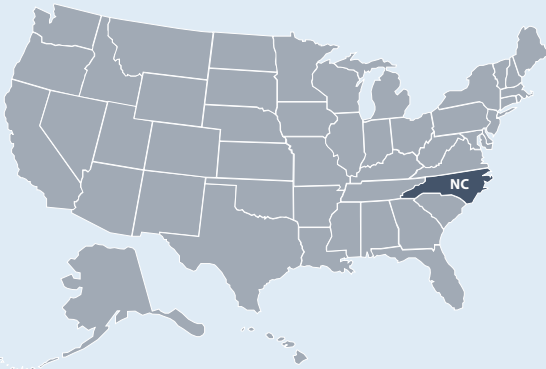




# State of North Carolina ENERGY SECTOR RISK PROFILE



## North Carolina State Facts



POPULATION

10.38 M



HOUSING UNITS

4.68 M



BUSINESS ESTABLISHMENTS

0.23 M

ENERGY EMPLOYMENT: 55,929 jobs

PUBLIC UTILITY COMMISSION: North Carolina Utilities Commission

STATE ENERGY OFFICE: North Carolina Department of Environmental Quality, Division of Energy, Mineral, and Land Resources

EMERGENCY MANAGEMENT AGENCY: North Carolina Department of Public Safety, Division of Emergency Management

AVERAGE ELECTRICITY TARIFF: 9.25 cents/kWh

ENERGY EXPENDITURES: \$2,992/capita

ENERGY CONSUMPTION PER CAPITA: 244 MMBtu (37th highest out of 50 states and Washington, D.C.)

GDP: \$563.7 billion

Data from 2020 or most recent year available.

For more information, see the Data Sources document.

## ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 138,290 GWh

COAL: 13,100 MSTN

NATURAL GAS: 554 Bcf

MOTOR GASOLINE: 105,300 Mbbl

DISTILLATE FUEL: 34,100 Mbbl

## ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 747 plants, 131.2 TWh, 38.0 GW total capacity

Coal: 9 plants, 30.7 TWh, 11.1 GW total capacity

Hydro: 41 plants, 6.2 TWh, 1.9 GW total capacity

Natural Gas: 20 plants, 41.1 TWh, 13.6 GW total capacity

Nuclear: 3 plants, 41.9 TWh, 5.4 GW total capacity

Petroleum: 47 plants, 0.2 TWh, 0.6 GW total capacity

Wind & Solar: 591 plants, 8.0 TWh, 4.7 GW total capacity

Other sources: 36 plants, 3.1 TWh, 0.8 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 North Carolina'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 Carolina Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Hurricanes** at \$186 million per year (5th leading cause nationwide at \$1.9 billion per year).
- North Carolina had 183 Major Disaster Declarations, 268 Emergency Declarations, and 4 Fire Management Assistance Declarations for 14 events between 2013 and 2019.
- North Carolina registered 18% fewer Heating Degree Days and 34% greater Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Raleigh.

