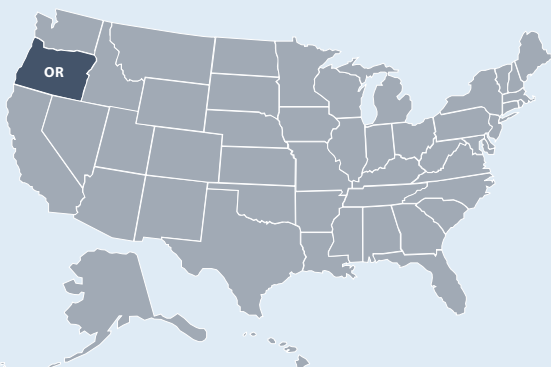




State of Oregon

ENERGY SECTOR RISK PROFILE



Oregon State Facts



POPULATION

4.19 M



HOUSING
UNITS

1.79 M



BUSINESS
ESTABLISHMENTS

0.11 M

ENERGY EMPLOYMENT: 27,663 jobs

PUBLIC UTILITY COMMISSION: Oregon Public Utility Commission

STATE ENERGY OFFICE: Oregon Department of Energy

EMERGENCY MANAGEMENT AGENCY: Oregon Office of
Emergency Management

AVERAGE ELECTRICITY TARIFF: 8.85 cents/kWh

ENERGY EXPENDITURES: \$3,140/capita

ENERGY CONSUMPTION PER CAPITA: 249 MMBtu
(36th highest out of 50 states and Washington, D.C.)

GDP: \$239.8 billion

Data from 2020 or most recent year available.

For more information, see the Data Sources document.

ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 51,940 GWh

COAL: 1,000 MSTN

NATURAL GAS: 283 Bcf

MOTOR GASOLINE: 36,900 Mbbl

DISTILLATE FUEL: 18,700 Mbbl

ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 202 plants, 62.3 TWh,
17.7 GW total capacity

Coal: 1 plant, 2.6 TWh, 0.6 GW total capacity

Hydro: 65 plants, 30.3 TWh, 8.4 GW total capacity

Natural Gas: 13 plants, 20.9 TWh, 4.4 GW total capacity

Nuclear: 0 plants

Petroleum: 0 plants

Wind & Solar: 97 plants, 7.2 TWh, 3.8 GW total capacity

Other sources: 26 plants, 1.2 TWh, 0.4 GW total capacity

COAL: 0 MSTN

NATURAL GAS: 0 Bcf

CRUDE OIL: 0 Mbbl

ETHANOL: 1,000 Mbbl

Data from EIA (2018, 2019).

This State Energy Risk Profile examines the relative magnitude of the risks that the state of Oregon'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.

Oregon Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Winter Storms & Extreme Cold** at \$11 million per year (7th leading cause nationwide at \$418 million per year).
- Oregon had 35 Major Disaster Declarations, 0 Emergency Declarations, and 35 Fire Management Assistance Declarations for 34 events between 2013 and 2019.
- Oregon registered 4% fewer Heating Degree Days and 39% greater Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Salem.

