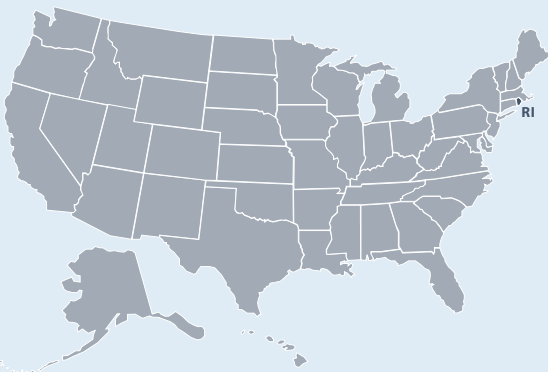




State of Rhode Island ENERGY SECTOR RISK PROFILE



Rhode Island State Facts



POPULATION

1.06 M



HOUSING UNITS

0.47 M



BUSINESS ESTABLISHMENTS

0.03 M

ENERGY EMPLOYMENT: 5,686 jobs

PUBLIC UTILITY COMMISSION: Rhode Island Public Utilities Commission

STATE ENERGY OFFICE: Rhode Island Office of Energy Resources

EMERGENCY MANAGEMENT AGENCY: Rhode Island Emergency Management Agency

AVERAGE ELECTRICITY TARIFF: 18.10 cents/kWh

ENERGY EXPENDITURES: \$3,057/capita

ENERGY CONSUMPTION PER CAPITA: 174 MMBtu (51st highest out of 50 states and Washington, D.C.)

GDP: \$60.6 billion

Data from 2020 or most recent year available.

For more information, see the Data Sources document.

ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 11,060 GWh

COAL: 0 MSTN

NATURAL GAS: 97 Bcf

MOTOR GASOLINE: 15,400 Mbbl

DISTILLATE FUEL: 6,200 Mbbl

ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 53 plants, 7.6 TWh, 2.2 GW total capacity

Coal: 0 plants

Hydro: 2 plants, 0.0 TWh, 0.0 GW total capacity

Natural Gas: 9 plants, 7.1 TWh, 2.0 GW total capacity

Nuclear: 0 plants

Petroleum: 1 plant, 0.0 TWh, 0.0 GW total capacity

Wind & Solar: 38 plants, 0.3 TWh, 0.2 GW total capacity

Other sources: 3 plants, 0.2 TWh, 0.0 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 Rhode Island’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.

Rhode Island Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Flooding** at \$11 million per year (leading cause nationwide at \$12 billion per year).
- Rhode Island had 10 Major Disaster Declarations, 0 Emergency Declarations, and 0 Fire Management Assistance Declarations for 2 events between 2013 and 2019.
- Rhode Island registered 11% fewer Heating Degree Days and 59% greater Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Providence.