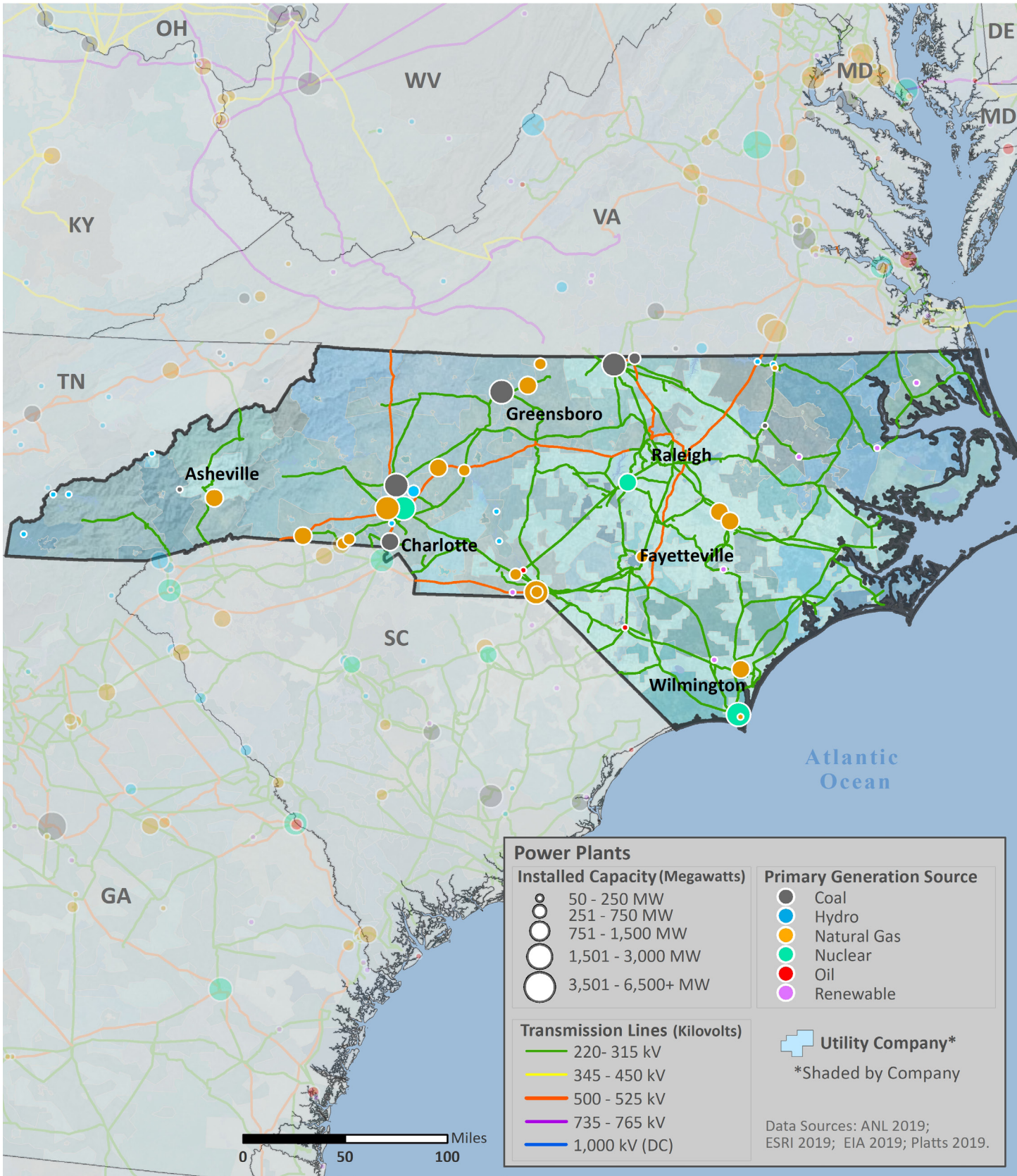
## Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	1	\$0
Earthquake (≥ 3.5 M)	0	\$0
Extreme Heat	1	\$0
Flood	55	\$124
Hurricane	3	\$186
Landslide	2	\$1
Thunderstorm & Lightning	203	\$24
Tornado	16	\$62
Wildfire	1	\$0
Winter Storm & Extreme Cold	41	\$3

Data Sources: NOAA and USGS



# ELECTRIC









## Electric Infrastructure

- North Carolina has 117 electric utilities:
  - 3 Investor owned
  - 27 Cooperative
  - 70 Municipal
  - 17 Other utilities
- Plant retirements scheduled by 2025: 8 electric generating units totaling 1,134 MW of installed capacity.

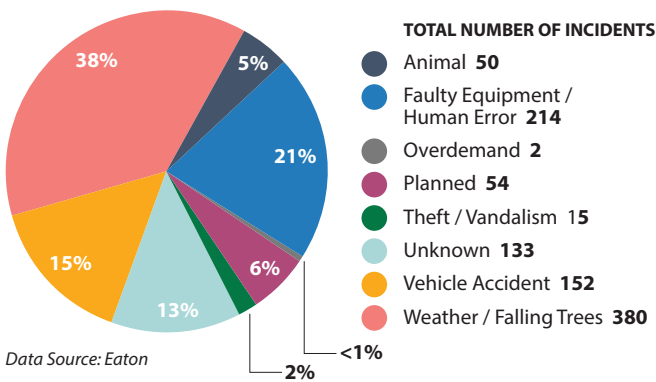
- In 2018, the average North Carolina electric customer experienced 2.1 service interruptions that lasted an average of 29.4 hours.
- In North Carolina, between 2008 and 2017:
  - The greatest number of electric outages occurred in **July** (leading month for outages nationwide)
  - The leading cause of electric outages was **Weather or Falling Trees** (leading cause nationwide)
  - Electric outages affected 684,562 customers on average

