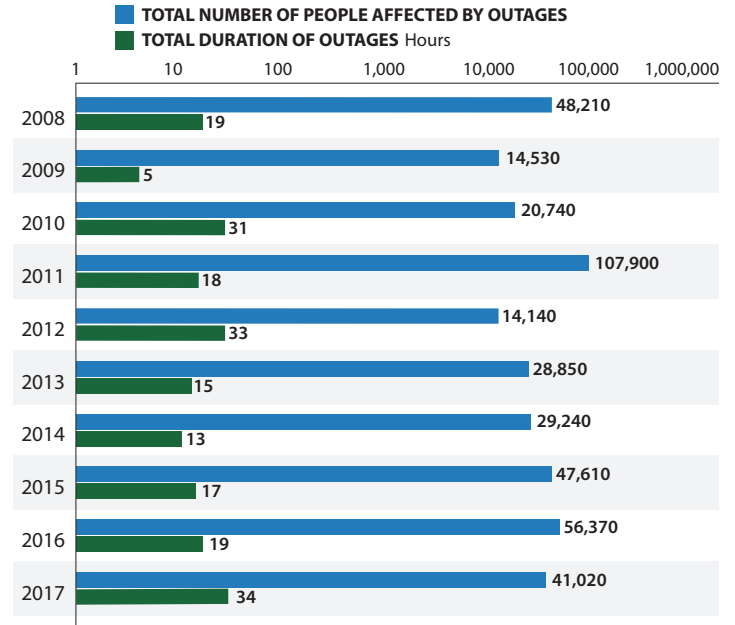
	 CUSTOMERS	 CONSUMPTION
Residential 	82%	25%
Commercial 	16%	33%
Industrial 	2%	42%
Transportation 	<1%	<1%

