# **State of Texas**ENERGY SECTOR RISK PROFILE





#### **Texas State Facts**

POPULATION

28.70 M

HOUSING UNITS

11.10 M

BUSINESS ESTABLISHMENTS

0.58 M

**ENERGY EMPLOYMENT:** 607,626 jobs

**PUBLIC UTILITY COMMISSION:** Public Utility Commission of Texas **STATE ENERGY OFFICE:** Texas State Energy Conservation Office

**EMERGENCY MANAGEMENT AGENCY:** Texas Division of

**Emergency Management** 

AVERAGE ELECTRICITY TARIFF: 8.48 cents/kWh

**ENERGY EXPENDITURES:** \$4,540/capita

**ENERGY CONSUMPTION PER CAPITA:** 472 MMBtu (6th highest out of 50 states and Washington, D.C.)

**GDP:** \$1,802.5 billion

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

#### **ANNUAL ENERGY CONSUMPTION**

**ELECTRIC POWER: 424,530 GWh** 

COAL: 76,400 MSTN NATURAL GAS: 3,978 Bcf

MOTOR GASOLINE: 360,600 Mbbl DISTILLATE FUEL: 222,000 Mbbl

#### **ANNUAL ENERGY PRODUCTION**

**ELECTRIC POWER GENERATION:** 504 plants, 483.2 TWh,

135.4 GW total capacity

**Coal:** 16 plants, 91.8 TWh, 20.0 GW total capacity **Hydro:** 24 plants, 1.5 TWh, 0.7 GW total capacity

**Natural Gas:** 164 plants, 255.6 TWh, 77.7 GW total capacity **Nuclear:** 2 plants, 41.3 TWh, 5.1 GW total capacity

Petroleum: 12 plants, 41.3 TWh, 5.1 GW total capacity
Wind & Solar: 240 plants, 88.0 TWh, 30.5 GW total capacity
Other sources: 46 plants, 4.8 TWh, 1.3 GW total capacity

COAL: 36,400 MSTN NATURAL GAS: 10,360 Bcf CRUDE OIL: 1,850,700 Mbbl ETHANOL: 9,400 Mbbl

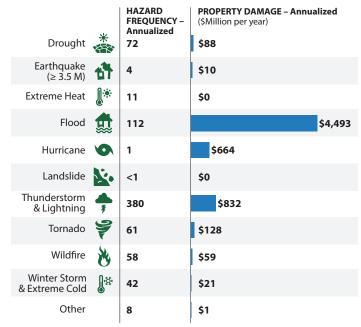
Data from EIA (2018, 2019).

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

#### **Texas Risks and Hazards Overview**

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Flooding** at \$4.5 billion per year (leading cause nationwide at \$12 billion per year).
- Texas had 389 Major Disaster Declarations, 1 Emergency Declaration, and 9 Fire Management Assistance Declarations for 23 events between 2013 and 2019.
- Texas registered 13% fewer Heating Degree Days and 12% greater Cooling Degree Days than average in 2019.
- There are 8 Fusion Centers in Texas. The Primary Fusion Center is located in Austin.

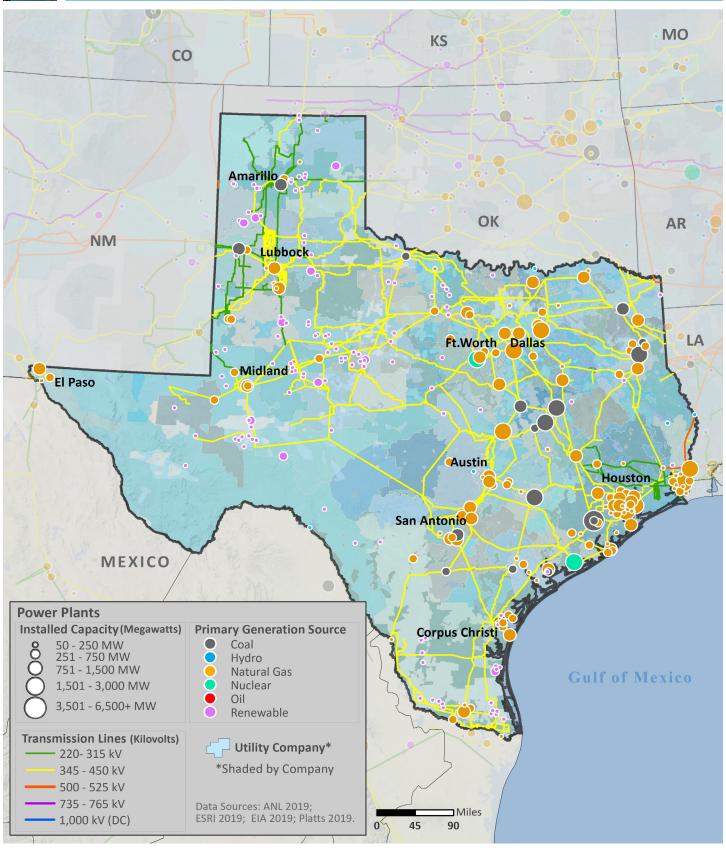
#### Annualized Frequency of and Property Damage Due to Natural Hazards, 2009–2019