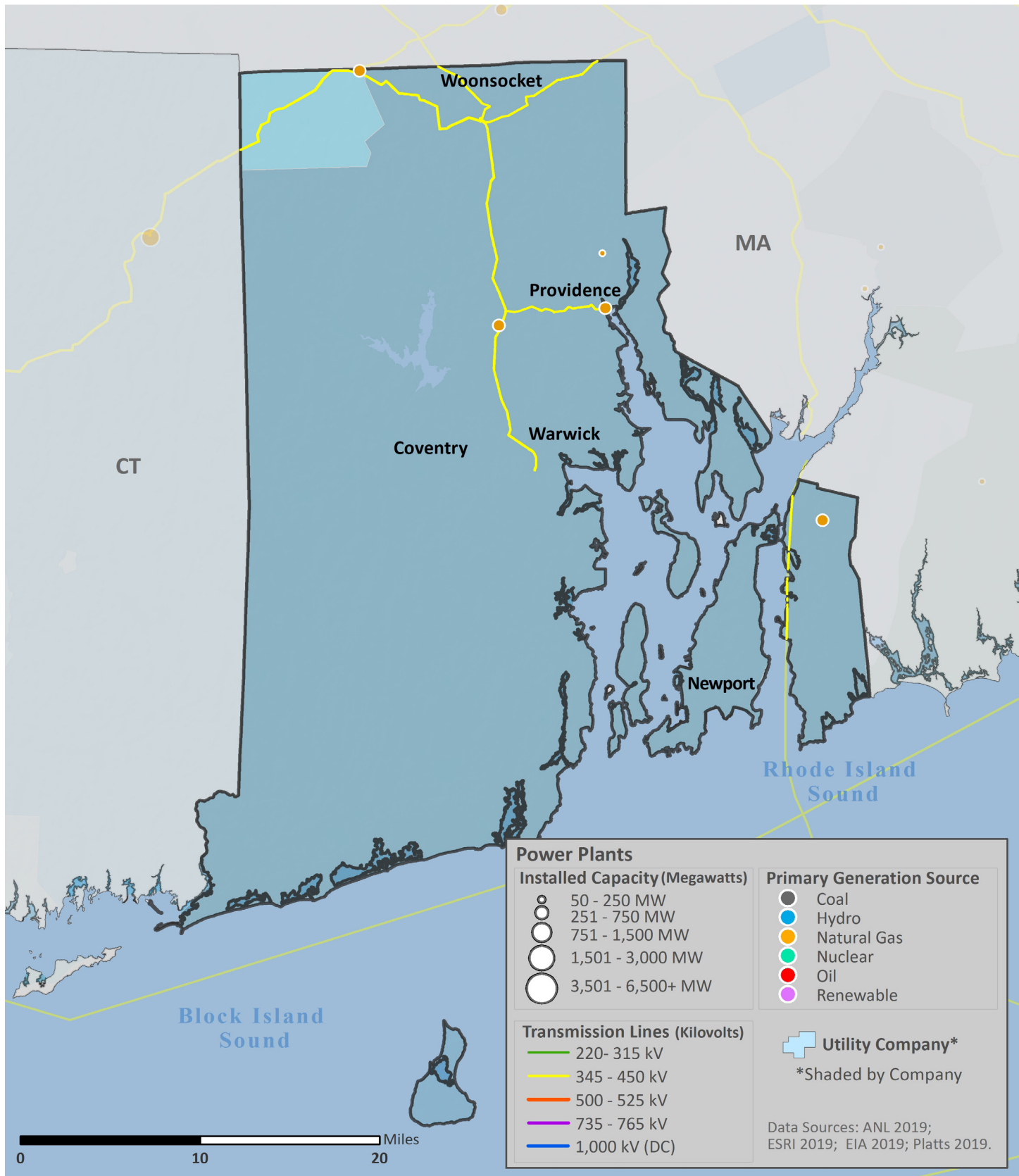
Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	1	\$0
Earthquake (≥ 3.5 M)	0	\$0
Extreme Heat	<1	\$0
Flood	5	\$11
Hurricane	<1	\$0
Landslide	0	\$0
Thunderstorm & Lightning	12	\$0
Tornado	<1	\$0
Wildfire	0	\$0
Winter Storm & Extreme Cold	6	\$0

Data Sources: NOAA and USGS



ELECTRIC









Electric Infrastructure

- Rhode Island has 4 electric utilities:
 - 1 Investor owned
 - 0 Cooperative
 - 1 Municipal
 - 2 Other utilities
- Plant retirements scheduled by 2025: None.

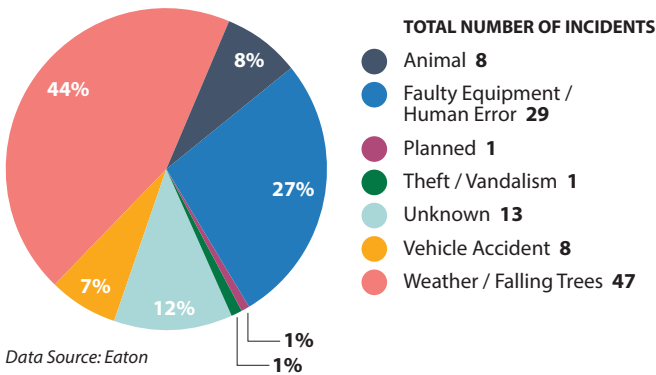
- In 2018, the average Rhode Island electric customer experienced 1.6 service interruptions that lasted an average of 9.9 hours.
- In Rhode Island, between 2008 and 2017:
 - The greatest number of electric outages occurred in **January** (6th for outages nationwide)
 - The leading cause of electric outages was **Weather or Falling Trees** (leading cause nationwide)
 - Electric outages affected 142,485 customers on average

