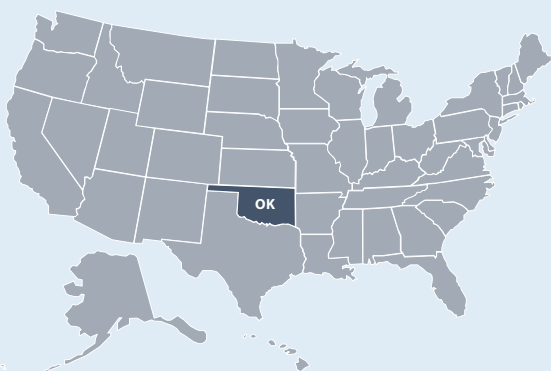




# State of Oklahoma ENERGY SECTOR RISK PROFILE



## Oklahoma State Facts



POPULATION

3.94 M



HOUSING UNITS

1.74 M



BUSINESS ESTABLISHMENTS

0.09 M

**ENERGY EMPLOYMENT:** 102,042 jobs  
**PUBLIC UTILITY COMMISSION:** Oklahoma Corporation Commission  
**STATE ENERGY OFFICE:** Oklahoma Office of the Secretary of Energy and Environment  
**EMERGENCY MANAGEMENT AGENCY:** Oklahoma Department of Emergency Management  
**AVERAGE ELECTRICITY TARIFF:** 8.09 cents/kWh  
**ENERGY EXPENDITURES:** \$3,969/capita  
**ENERGY CONSUMPTION PER CAPITA:** 418 MMBtu (9th highest out of 50 states and Washington, D.C.)  
**GDP:** \$202.6 billion

Data from 2020 or most recent year available. For more information, see the Data Sources document.

## ANNUAL ENERGY CONSUMPTION

**ELECTRIC POWER:** 64,580 GWh

**COAL:** 9,900 MSTN

**NATURAL GAS:** 668 Bcf

**MOTOR GASOLINE:** 47,200 Mbbbl

**DISTILLATE FUEL:** 42,900 Mbbbl

## ANNUAL ENERGY PRODUCTION

**ELECTRIC POWER GENERATION:** 124 plants, 85.2 TWh, 30.5 GW total capacity

**Coal:** 6 plants, 7.8 TWh, 3.6 GW total capacity

**Hydro:** 10 plants, 3.9 TWh, 0.8 GW total capacity

**Natural Gas:** 32 plants, 44.2 TWh, 17.4 GW total capacity

**Nuclear:** 0 plants

**Petroleum:** 13 plants, 0.0 TWh, 0.1 GW total capacity

**Wind & Solar:** 59 plants, 29.1 TWh, 8.2 GW total capacity

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

**COAL:** 600 MSTN

**NATURAL GAS:** 3,170 Bcf

**CRUDE OIL:** 211,800 Mbbbl

**ETHANOL:** 0 Mbbbl

Data from EIA (2018, 2019).

This State Energy Risk Profile examines the relative magnitude of the risks that the state of Oklahoma’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.

## Oklahoma Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Tornadoes** at \$224 million per year (4th leading cause nationwide at \$2 billion per year).
- Oklahoma had 302 Major Disaster Declarations, 10 Emergency Declarations, and 18 Fire Management Assistance Declarations for 28 events between 2013 and 2019.
- Oklahoma registered 3% fewer Heating Degree Days and 2% greater Cooling Degree Days than average in 2019.
- There is 1 Fusion Center located in Oklahoma City.