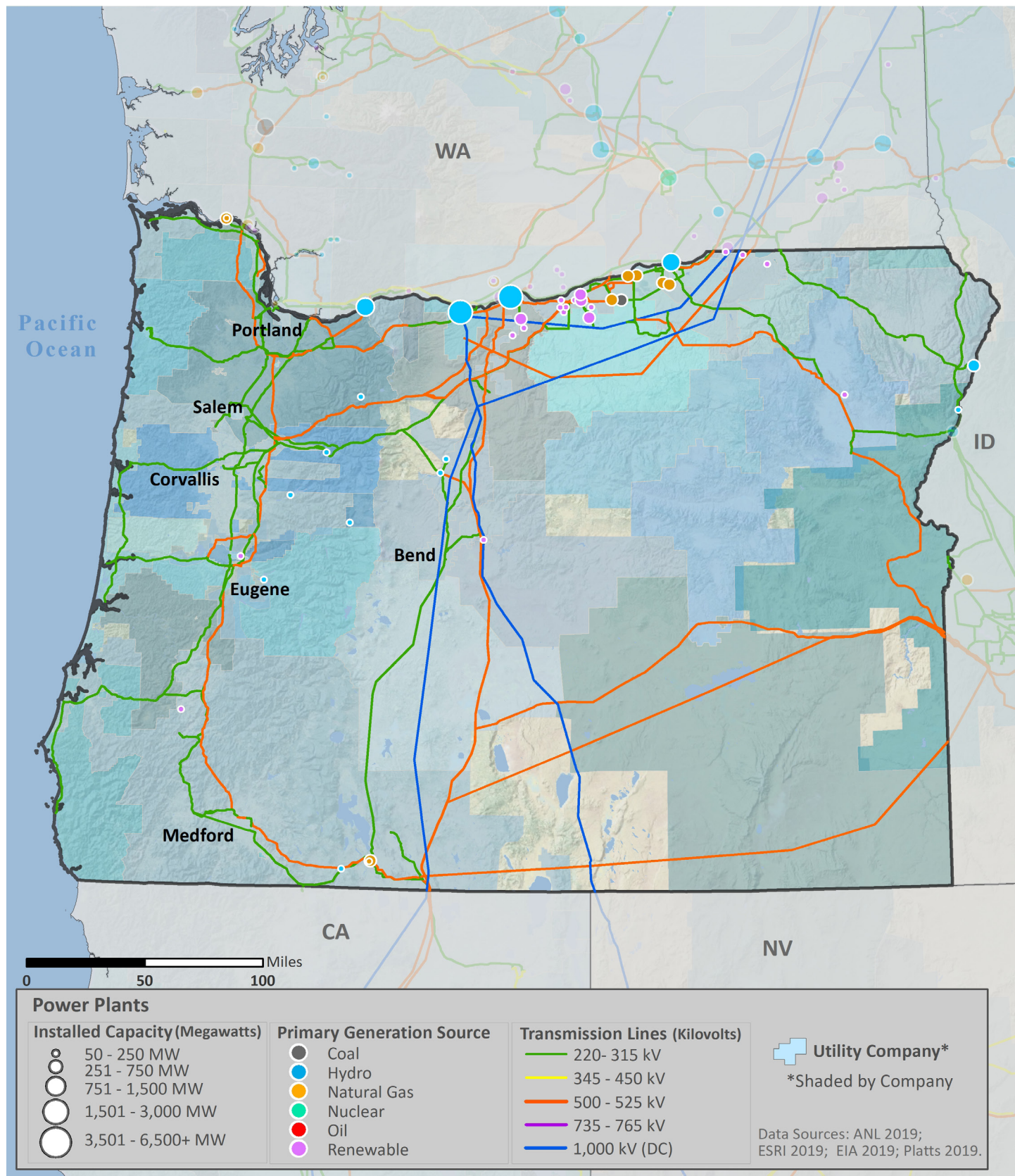
Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	<1	\$0
Earthquake (≥ 3.5 M)	9	\$0
Extreme Heat	2	\$0
Flood	18	\$9
Hurricane	0	\$0
Landslide	2	\$0
Thunderstorm & Lightning	58	\$3
Tornado	6	\$0
Wildfire	22	\$1
Winter Storm & Extreme Cold	48	\$11

Data Sources: NOAA and USGS



ELECTRIC



Electric Infrastructure

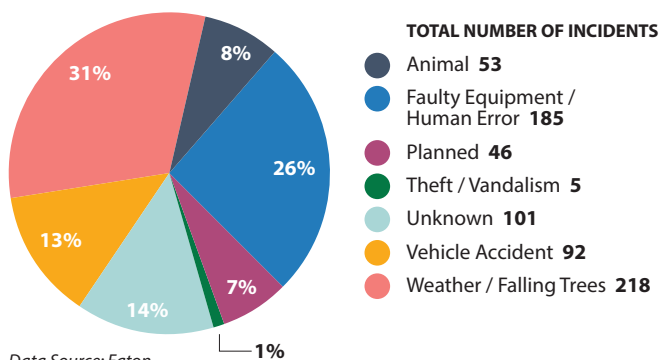
- Oregon has 39 electric utilities:
 - 2 Investor owned
 - 17 Cooperative
 - 18 Municipal / Public Utility Districts
 - 2 Other utilities
- Plant retirements scheduled by 2025: 12 electric generating units totaling 665 MW of installed capacity.

Electric Customers and Consumption by Sector, 2018

	 CUSTOMERS	 CONSUMPTION
Residential 	87%	38%
Commercial 	12%	33%
Industrial 	1%	28%
Transportation 	<1%	<1%