Data Source: EIA

Electric Utility-Reported Outages by Cause, 2008 – 2017

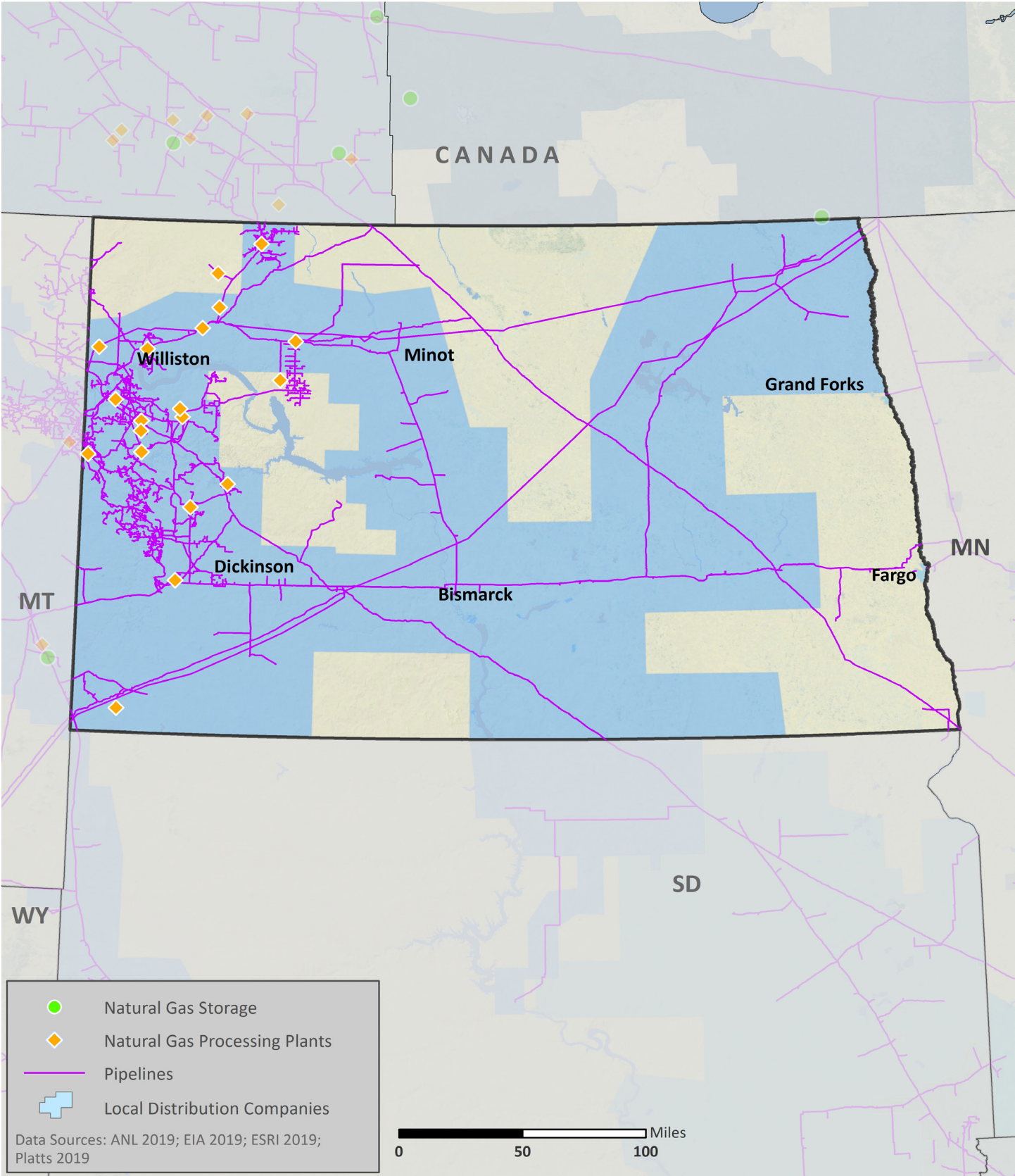


Electric Utility Outage Data, 2008 – 2017



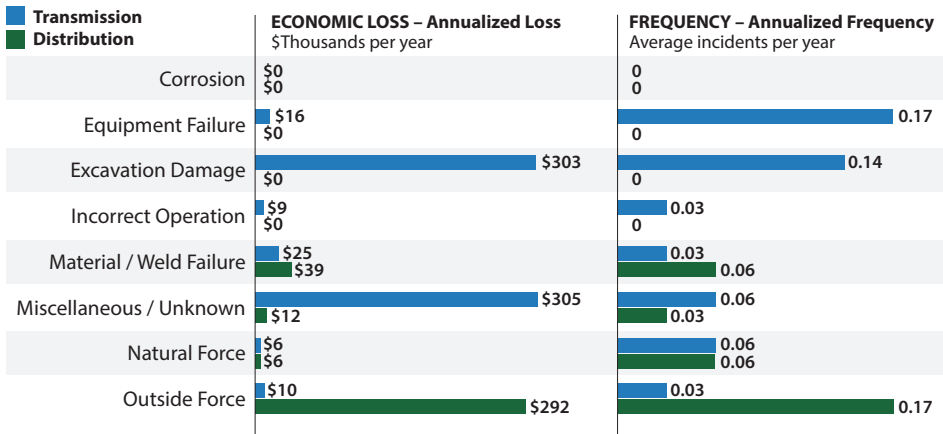


NATURAL GAS



Natural Gas Transport

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








Data Source: DOT PHMSA

- As of 2018, North Dakota had:
 - 2,514 miles of natural gas transmission pipelines
 - 3,772 miles of natural gas distribution pipelines
- 19% of North Dakota’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, North Dakota’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)
 - **Outside Forces** when transported by distribution pipelines (leading cause nationwide at \$76.59M per year)

Natural Gas Processing and Liquefied Natural Gas

Natural Gas Customers and Consumption by Sector, 2018

	CUSTOMERS	CONSUMPTION
Residential 	86%	18%
Commercial 	13%	20%
Industrial 	<1%	49%
Transportation 	<1%	<1%
Electric Power 	<1%	13%
Other	<1%	<1%