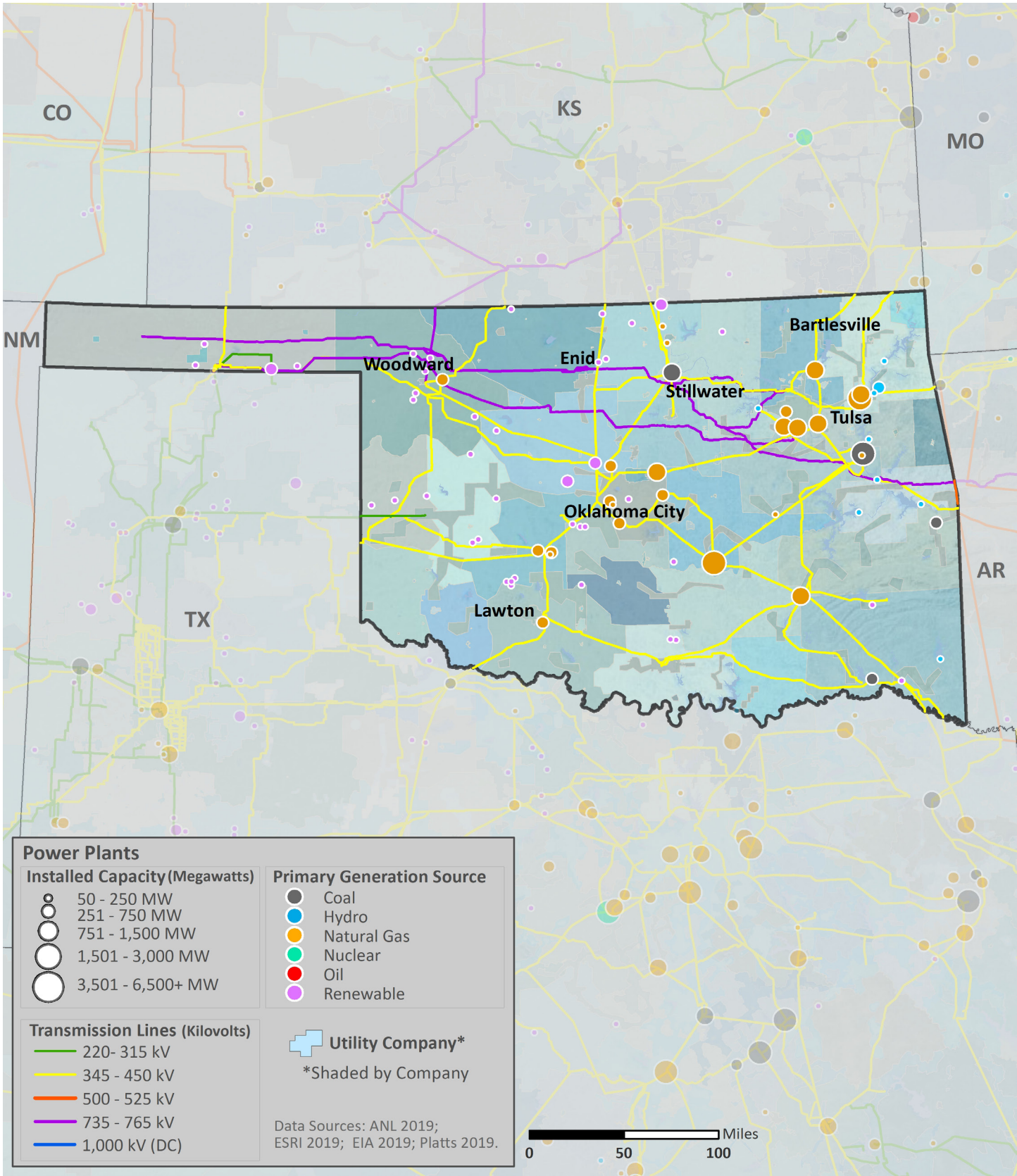
## Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized (\$Million per year)
Drought	19	\$0
Earthquake (≥ 3.5 M)	52	\$3
Extreme Heat	7	\$0
Flood	40	\$3
Hurricane	0	\$0
Landslide	0	\$0
Thunderstorm & Lightning	130	\$51
Tornado	20	\$224
Wildfire	11	\$7
Winter Storm & Extreme Cold	17	\$16

Data Sources: NOAA and USGS



# ELECTRIC









## Electric Infrastructure

- Oklahoma has 92 electric utilities:
  - 5 Investor owned
  - 26 Cooperative
  - 58 Municipal
  - 3 Other utilities
- Plant retirements scheduled by 2025: 1 electric generating unit totaling 163 MW of installed capacity.

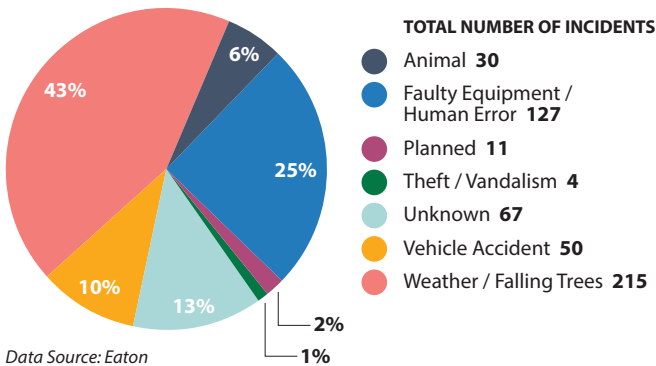
- In 2018, the average Oklahoma electric customer experienced 1.3 service interruptions that lasted an average of 2.9 hours.
- In Oklahoma, between 2008 and 2017:
  - The greatest number of electric outages occurred in **August** (3rd for outages nationwide)
  - The leading cause of electric outages was **Weather or Falling Trees** (leading cause nationwide)
  - Electric outages affected 222,152 customers on average

