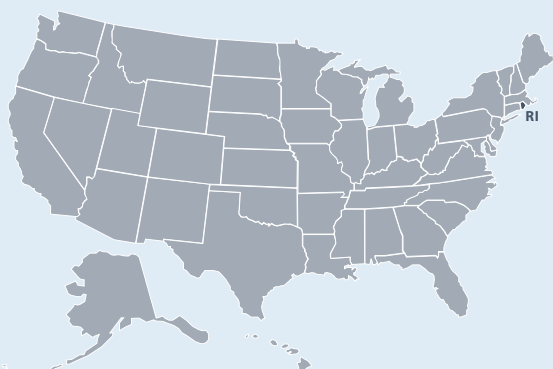




# State of Rhode Island

## 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.

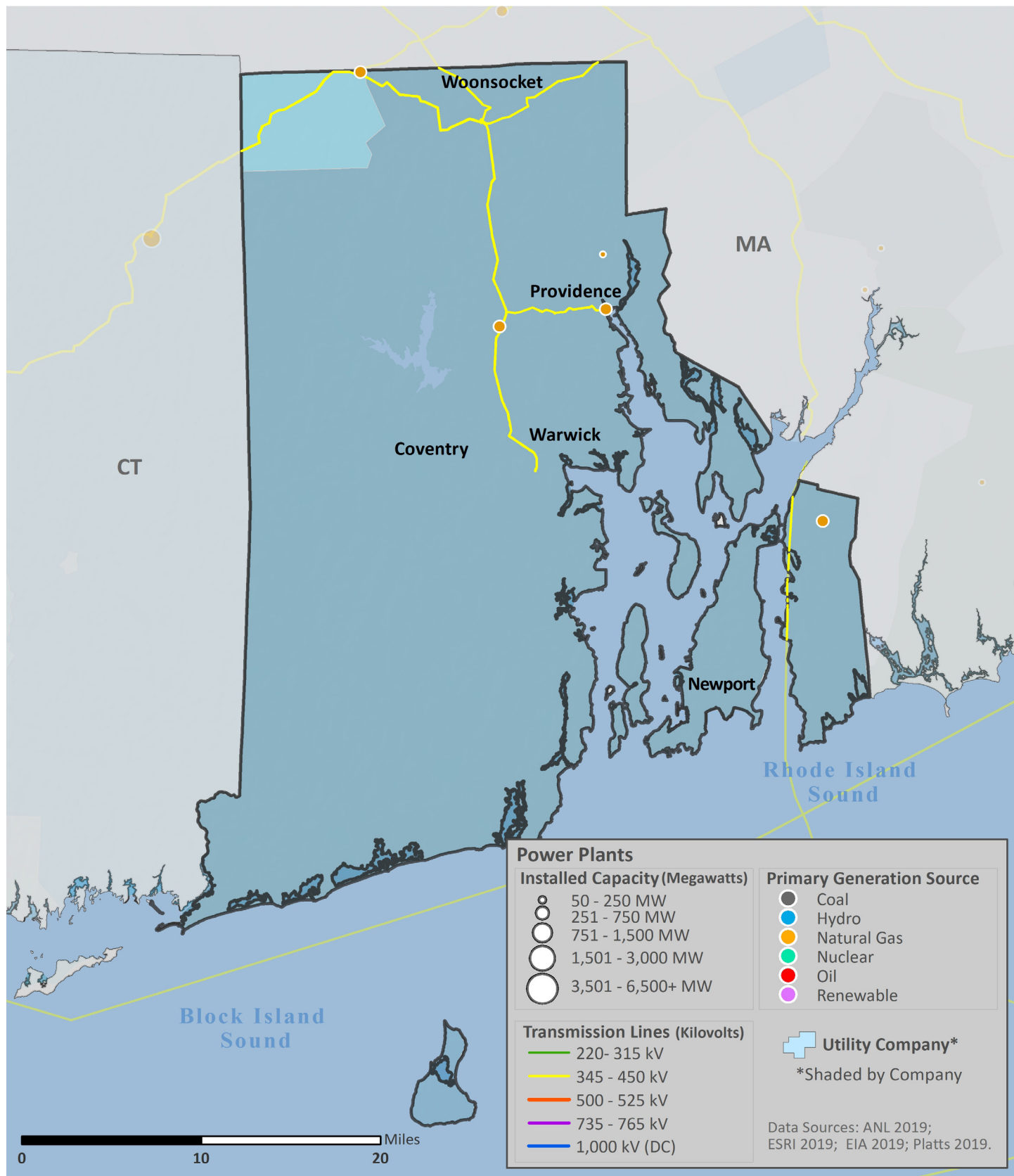
### Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

