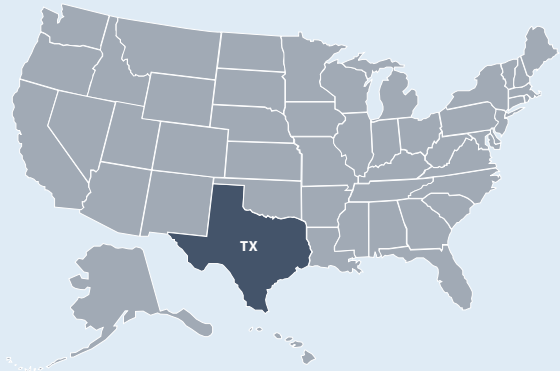
State of Texas
ENERGY SECTOR RISK PROFILE

U.S. DEPARTMENT OF ENERGY
Cybersecurity, Energy Security, and Emergency Response



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, *7.77 GW total capacity*
- **Nuclear:** 2 plants, 41.3 TWh, *5.1 GW total capacity*
- **Petroleum:** 12 plants, 0.2 TWh, *0.1 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

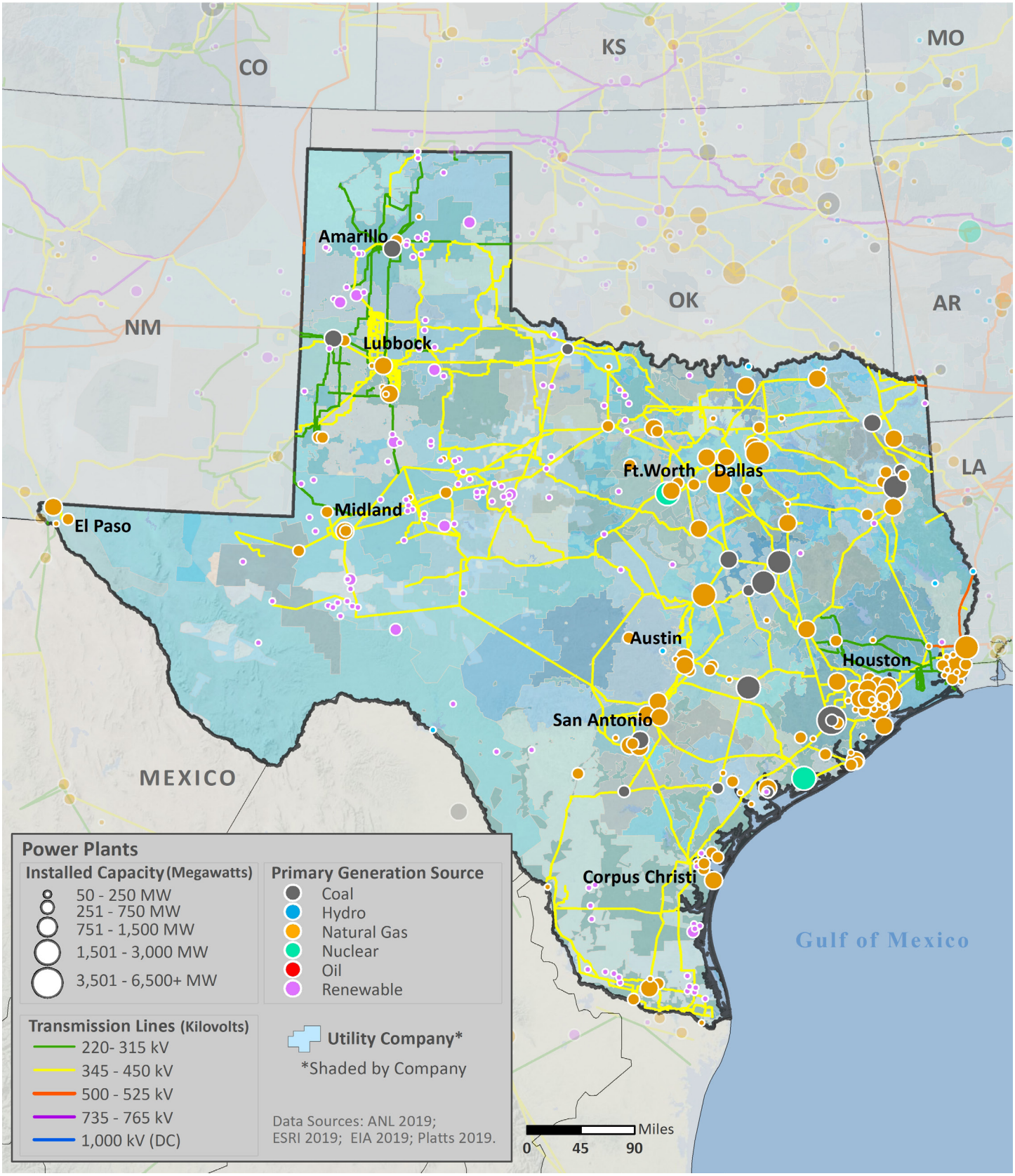
- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Flooding** at $4.5 billion per year *(leading cause nationwide at $12 billion per year)*.
- Texas had 389 Major Disaster Declarations, 1 Emergency Declaration, and 9 Fire Management Assistance Declarations 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

