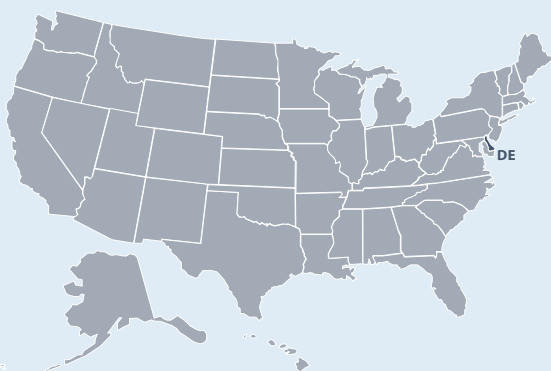




State of Delaware ENERGY SECTOR RISK PROFILE



Delaware State Facts



POPULATION

0.97 M



HOUSING UNITS

0.44 M



BUSINESS ESTABLISHMENTS

0.03 M

ENERGY EMPLOYMENT: 6,785 jobs

PUBLIC UTILITY COMMISSION: Delaware Public Service Commission

STATE ENERGY OFFICE: Delaware Division of Climate, Coastal and Energy

EMERGENCY MANAGEMENT AGENCY: Delaware Emergency Management Agency

AVERAGE ELECTRICITY TARIFF: 10.55 cents/kWh

ENERGY EXPENDITURES: \$3,485/capita

ENERGY CONSUMPTION PER CAPITA: 282 MMBtu (29th highest out of 50 states and Washington, D.C.)

GDP: \$73.5 billion

Data from 2020 or most recent year available.

For more information, see the Data Sources document.

ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 16,100 GWh

COAL: 200 MSTN

NATURAL GAS: 89 Bcf

MOTOR GASOLINE: 10,800 Mbbl

DISTILLATE FUEL: 2,700 Mbbl

ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 33 plants, 5.3 TWh, 3.2 GW total capacity

Coal: 1 plant, 0.1 TWh, 0.4 GW total capacity

Hydro: 0 plants

Natural Gas: 10 plants, 4.8 TWh, 2.8 GW total capacity

Nuclear: 0 plants

Petroleum: 6 plants, 0.0 TWh, 0.2 GW total capacity

Wind & Solar: 12 plants, 0.1 TWh, 0.0 GW total capacity

Other sources: 4 plants, 0.3 TWh, 0.2 GW total capacity

COAL: 0 MSTN

NATURAL GAS: 0 Bcf

CRUDE OIL: 0 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 Delaware’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.

Delaware Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Flooding** at \$5 million per year (leading cause nationwide at \$12 billion per year).
- Delaware had 1 Major Disaster Declaration, 0 Emergency Declarations, and 0 Fire Management Assistance Declarations between 2013 and 2019.
- Delaware registered 16% fewer Heating Degree Days and 52% greater Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Dover.