Data Source: EIA

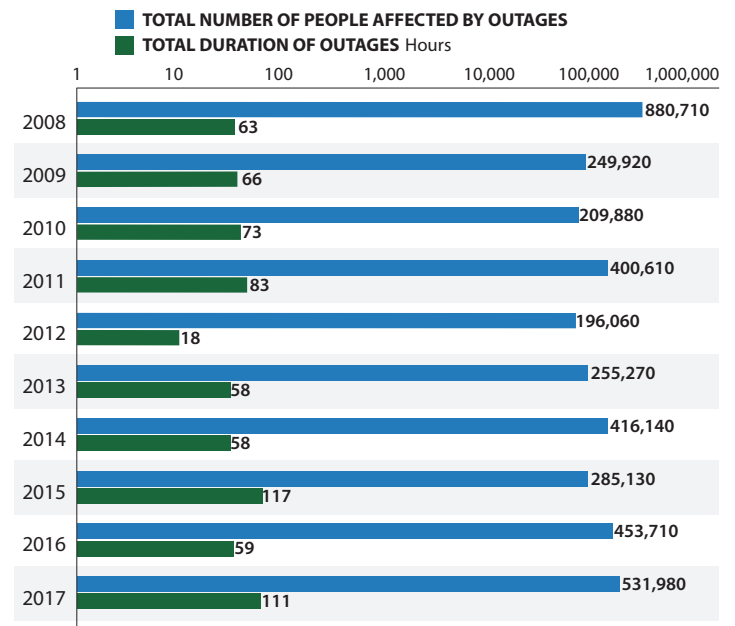
Electric Utility-Reported Outages by Cause, 2008 – 2017



Data Source: Eaton

- In 2018, the average Oregon electric customer experienced 0.9 service interruptions that lasted an average of 1.9 hours.
- In Oregon, between 2008 and 2017:
 - The greatest number of electric outages occurred in **December** (4th for outages nationwide)
 - The leading cause of electric outages was **Weather or Falling Trees** (leading cause nationwide)
 - Electric outages affected 384,941 customers on average

Electric Utility Outage Data, 2008 – 2017



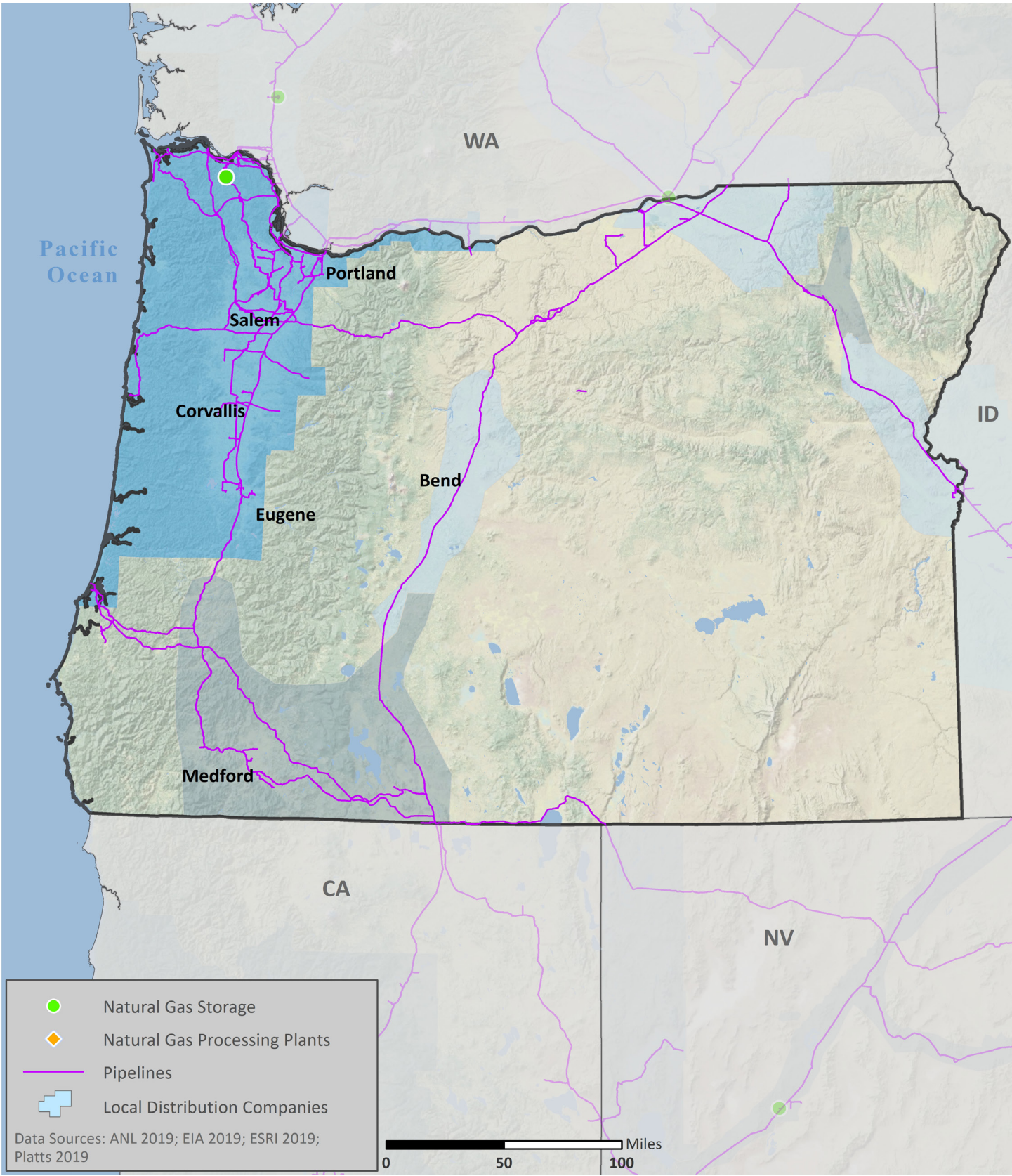
Note: This chart uses a logarithmic scale to display a very wide range of values.