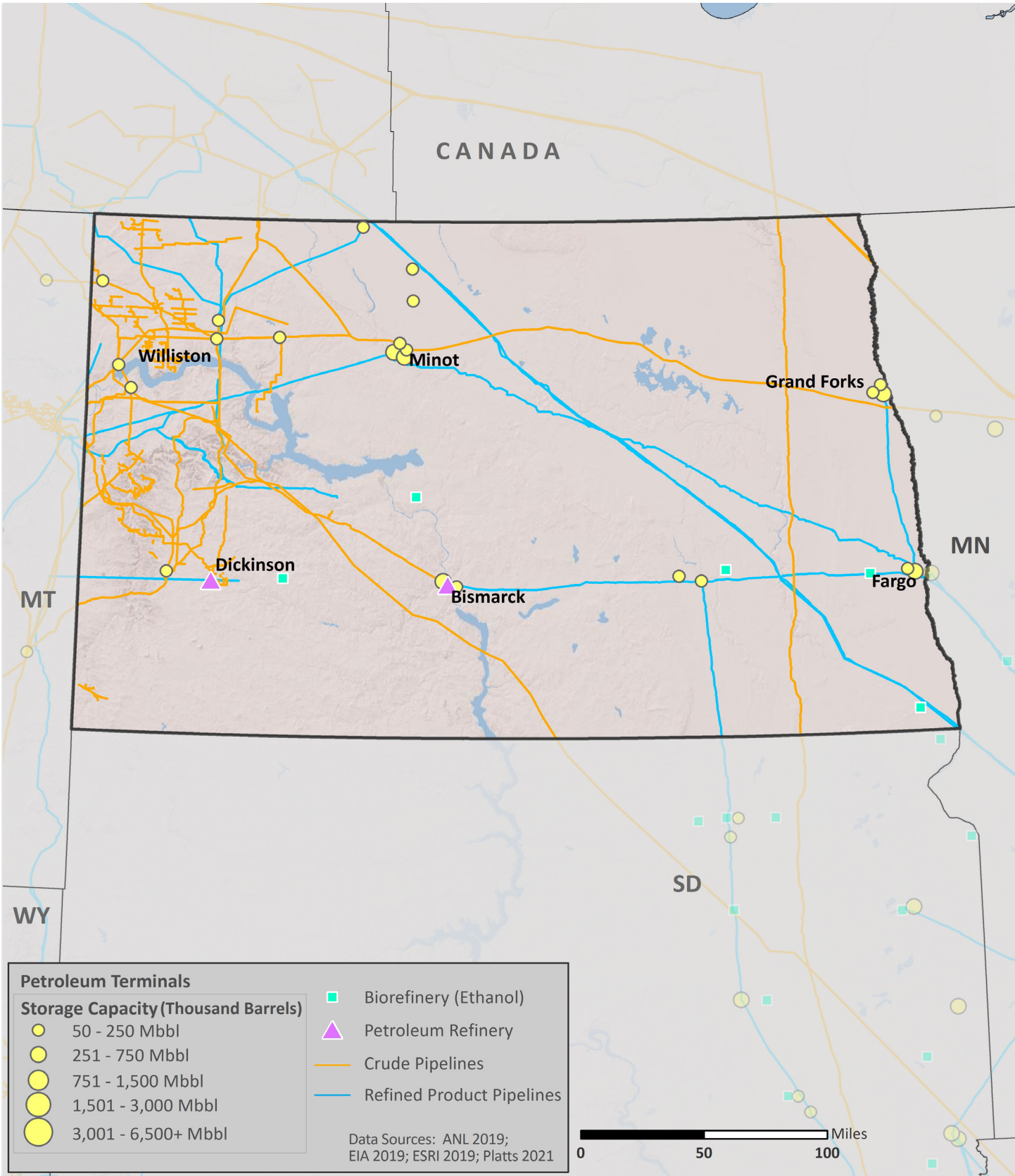
Data Source: EIA

- North Dakota has 19 natural gas processing facilities with a total capacity of 1,503 MMcf/d.
- North Dakota has 0 liquefied natural gas (LNG) facilities with a total storage capacity of 0 barrels.