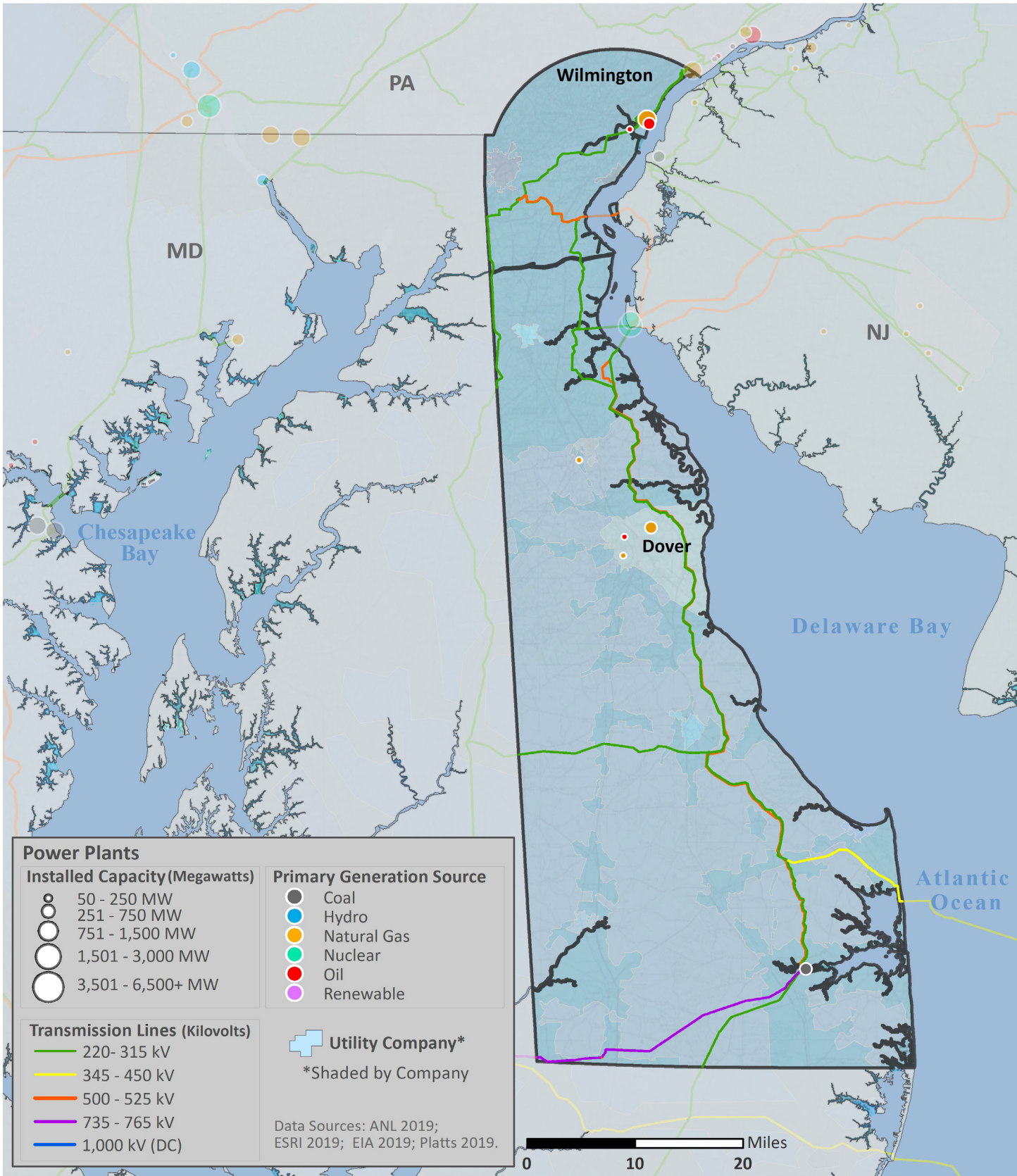
Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	1	\$0
Earthquake (≥ 3.5 M)	<1	\$0
Extreme Heat	2	\$0
Flood	11	\$5
Hurricane	<1	\$0
Landslide	0	\$0
Thunderstorm & Lightning	24	\$1
Tornado	2	\$0
Wildfire	<1	\$0
Winter Storm & Extreme Cold	11	\$1

Data Sources: NOAA and USGS









ELECTRIC



Electric Infrastructure

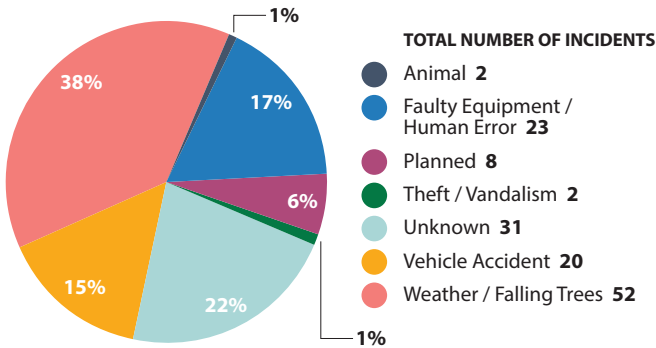
- Delaware has 11 electric utilities:
 - 1 Investor owned
 - 1 Cooperative
 - 9 Municipal
 - 0 Other utilities
- Plant retirements scheduled by 2025: None.
- In 2018, the average Delaware electric customer experienced 1 service interruption that lasted an average of 2.3 hours.
- In Delaware, between 2008 and 2017:
 - The greatest number of electric outages occurred in **September** (8th for outages nationwide)
 - The leading cause of electric outages was **Weather or Falling Trees** (leading cause nationwide)
 - Electric outages affected 54,540 customers on average

Electric Customers and Consumption by Sector, 2018

	 CUSTOMERS	 CONSUMPTION
Residential 	89%	43%
Commercial 	11%	37%
Industrial 	<1%	20%
Transportation 	<1%	<1%