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	\$6	0.03
Material / Weld Failure	\$35	0.11
Miscellaneous / Unknown	\$11	0.11
Natural Force	\$0	0
Outside Force	\$4	0.03

Data Source: DOT PHMSA

- As of 2018, Oregon had:
 - 2,507 miles of natural gas transmission pipelines
 - 15,998 miles of natural gas distribution pipelines
- 45% of Oregon's natural gas transmission system and 20% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Oregon's natural gas supply was most impacted by:
 - **Material Failures** when transported by transmission pipelines (leading cause nationwide at \$28.43M 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	90%	17%
Commercial	10%	12%
Industrial	<1%	22%
Transportation	<1%	<1%
Electric Power	<1%	49%
Other	<1%	<1%

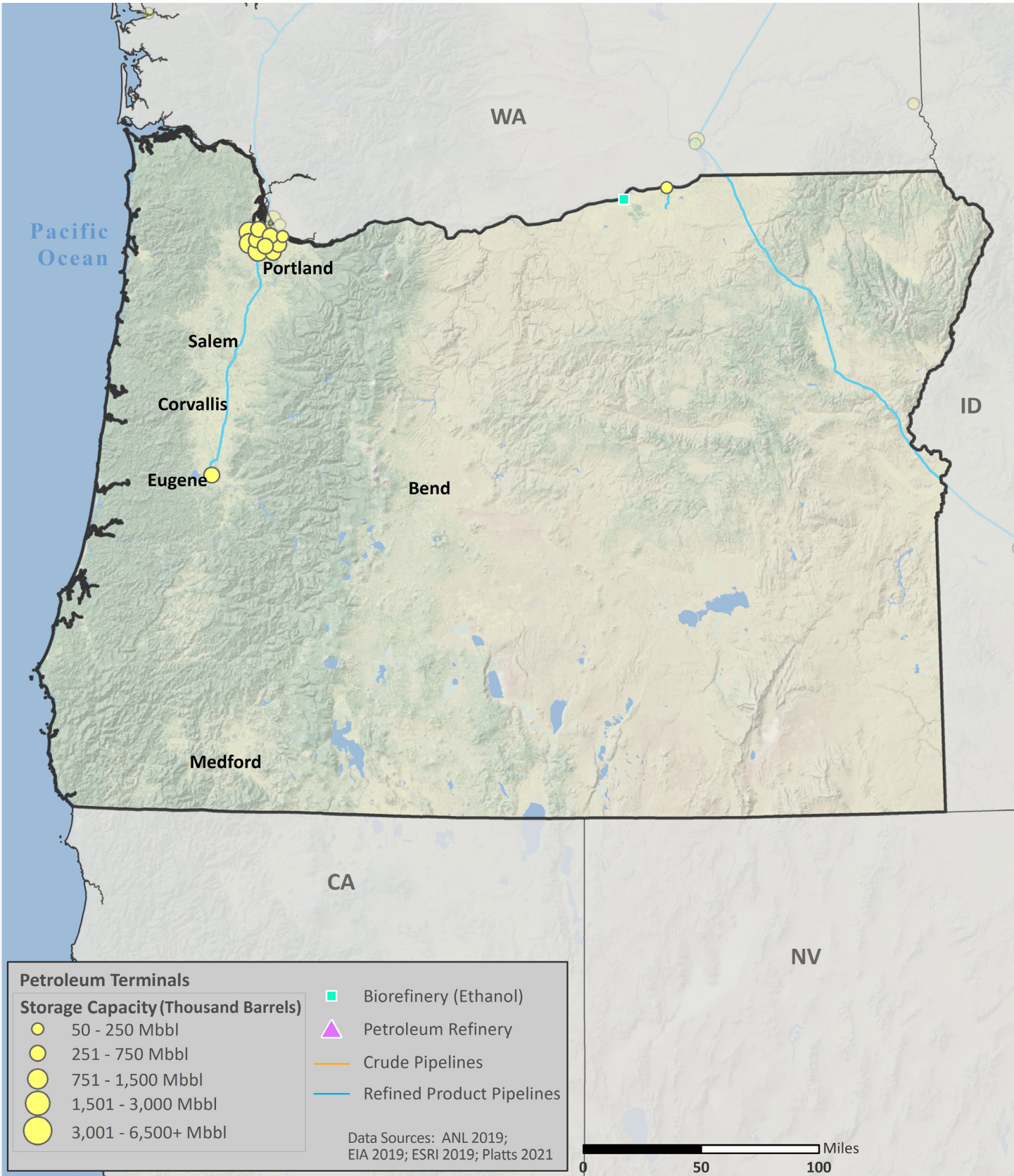
Data Source: EIA

- Oregon has 0 natural gas processing facilities.
- Oregon has 2 liquefied natural gas (LNG) facilities with a total storage capacity of 475,000 barrels.