### Electric Customers and Consumption by Sector, 2018

	 CUSTOMERS	 CONSUMPTION
Residential 	87%	44%
Commercial 	13%	36%
Industrial 	<1%	20%
Transportation 	<1%	<1%

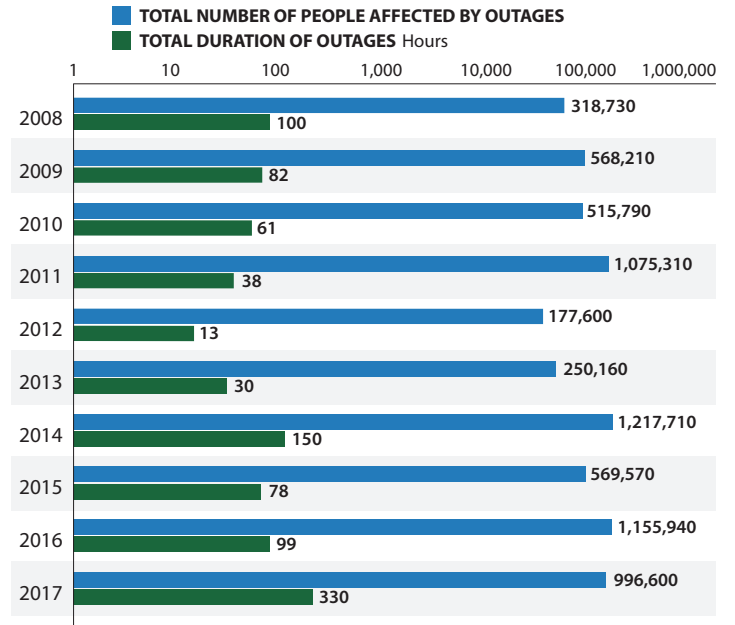
Data Source: EIA

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



Data Source: Eaton

### Electric Utility Outage Data, 2008 – 2017



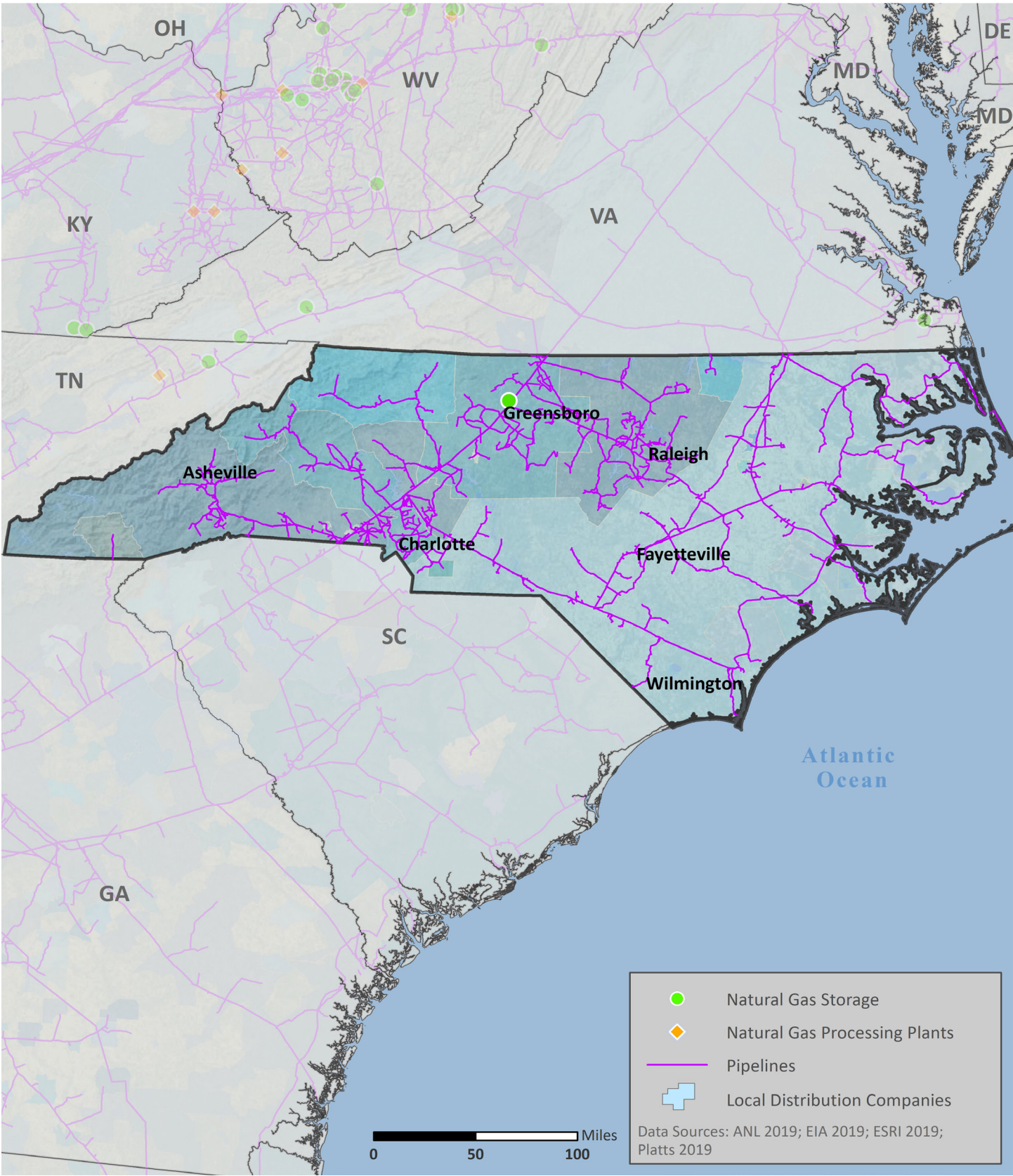
Note: This chart uses a logarithmic scale to display a very wide range of values.