### Electric Customers and Consumption by Sector, 2018

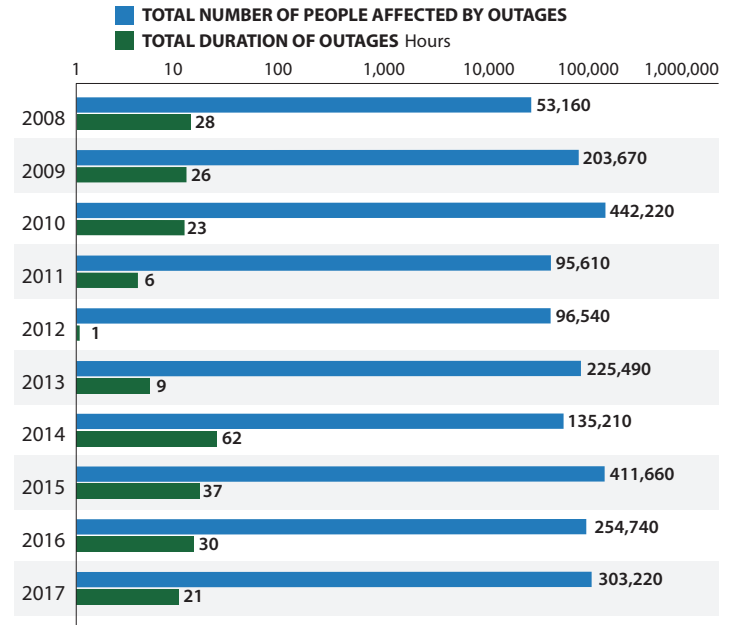
	 CUSTOMERS	 CONSUMPTION
Residential 	85%	37%
Commercial 	14%	33%
Industrial 	<1%	30%
Transportation 	<1%	<1%