Data Sources: NOAA and USGS



# **ELECTRIC**



#### **Electric Infrastructure**

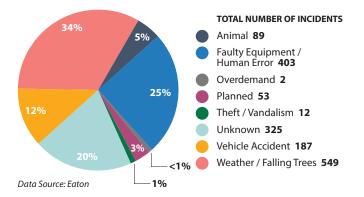
- Texas has 251 electric utilities:
  - 6 Investor owned
  - 69 Cooperative
  - 66 Municipal
  - 110 Other utilities
- Plant retirements scheduled by 2025: 19 electric generating units totaling 3,235 MW of installed capacity.

#### Electric Customers and Consumption by Sector, 2018

		((C)) CUSTOMERS	CONSUMPTION
Residential	血	87%	37%
Commercial		12%	34%
Industrial	<b></b>	<1%	29%
Transportation	<b>7</b> Ü	<1%	<1%

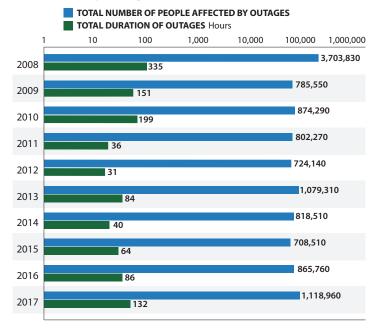
Data Source: EIA

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



- In 2018, the average Texas electric customer experienced 1.3 service interruptions that lasted an average of 2.8 hours.
- In Texas, between 2008 and 2017:
  - The greatest number of electric outages occurred in **June** (2nd for outages nationwide)
  - The leading cause of electric outages was Weather or Falling Trees (leading cause nationwide)
  - Electric outages affected 1,148,113 customers on average

#### Electric Utility Outage Data, 2008-2017

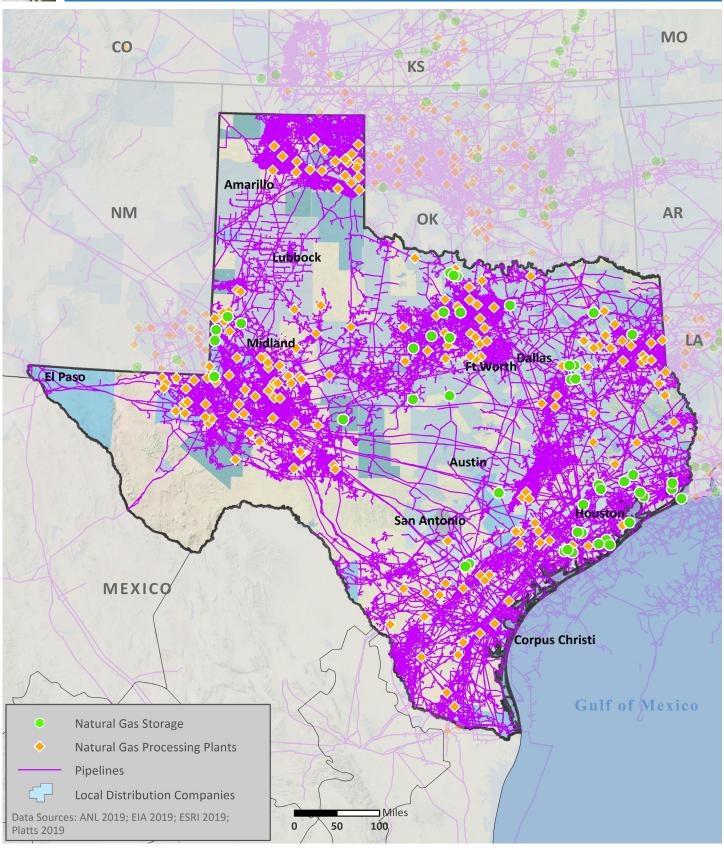


Note: This chart uses a logarithmic scale to display a very wide range of values. Data Source: Eaton



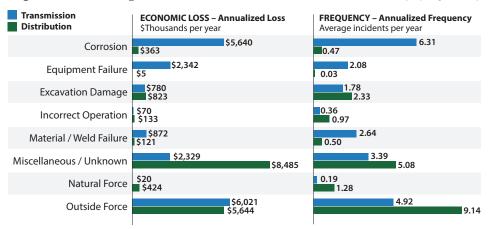


# NATURAL GAS



## **Natural Gas Transport**

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



- As of 2018, Texas had:
  - 45,902 miles of natural gas transmission pipelines
  - 108,463 miles of natural gas distribution pipelines
- 49% of Texas's natural gas transmission system and 34% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Texas's natural gas supply was most impacted by:
  - Outside Forces when transported by transmission pipelines (3rd leading cause nationwide at \$20.65M per year)
- Miscellaneous or Unknown events when transported by distribution pipelines (2nd leading cause nationwide at \$67.89M per year)

## **Natural Gas Processing and Liquefied Natural Gas**

Natural Gas Customers and Consumption by Sector, 2018

Residential	â	CUSTOMERS 93%	CONSUMPTION 6%
Commercial	▦	6%	5%
Industrial	mi	<1%	45%
Transportation		<1%	<1%
Electric Power		<1%	44%
Other		<1%	<1%

- Texas has 176 natural gas processing facilities with a total capacity of 26,593 MMcf/d.
- $\bullet$  Texas has 6 liquefied natural gas (LNG) facilities with a total storage capacity of 11,315,246 barrels.