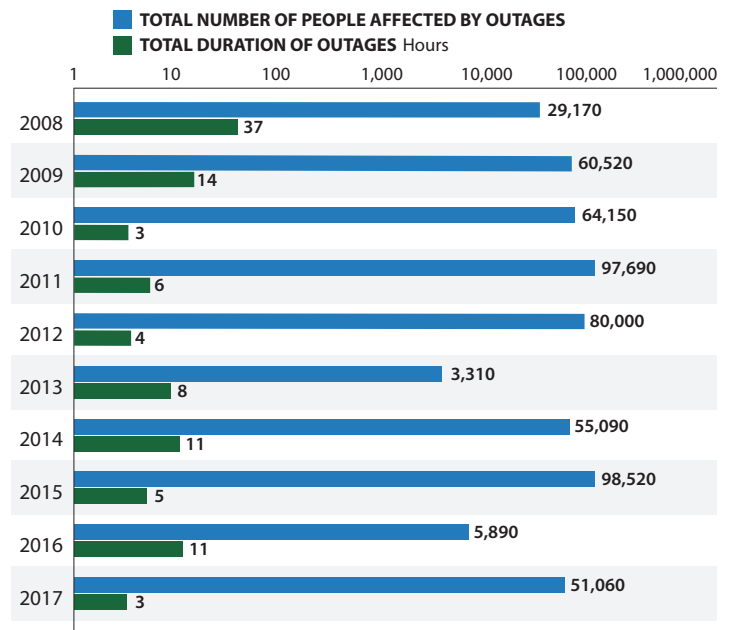
Data Source: EIA

Electric Utility-Reported Outages by Cause, 2008 – 2017



Data Source: Eaton

Electric Utility Outage Data, 2008 – 2017

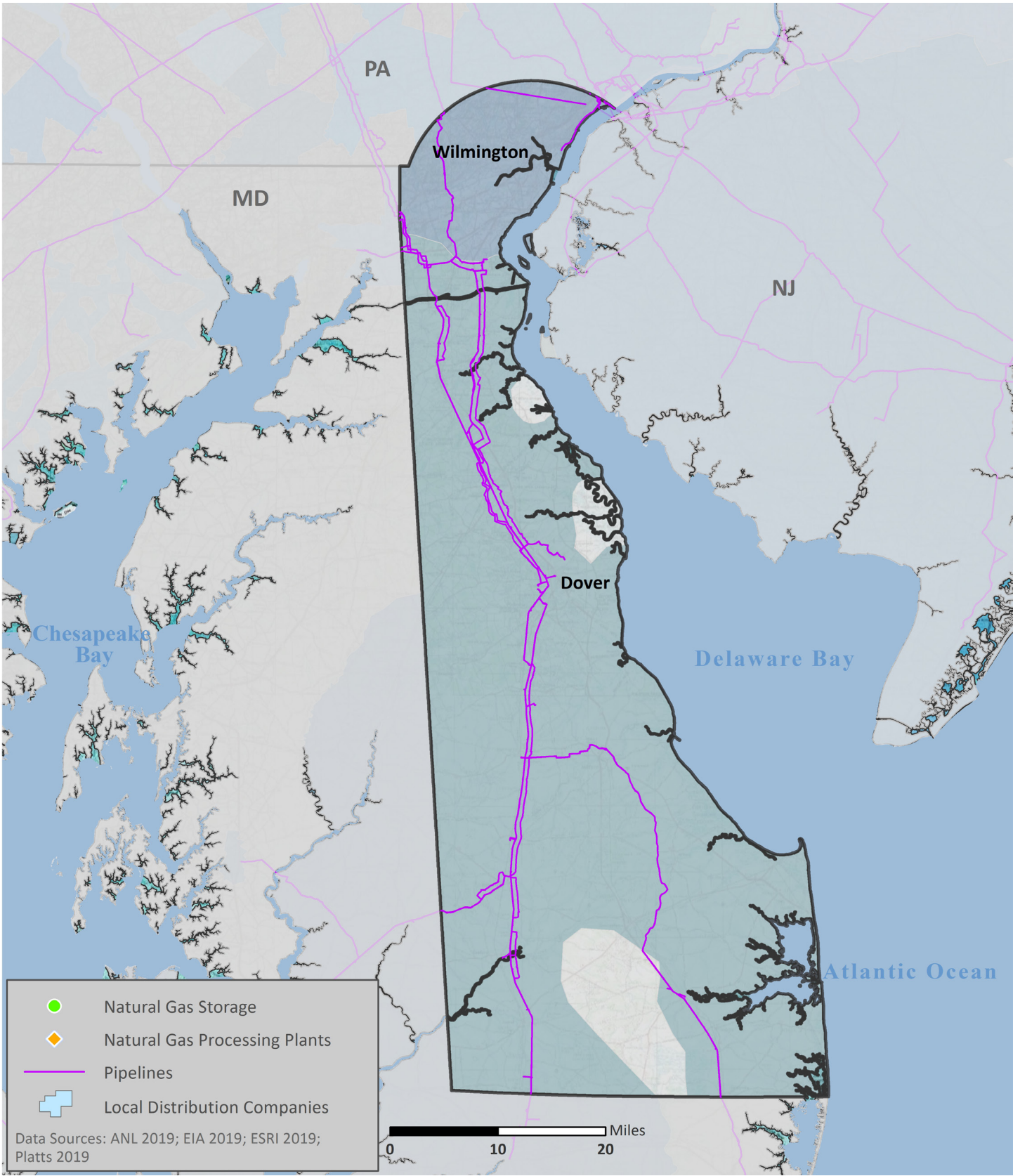


Note: This chart uses a logarithmic scale to display a very wide range of values.
Data Source: Eaton





NATURAL GAS



Natural Gas Transport

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

	ECONOMIC LOSS – Annualized Loss \$Thousands per year	FREQUENCY – Annualized Frequency Average incidents per year
Corrosion	\$0	0
Equipment Failure	\$0	0
Excavation Damage	\$0	0
Incorrect Operation	\$0	0
Material / Weld Failure	\$0	0
Miscellaneous / Unknown	\$15	0.06
Natural Force	\$3	0.03
Outside Force	\$121	0.31

Data Source: DOT PHMSA

- As of 2018, Delaware had:
 - 367 miles of natural gas transmission pipelines
 - 3,297 miles of natural gas distribution pipelines
- 34% of Delaware’s natural gas transmission system and 19% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Delaware’s natural gas supply was most impacted by:
 - **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	92%	12%
Commercial	7%	16%
Industrial	<1%	31%
Transportation	<1%	<1%
Electric Power	<1%	41%
Other	<1%	<1%