Data Source: EIA

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

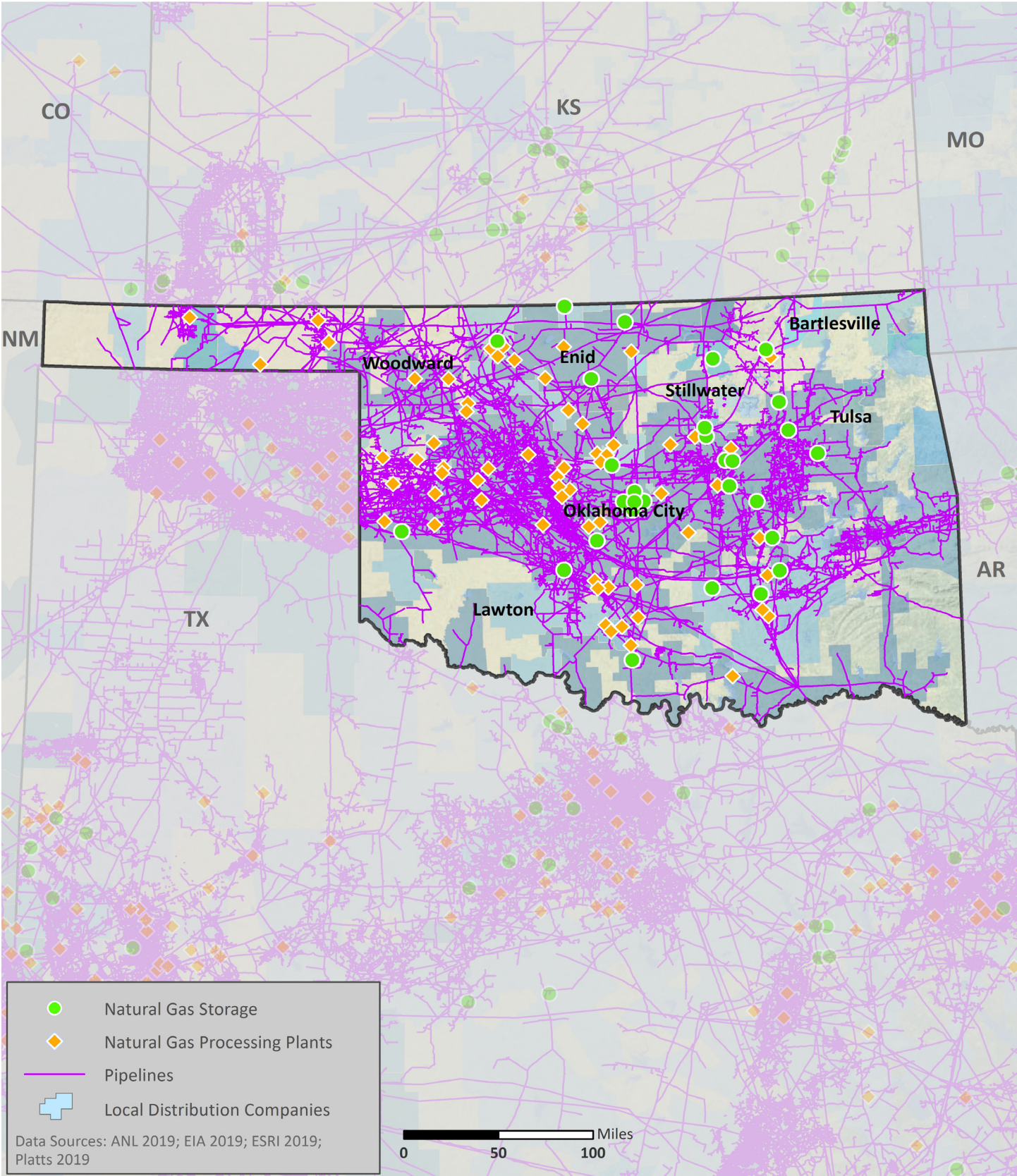


### Electric Utility Outage Data, 2008 – 2017



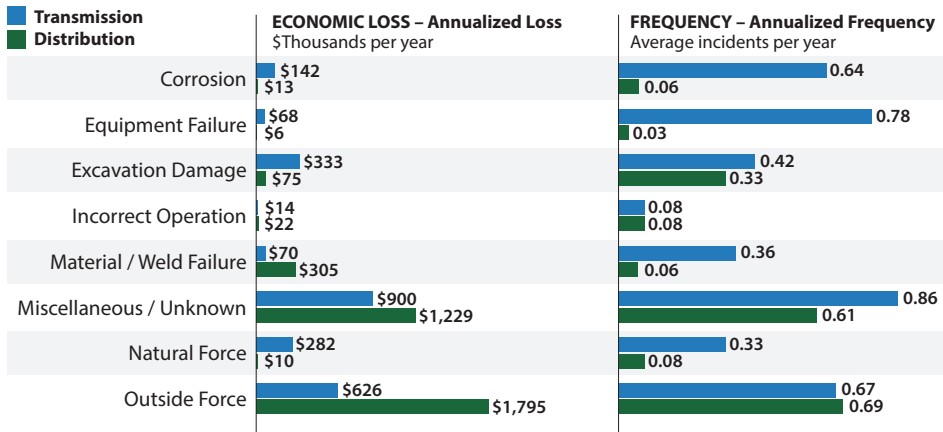


# NATURAL GAS



## Natural Gas Transport

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








Data Source: DOT PHMSA

- As of 2018, Oklahoma had:
  - 11,683 miles of natural gas transmission pipelines
  - 26,732 miles of natural gas distribution pipelines
- 38% of Oklahoma’s natural gas transmission system and 23% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Oklahoma’s natural gas supply was most impacted by:
  - **Miscellaneous or Unknown** events when transported by transmission pipelines (5th leading cause nationwide at \$16.77M 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%	11%
Commercial 	9%	7%
Industrial 	<1%	33%
Transportation 	<1%	<1%
Electric Power 	<1%	49%
Other	<1%	<1%