Electric Customers and Consumption by Sector, 2018

	 CUSTOMERS	 CONSUMPTION
Residential 	88%	41%
Commercial 	12%	49%
Industrial 	<1%	10%
Transportation 	<1%	<1%

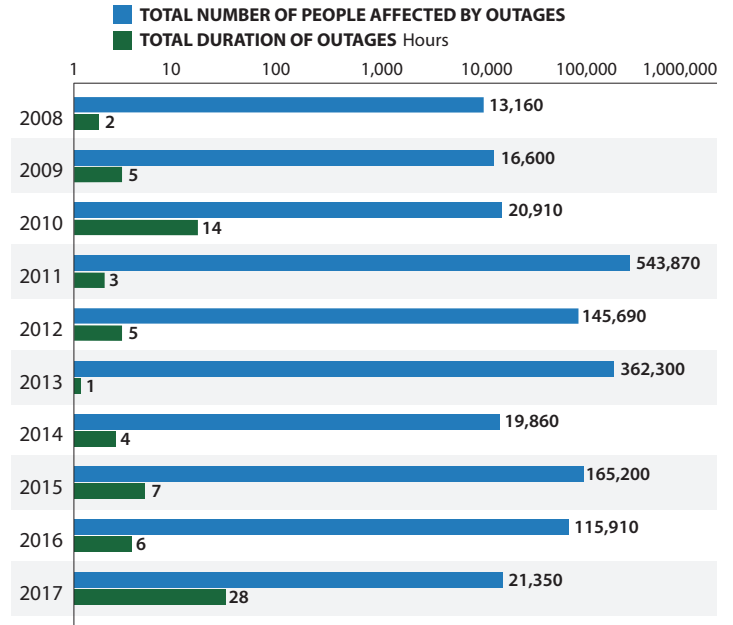
Data Source: EIA

Electric Utility-Reported Outages by Cause, 2008 – 2017



Data Source: Eaton

Electric Utility Outage Data, 2008 – 2017

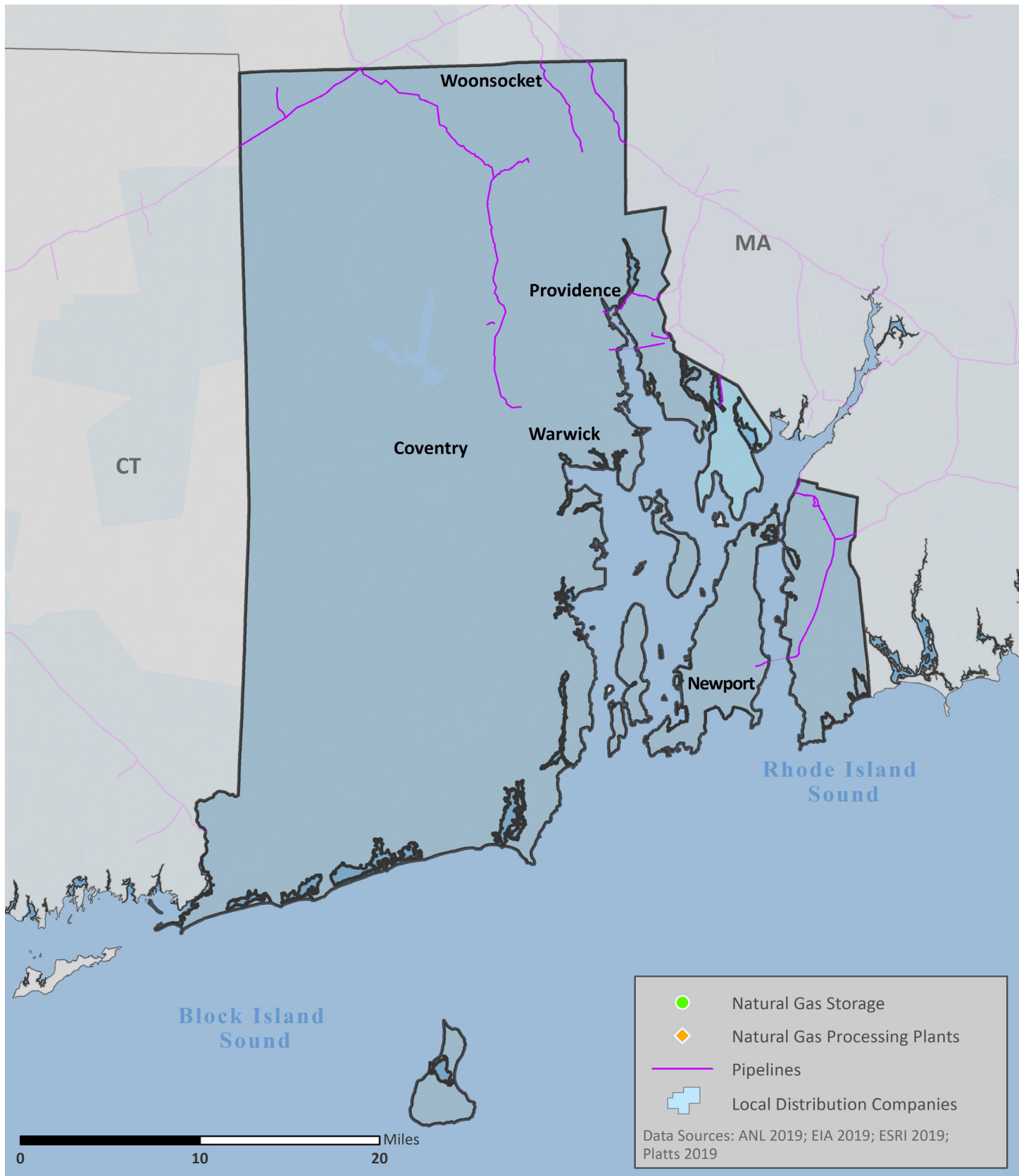


Note: This chart uses a logarithmic scale to display a very wide range of values.
Data Source: Eaton



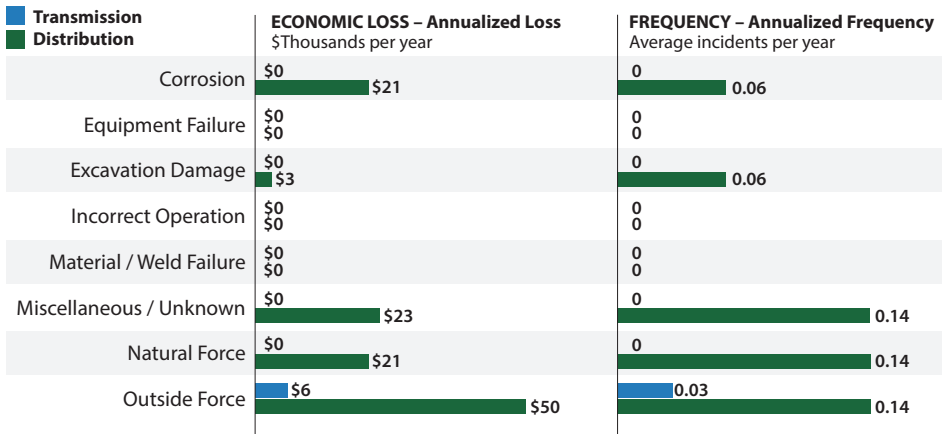


NATURAL GAS



Natural Gas Transport

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








Data Source: DOT PHMSA

- As of 2018, Rhode Island had:
 - 95 miles of natural gas transmission pipelines
 - 3,201 miles of natural gas distribution pipelines
- 52% of Rhode Island’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, Rhode Island’s natural gas supply was most impacted by:
 - **Outside Forces** when transported by transmission pipelines (3rd leading cause nationwide at \$20.65M 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 	91%	24%
Commercial 	9%	15%
Industrial 	<1%	10%
Transportation 	<1%	<1%
Electric Power 	<1%	51%
Other	<1%	<1%