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

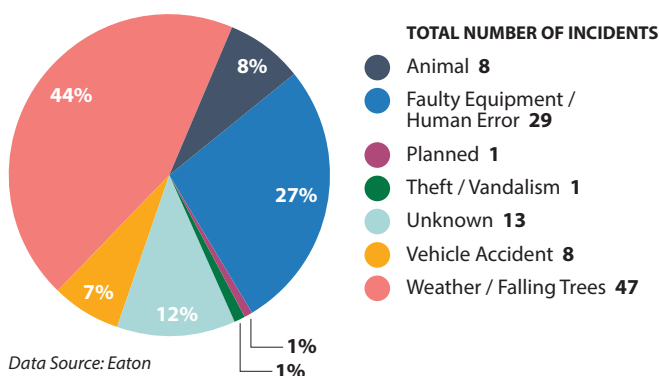
- In 2018, the average Rhode Island electric customer experienced 1.6 service interruptions that lasted an average of 9.9 hours.
- In Rhode Island, between 2008 and 2017:
  - The greatest number of electric outages occurred in **January** (6th for outages nationwide)
  - The leading cause of electric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

### Electric Customers and Consumption by Sector, 2018

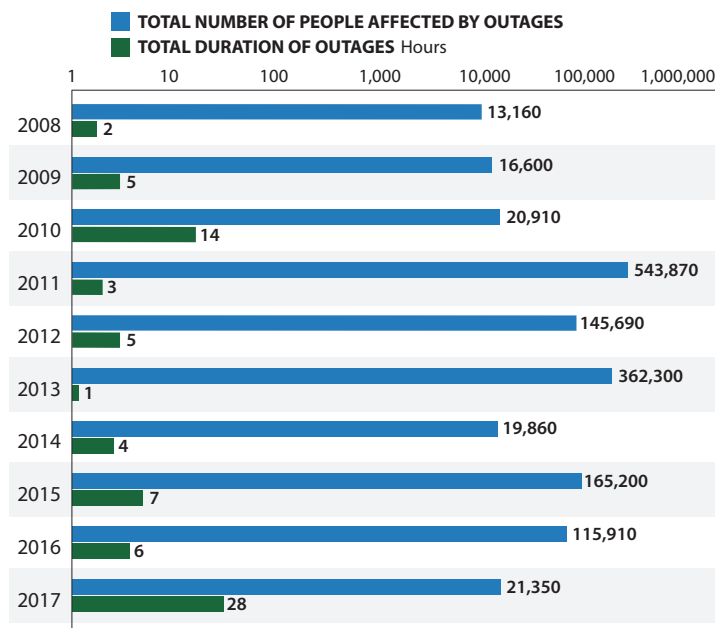
|                                                                                                  |  |  |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|                                                                                                  | 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