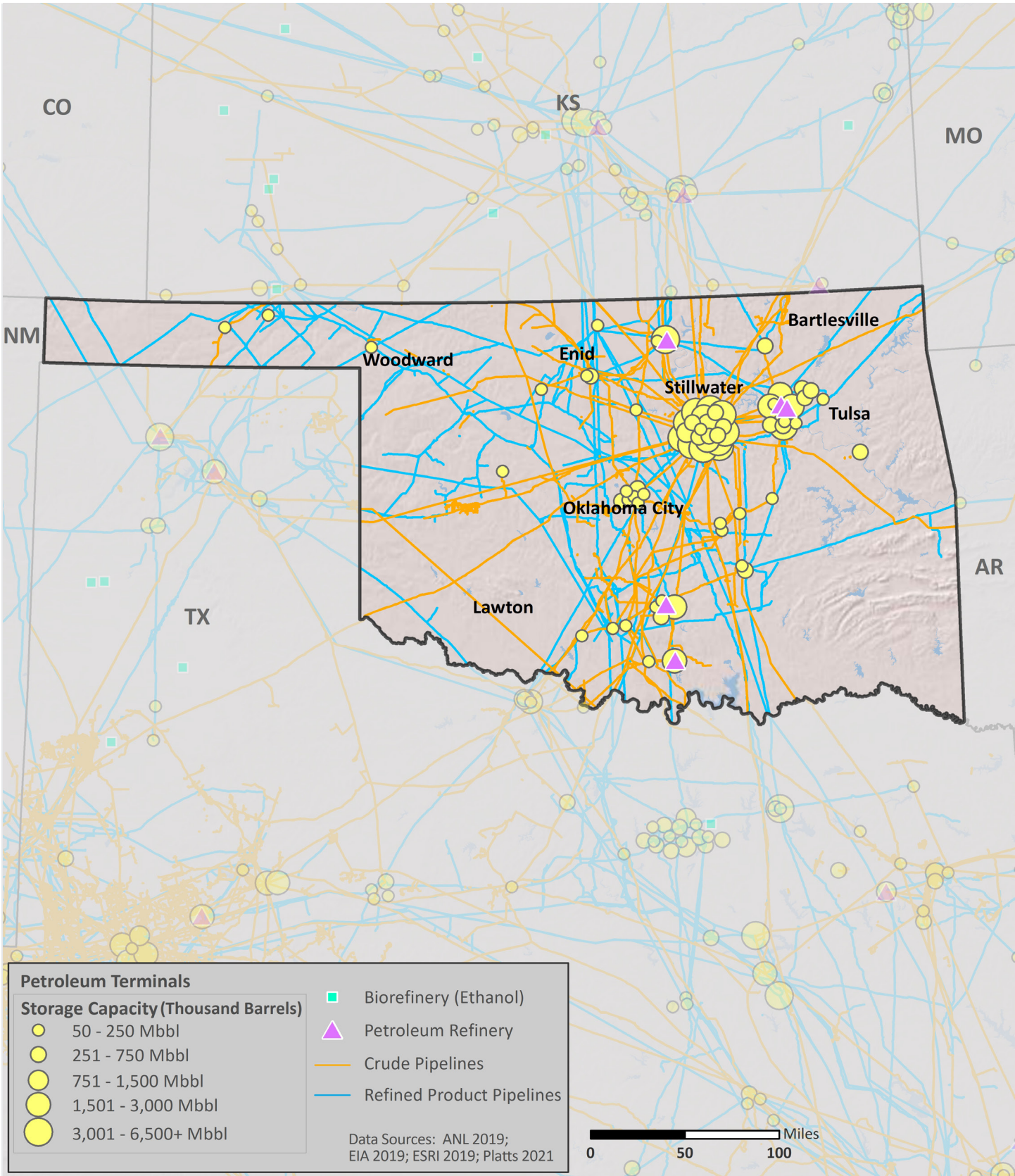
Data Source: EIA

- Oklahoma has 70 natural gas processing facilities with a total capacity of 7,833 MMcf/d.
- Oklahoma has 0 liquefied natural gas (LNG) facilities.