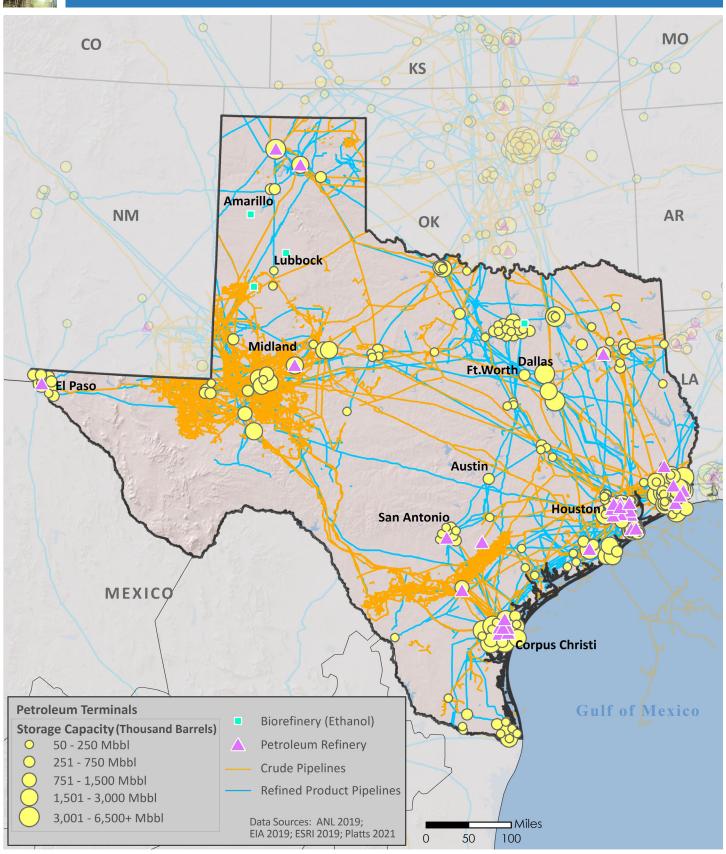
Data Source: EIA

Data Source: DOT PHMSA



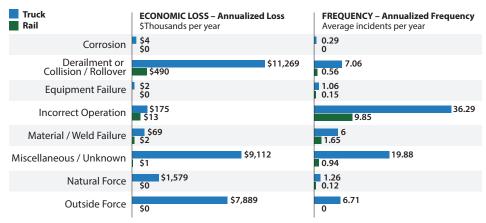


## **PETROLEUM**



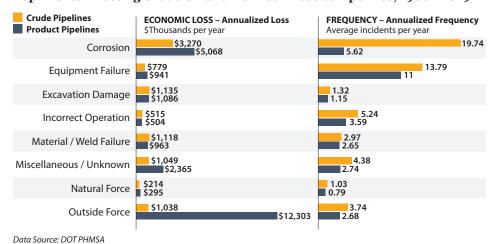
## **Petroleum Transport**

#### 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

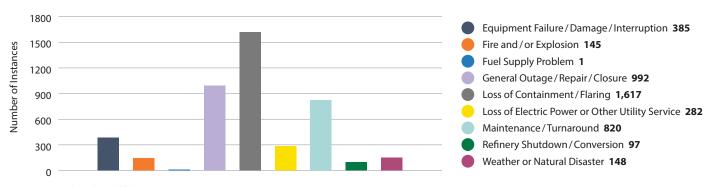


- As of 2018, Texas had:
  - 23,785 miles of crude oil pipelines
  - 10,247 miles of refined product pipelines
  - o miles of biofuels pipelines
- 45% of Texas's petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Texas's petroleum supply was most impacted by:
  - Derailments, Collisions, or Rollovers when transported by truck (8th leading cause nationwide at \$0.07M per year)
  - Derailments, Collisions, or Rollovers when transported by rail (leading cause nationwide at \$19.71M per year)
  - Corrosion when transported by crude pipelines (3rd leading cause nationwide at \$14.51M 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**

- Texas has 31 petroleum refineries with a total operable capacity of 5,855.5 Mb/d.
- Between 2009 and 2019, the leading cause of petroleum refinery disruptions in Texas was:
  - Loss of Containment or Flaring (leading cause nationwide)

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



Data Source: Hydrocarbon Publishing