### Electric Utility Outage Data, 2008 – 2017

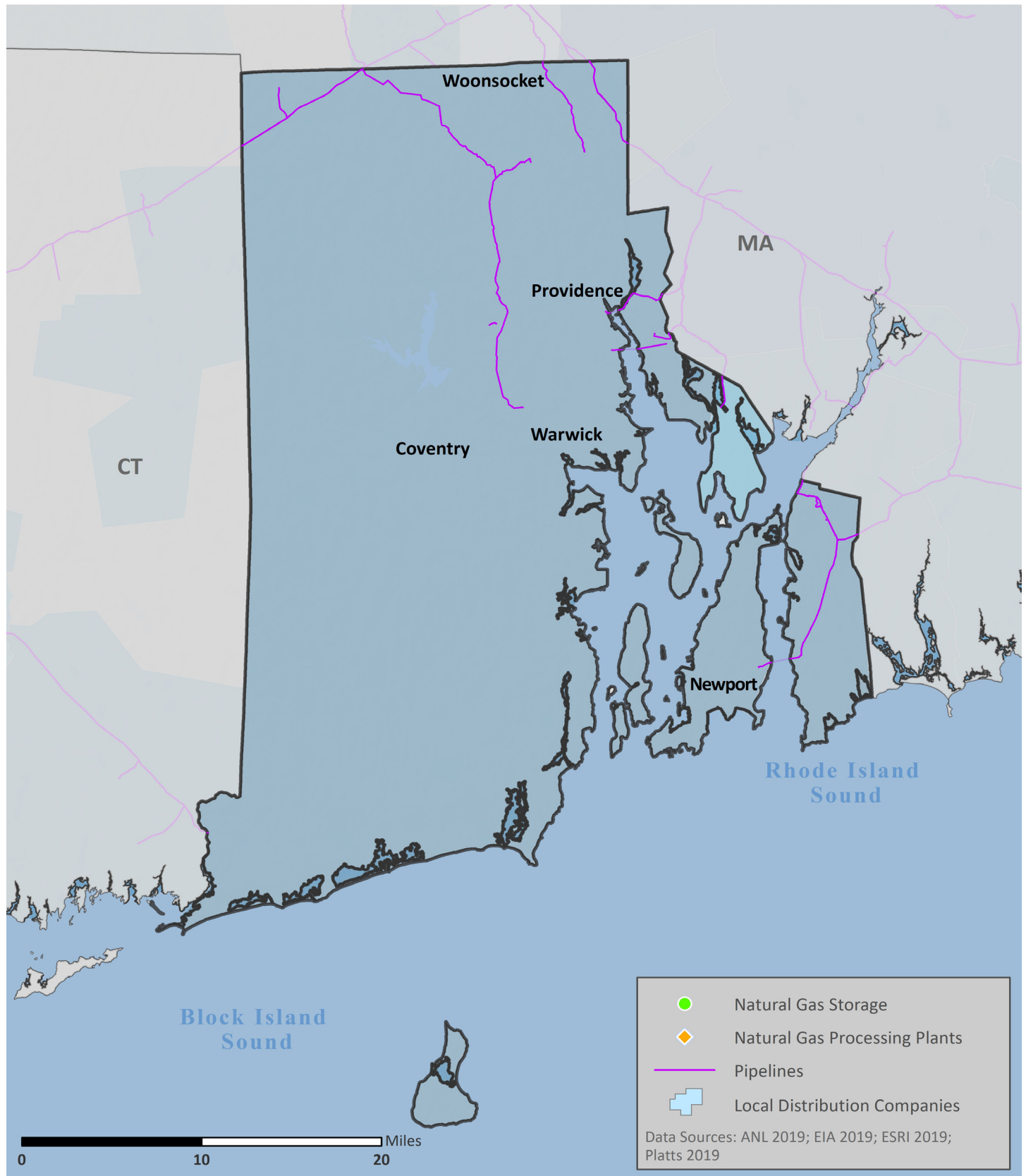


Note: This chart uses a logarithmic scale to display a very wide range of values.  
Data Source: Eaton





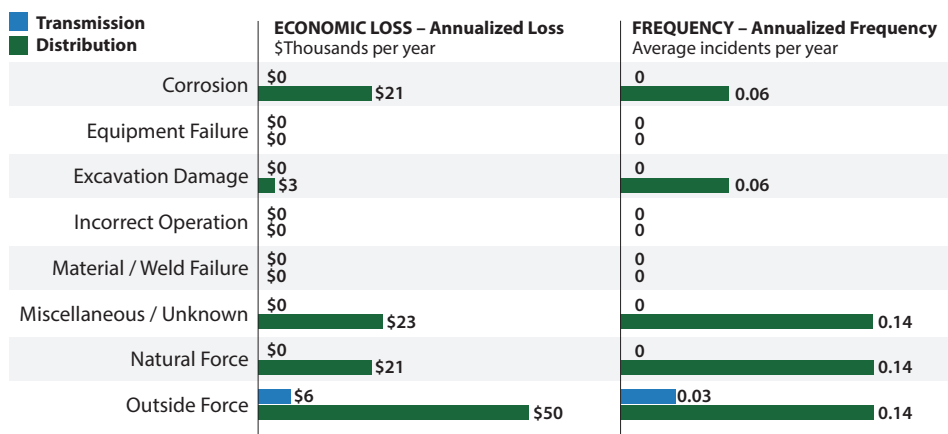
## NATURAL GAS





## 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%                                                                                            |