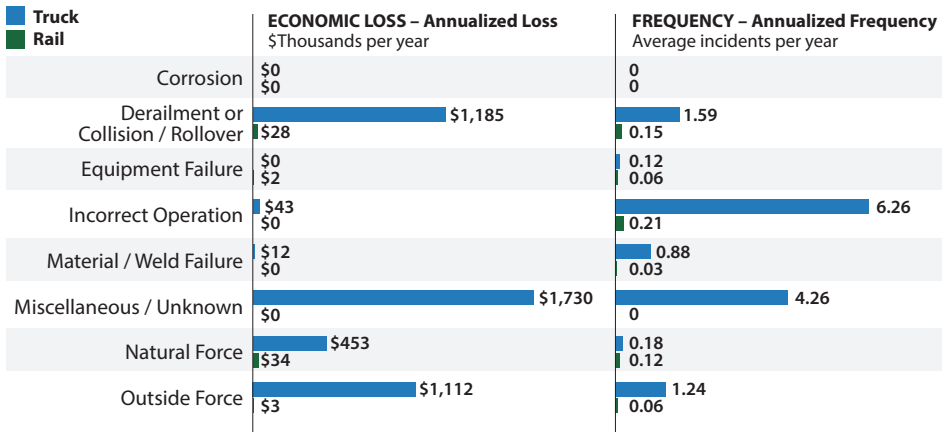


# PETROLEUM



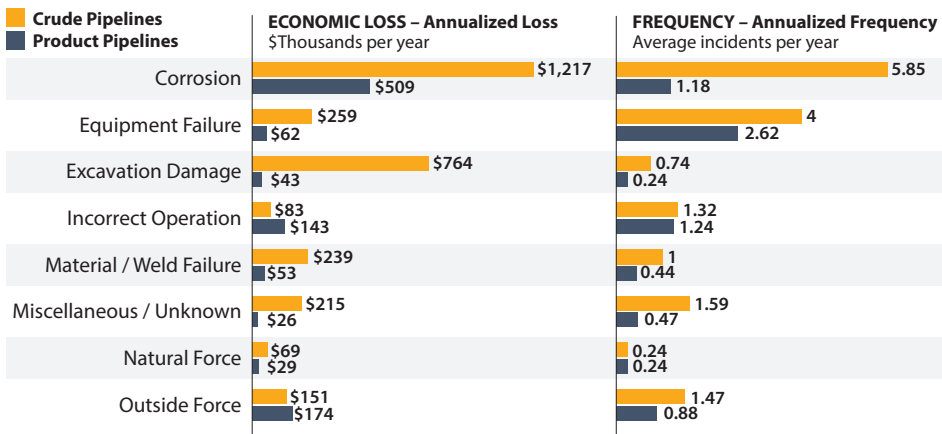
## Petroleum Transport

### 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



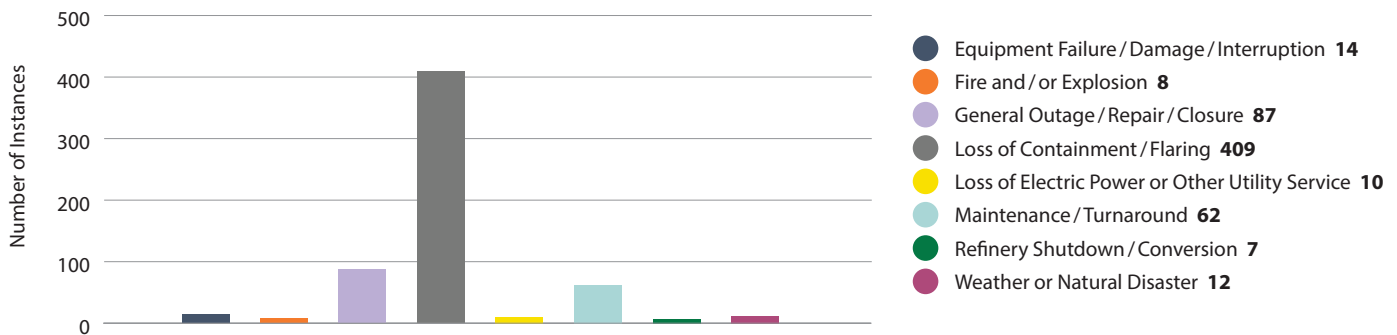
Data Source: DOT PHMSA

- As of 2018, Oklahoma had:
  - 7,460 miles of crude oil pipelines
  - 2,171 miles of refined product pipelines
  - 0 miles of biofuels pipelines
- 50% of Oklahoma’s petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Oklahoma’s petroleum supply was most impacted by:
  - **Miscellaneous or Unknown events** when transported by truck (3rd leading cause nationwide at \$52.87M per year)
  - **Natural Forces** when transported by rail (2nd leading cause nationwide at \$9.17M per year)
  - **Corrosion** when transported by crude pipelines (3rd leading cause nationwide at \$14.51M 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

- Oklahoma has 5 petroleum refineries with a total operable capacity of 522.8 Mb/d.
- Between 2009 and 2019, the leading cause of petroleum refinery disruptions in Oklahoma was:
  - **Loss of Containment or Flaring** (leading cause nationwide)

### Causes and Frequency of Petroleum Refinery Disruptions, 2009 – 2019



Data Source: Hydrocarbon Publishing