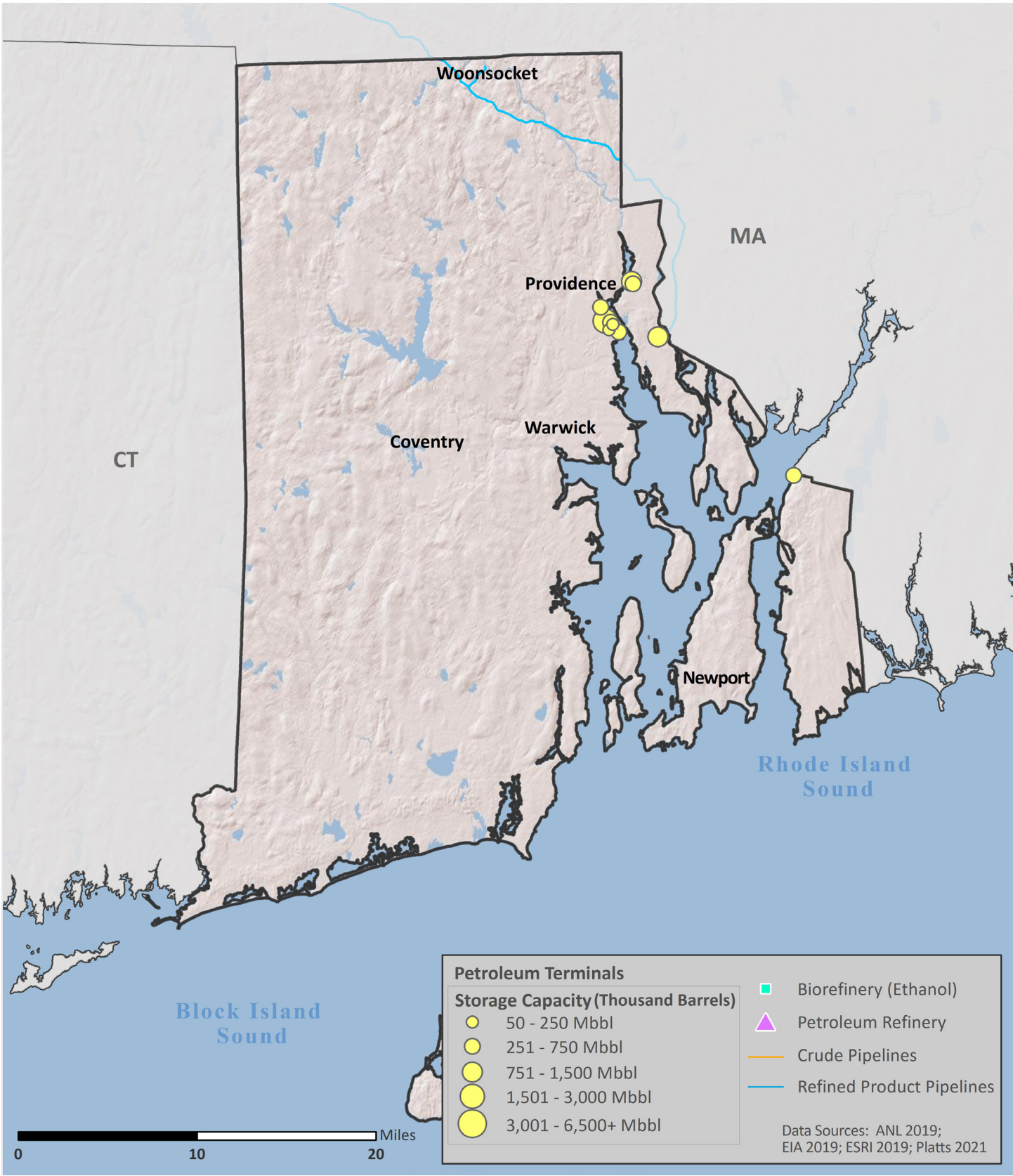
Data Source: EIA

- Rhode Island has 0 natural gas processing facilities.
- Rhode Island has 3 liquefied natural gas (LNG) facilities with a total storage capacity of 655,000 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	\$49	0.12
Equipment Failure	\$0	0
Incorrect Operation	\$2	0.76
Material / Weld Failure	\$0	0.18
Miscellaneous / Unknown	\$5	0.15
Natural Force	\$0	0
Outside Force	\$0	0.21

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
Excavation Damage	\$0	0
Incorrect Operation	\$0	0
Material / Weld Failure	\$0	0
Miscellaneous / Unknown	\$4	0.03
Natural Force	\$0	0
Outside Force	\$0	0

Data Source: DOT PHMSA

- As of 2018, Rhode Island had:
 - 0 miles of crude oil pipelines
 - 13 miles of refined product pipelines
 - 0 miles of biofuels pipelines
- 0% of Rhode Island’s petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Rhode Island’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 product pipelines (3rd leading cause nationwide at \$11.97M per year)
- Disruptions in other states may impact supply.

Petroleum Refineries

- There are no operating petroleum refineries in Rhode Island.