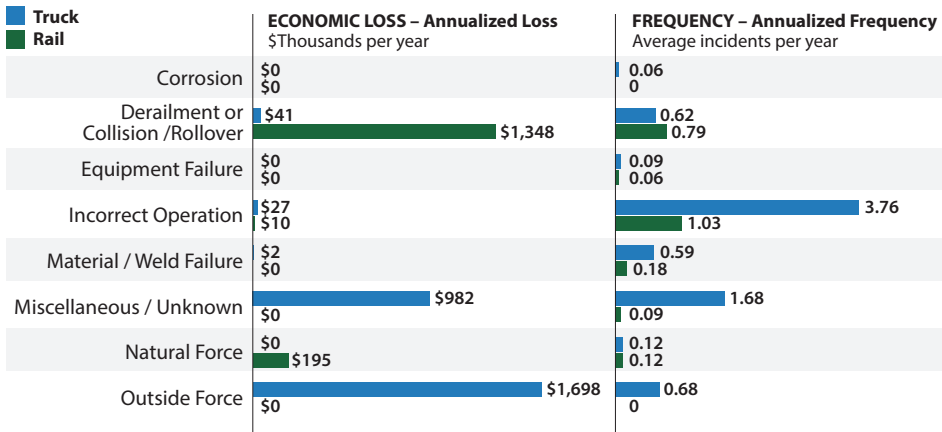


PETROLEUM



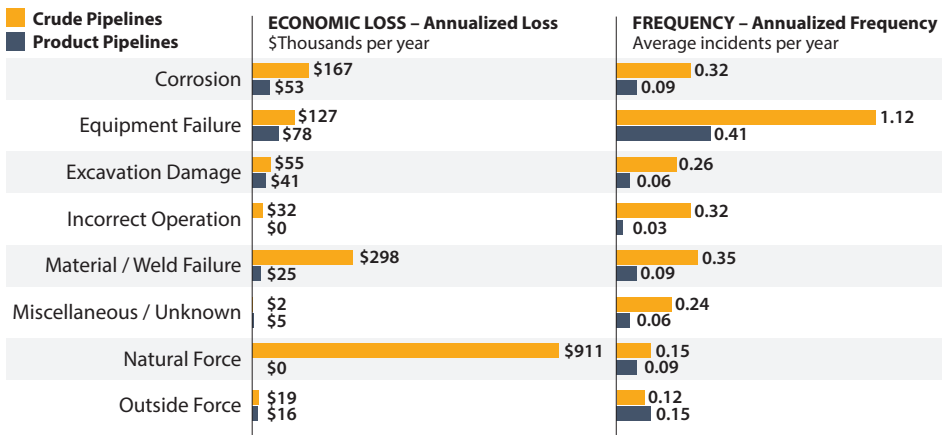
Petroleum Transport

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



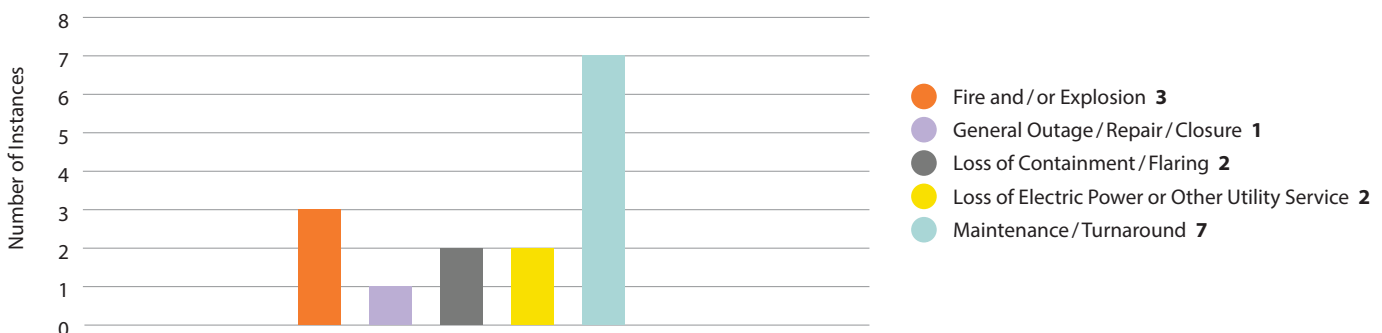
Data Source: DOT PHMSA

- As of 2018, North Dakota had:
 - 3,828 miles of crude oil pipelines
 - 781 miles of refined product pipelines
 - 0 miles of biofuels pipelines
- 26% of North Dakota’s petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, North Dakota’s petroleum supply was most impacted by:
 - **Outside Forces** events when transported by truck (2nd leading cause nationwide at \$60.45M 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)
 - **Equipment Failures** when transported by product pipelines (6th leading cause nationwide at \$4.66M per year)
- Disruptions in other states may impact supply.

Petroleum Refineries

- North Dakota has 2 petroleum refineries with a total operable capacity of 90 Mb/d.
- Between 2009 and 2019, the leading cause of petroleum refinery disruptions in North Dakota was:
 - **Maintenance** (2nd leading cause nationwide)

Causes and Frequency of Petroleum Refinery Disruptions, 2009 – 2019



Data Source: Hydrocarbon Publishing