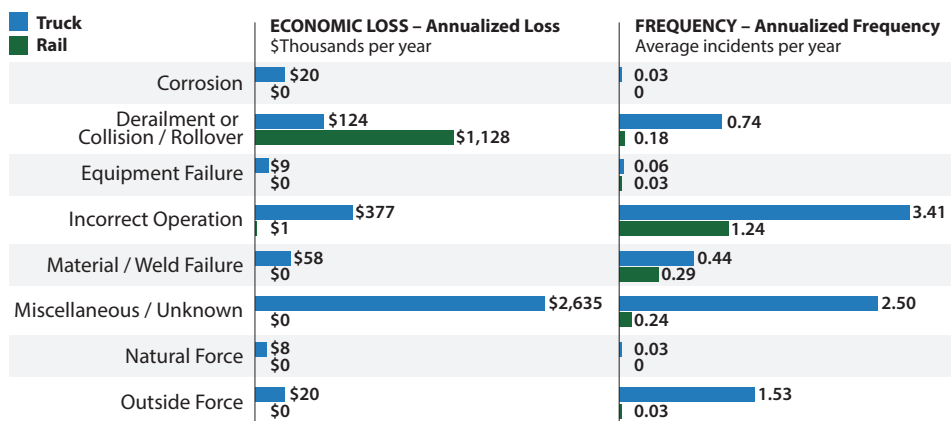


PETROLEUM



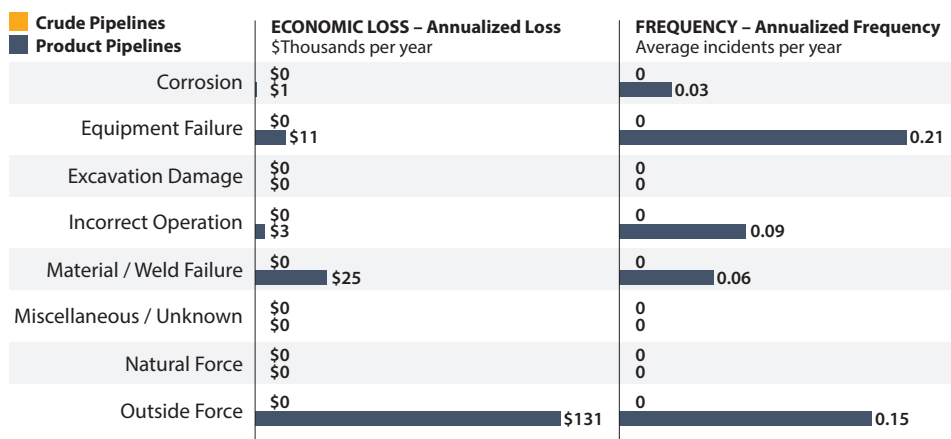
Petroleum Transport

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, Oregon had:
 - 0 miles of crude oil pipelines
 - 416 miles of refined product pipelines
 - 0 miles of biofuels pipelines
- 93% of Oregon's petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Oregon's petroleum supply was most impacted by:
 - **Miscellaneous or Unknown** events when transported by truck (3rd leading cause nationwide at \$52.87M per year)
 - **Derailments, Collisions, or Rollovers** when transported by rail (leading cause nationwide at \$19.71M per year)
 - **Outside Forces** when transported by product pipelines (leading cause nationwide at \$19.06M per year)
- Disruptions in other states may impact supply.

Petroleum Refineries

- There are no operating petroleum refineries in Oregon.