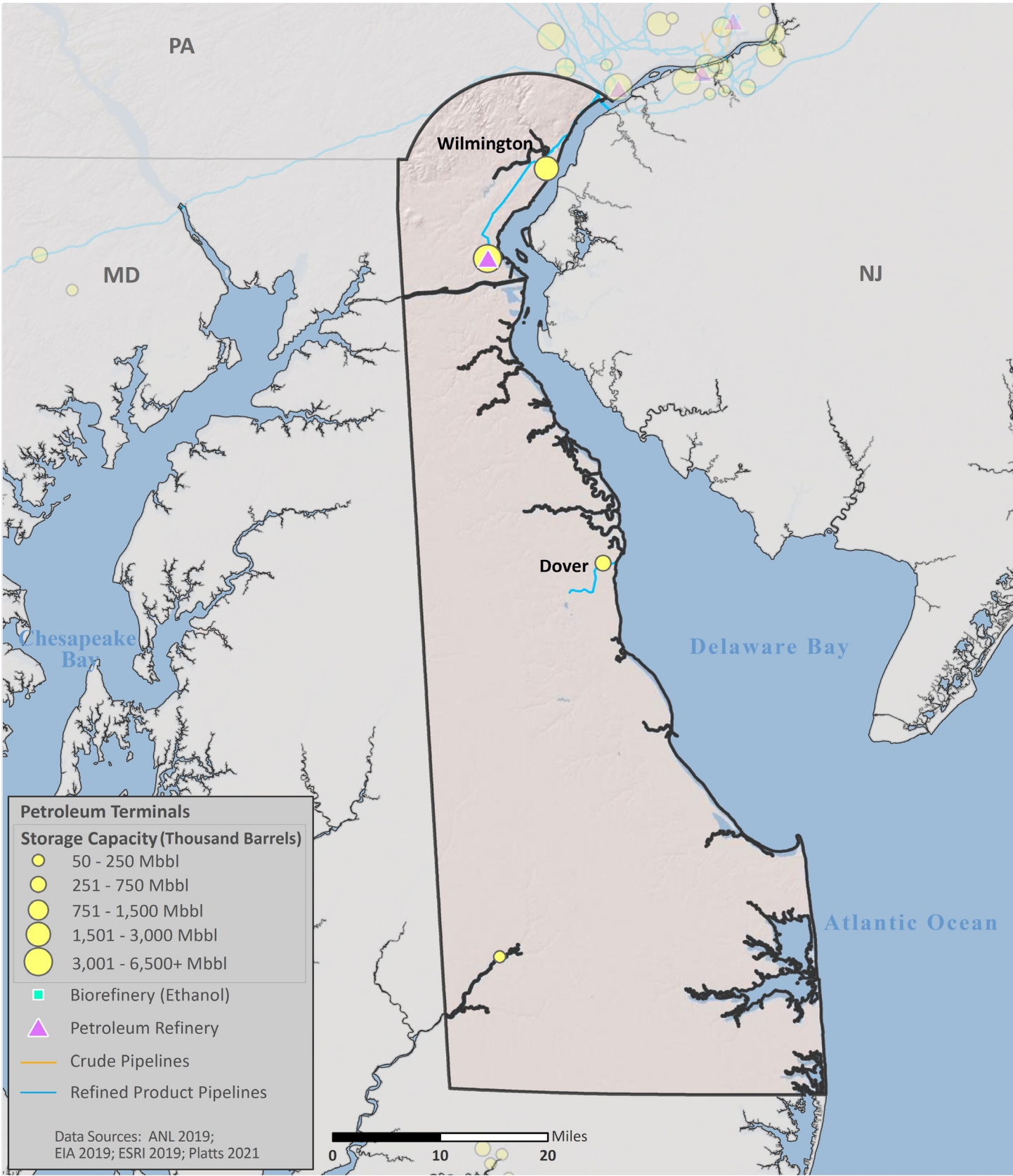
Data Source: EIA

- Delaware has 0 natural gas processing facilities.
- Delaware has 1 liquefied natural gas (LNG) facility with a total storage capacity of 72,500 barrels.





PETROLEUM



Petroleum Transport

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

	ECONOMIC LOSS – Annualized Loss \$Thousands per year	FREQUENCY – Annualized Frequency Average incidents per year
Corrosion	\$0	0
Derailment or Collision / Rollover	\$16	0.18
Equipment Failure	\$0	0
Incorrect Operation	\$1	0.97
Material / Weld Failure	\$1	0.18
Miscellaneous / Unknown	\$4	1.15
Natural Force	\$0	0
Outside Force	\$9	0.24

Data Source: DOT PHMSA

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

	ECONOMIC LOSS – Annualized Loss \$Thousands per year	FREQUENCY – Annualized Frequency Average incidents per year
Corrosion	\$0	0
Equipment Failure	\$0	0.03
Excavation Damage	\$24	0.03
Incorrect Operation	\$0	0
Material / Weld Failure	\$1	0.06
Miscellaneous / Unknown	\$0	0
Natural Force	\$0	0