Data Source: Eaton



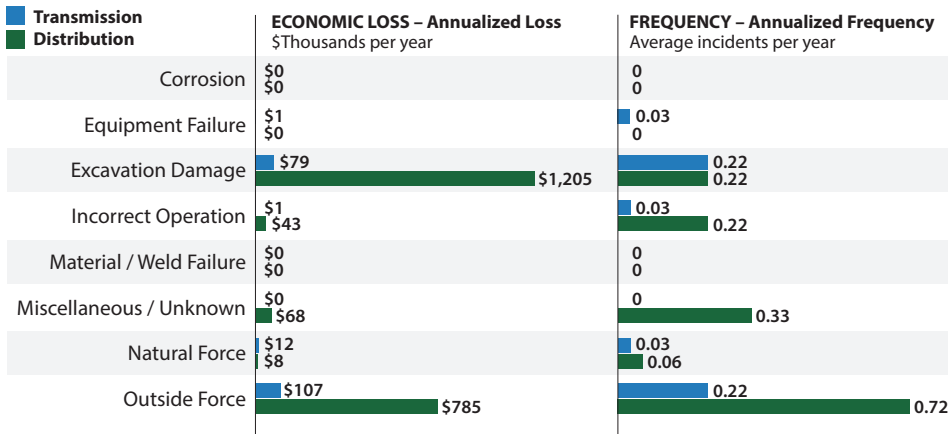


# NATURAL GAS



## Natural Gas Transport

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

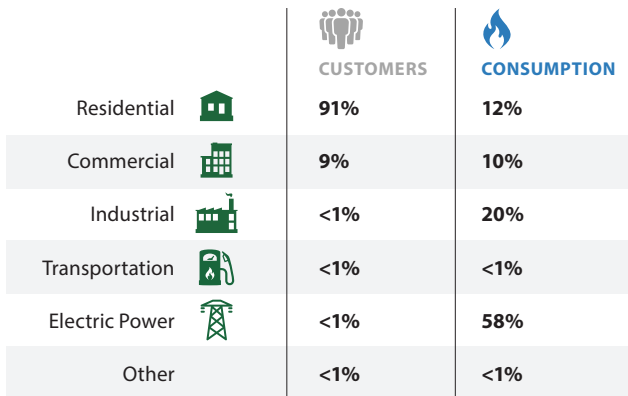


Data Source: DOT PHMSA

- As of 2018, North Carolina had:
  - 4,188 miles of natural gas transmission pipelines
  - 31,801 miles of natural gas distribution pipelines
- 33% of North Carolina’s natural gas transmission system and 22% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, North Carolina’s natural gas supply was most impacted by:
  - **Outside Forces** when transported by transmission pipelines (3rd leading cause nationwide at \$20.65M 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