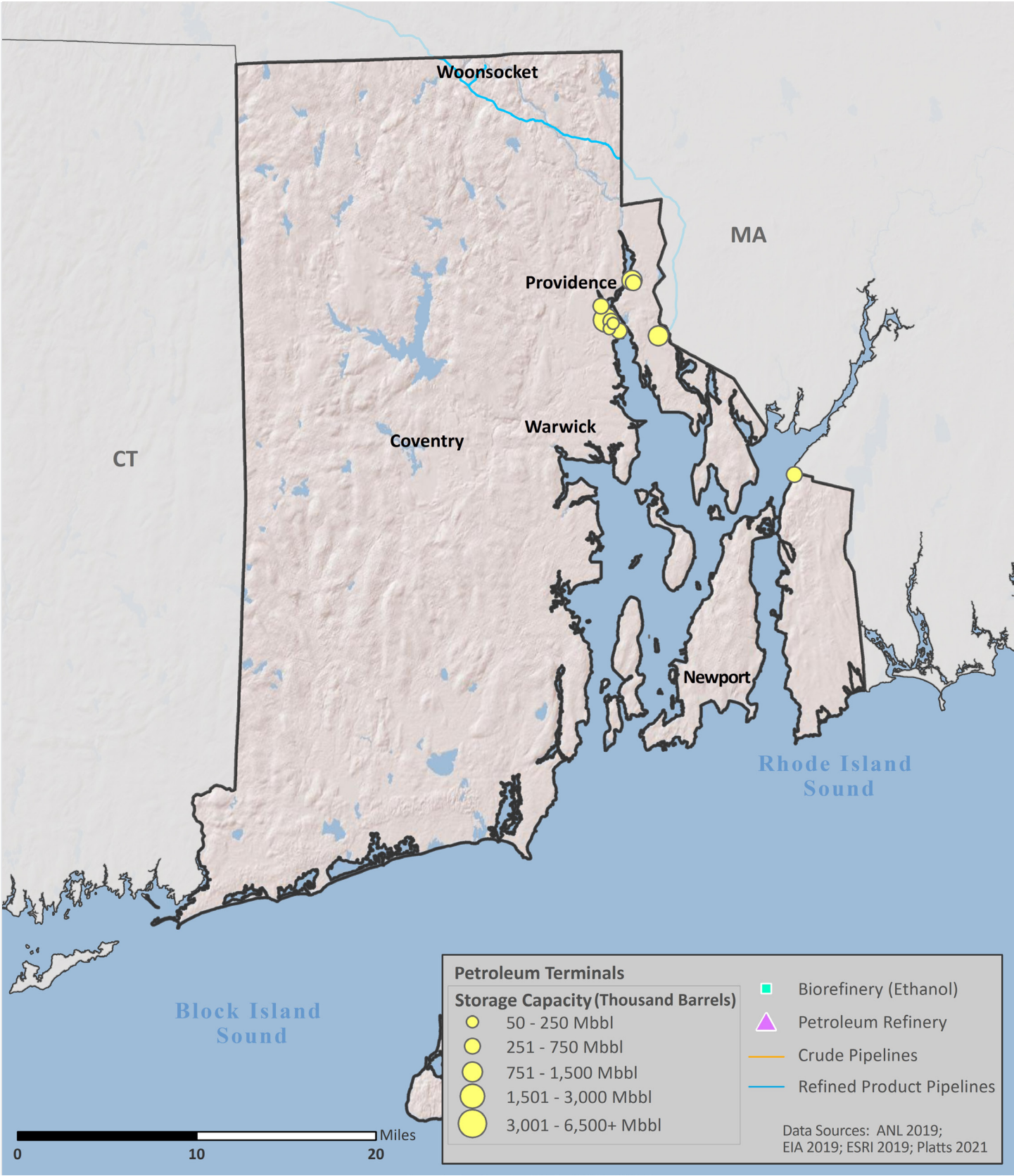
Data Source: EIA

- 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<br>\$Thousands per year | FREQUENCY – Annualized Frequency<br>Average incidents per year |
|------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|
| <b>Truck</b>                       |                                                         |                                                                |
| 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                                                           |
| <b>Rail</b>                        |                                                         |                                                                |

Data Source: DOT PHMSA

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

|                          | ECONOMIC LOSS – Annualized Loss<br>\$Thousands per year | FREQUENCY – Annualized Frequency<br>Average incidents per year |
|--------------------------|---------------------------------------------------------|----------------------------------------------------------------|
| <b>Crude Pipelines</b>   |                                                         |                                                                |
| 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                                                              |
| <b>Product Pipelines</b> |                                                         |                                                                |

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.