Outside Force	\$0	0

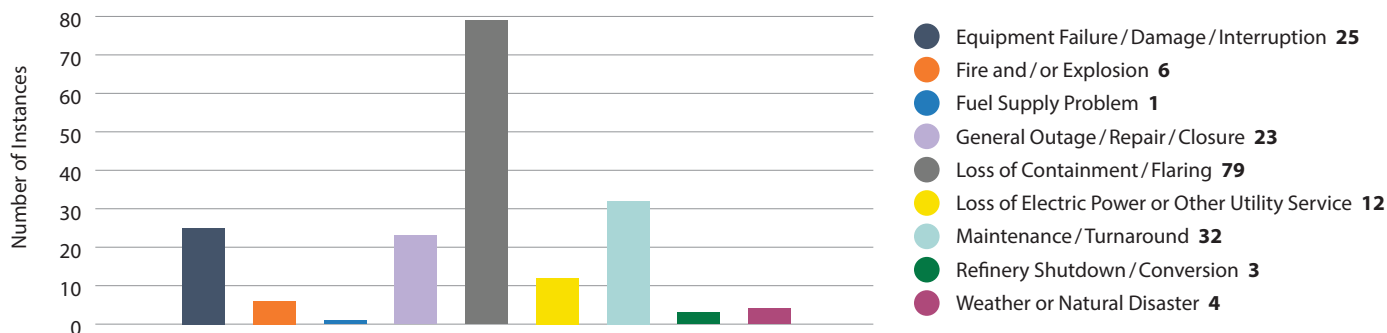
Data Source: DOT PHMSA

- As of 2018, Delaware had:
 - 0 miles of crude oil pipelines
 - 41 miles of refined product pipelines
 - 0 miles of biofuels pipelines
- 41% of Delaware’s petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Delaware’s petroleum supply was most impacted by:
 - **Derailments, Collisions, or Rollovers** when transported by truck (8th leading cause nationwide at \$0.07M per year)
 - **Excavation Damage** when transported by product pipelines (5th leading cause nationwide at \$5.74M per year)
- Disruptions in other states may impact supply.

Petroleum Refineries

- Delaware has 1 petroleum refinery with a total operable capacity of 182.2 Mb/d.
- Between 2009 and 2019, the leading cause of petroleum refinery disruptions in Delaware was:
 - **Loss of Containment or Flaring** (leading cause nationwide)

Causes and Frequency of Petroleum Refinery Disruptions, 2009 – 2019



Data Source: Hydrocarbon Publishing