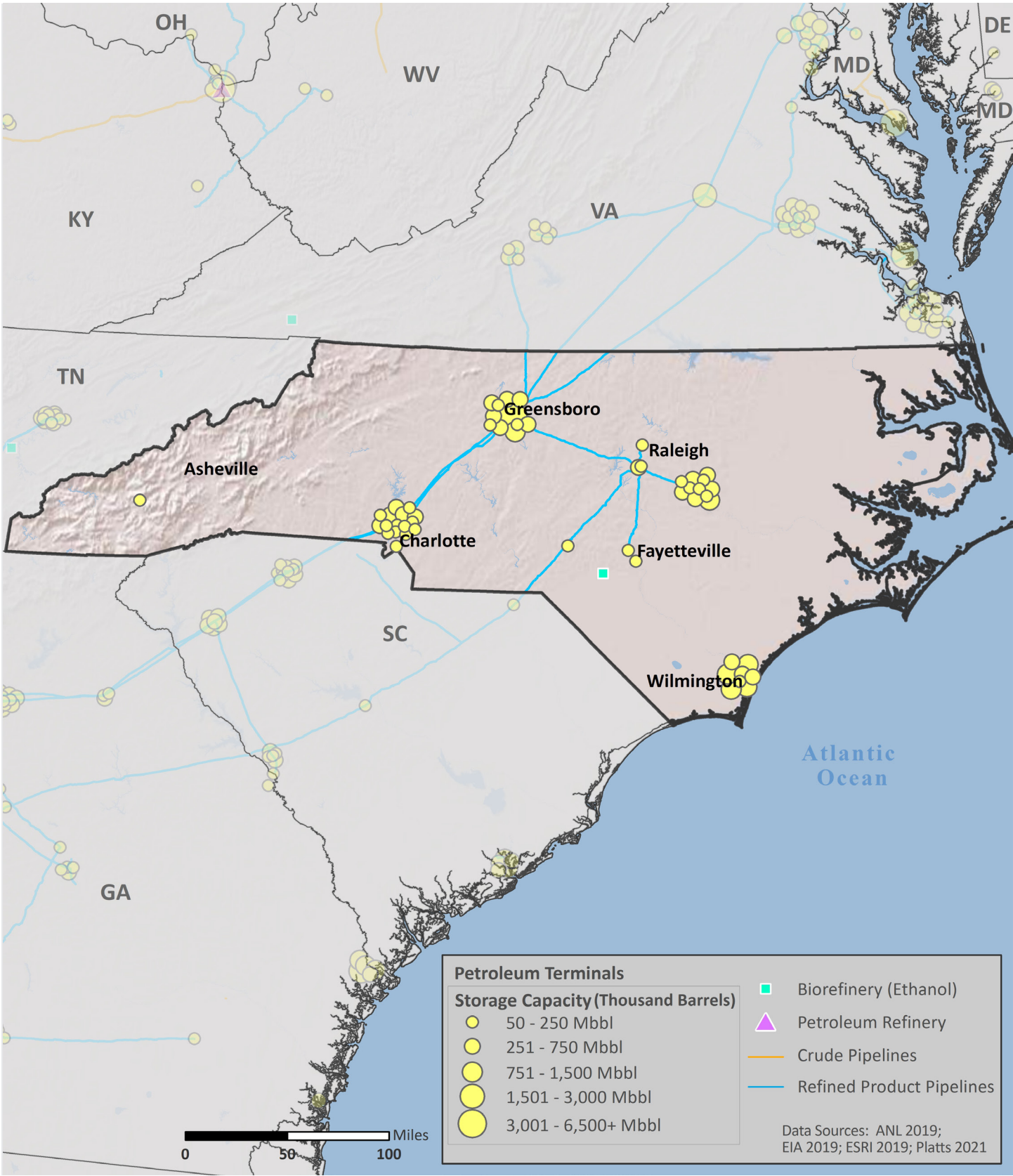
Data Source: EIA

- North Carolina has 0 natural gas processing facilities.
- North Carolina has 6 liquefied natural gas (LNG) facilities with a total storage capacity of 2,038,755 barrels.



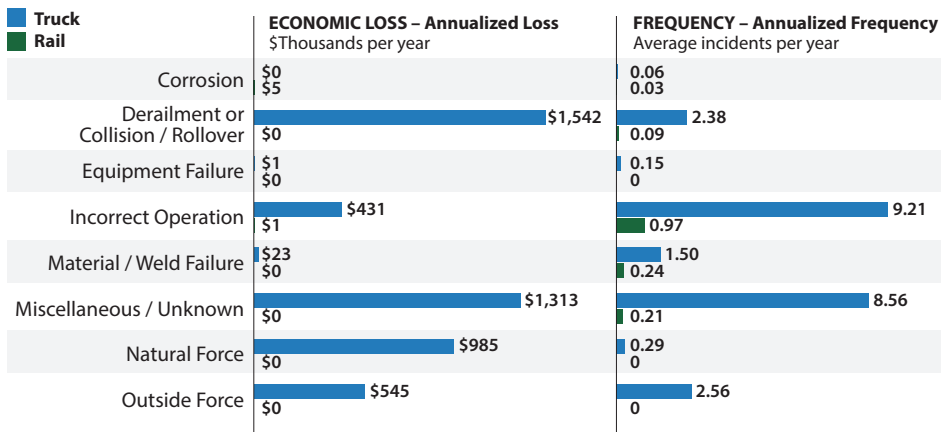


# PETROLEUM



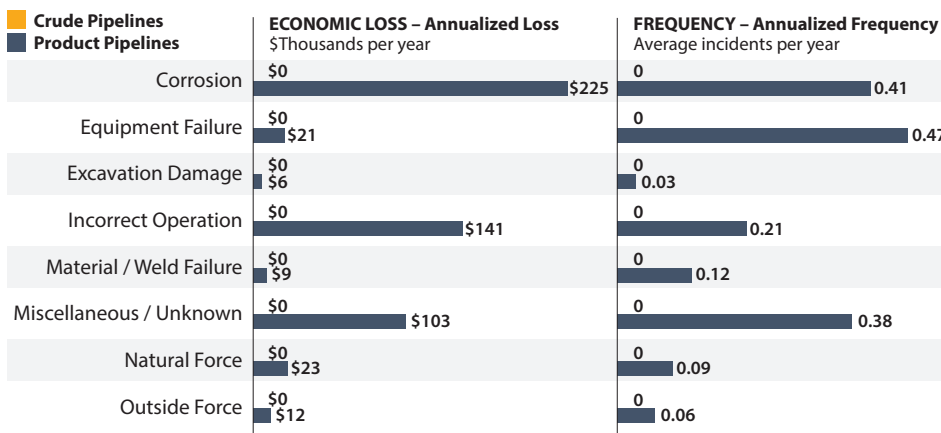
## Petroleum Transport

### 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 Carolina had:
  - 0 miles of crude oil pipelines
  - 1,065 miles of refined product pipelines
  - 0 miles of biofuels pipelines
- 57% of North Carolina’s petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, North Carolina’s petroleum supply was most impacted by:
  - **Derailments, Collisions, or Rollovers** when transported by truck (8th leading cause nationwide at \$0.07M per year)
  - **Corrosion** when transported by rail (8th leading cause nationwide at \$0.01M per year)
  - **Corrosion** when transported by product pipelines (2nd leading cause nationwide at \$15.2M per year)
- Disruptions in other states may impact supply.

## Petroleum Refineries

- There are no operating petroleum refineries in North Carolina.