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized ($Million per year)
Drought	72	$88
Earthquake (≥ 3.5 M)	4	$10
Extreme Heat	11	$0
Flood	112	$4,493
Hurricane	1	$664
Landslide	<1	$0
Thunderstorm & Lightning	380	$832
Tornado	61	$128
Wildfire	58	$59
Winter Storm & Extreme Cold	42	$21
Other	8	$1

Data Sources: NOAA and USGS

ELECTRIC


CO
KS
MO
NM
OK
AR
LA
MEXICO
Gulf of Mexico
Amarillo
Lubbock
Midland
El Paso
Ft.Worth
Dallas
Austin
Houston
San Antonio
Corpus Christi
Power Plants
Installed Capacity (Megawatts)
50 - 250 MW
251 - 750 MW
751 - 1,500 MW
1,501 - 3,000 MW
3,501 - 6,500+ MW
Primary Generation Source
Coal
Hydro
Natural Gas
Nuclear
Oil
Renewable
Transmission Lines (Kilovolts)
220- 315 kV
345 - 450 kV
500 - 525 kV
735 - 765 kV
1,000 kV (DC)
Utility Company*
*Shaded by Company
Data Sources: ANL 2019;
ESRI 2019; EIA 2019; Platts 2019.
Miles
0
45
90

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.

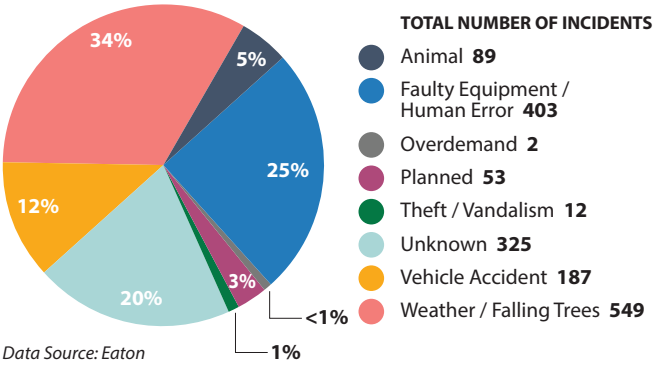
- In 2018, the average Texas electric customer experienced 1.3 service interruptions that lasted an average of 2.8 hours.
- In Texas, between 2008 and 2017:
  - *The greatest number of electric outages occurred in **June** (2nd for outages nationwide)*
  - *The leading cause of electric outages was **Weather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

Electric Customers and Consumption by Sector, 2018

	CUSTOMERS	CONSUMPTION
Residential	87%	37%
Commercial	12%	34%
Industrial	<1%	29%
Transportation	<1%	<1%

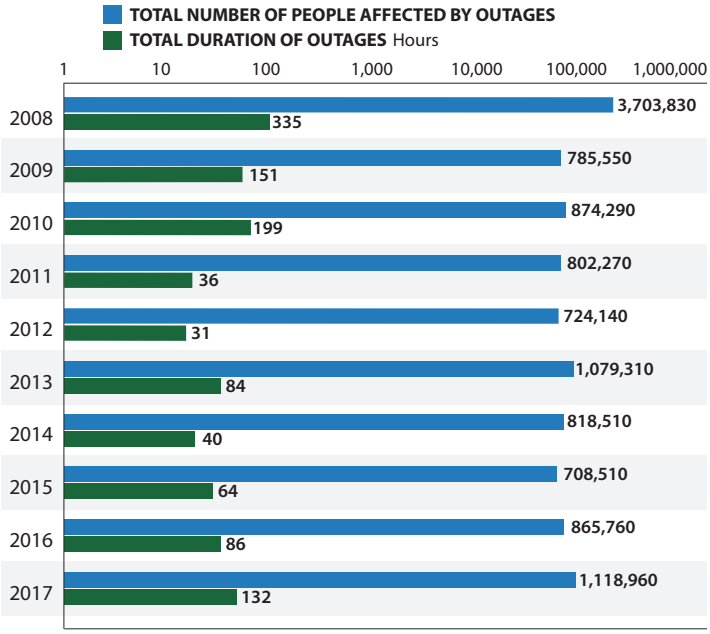
Data Source: EIA

Electric Utility-Reported Outages by Cause, 2008 – 2017



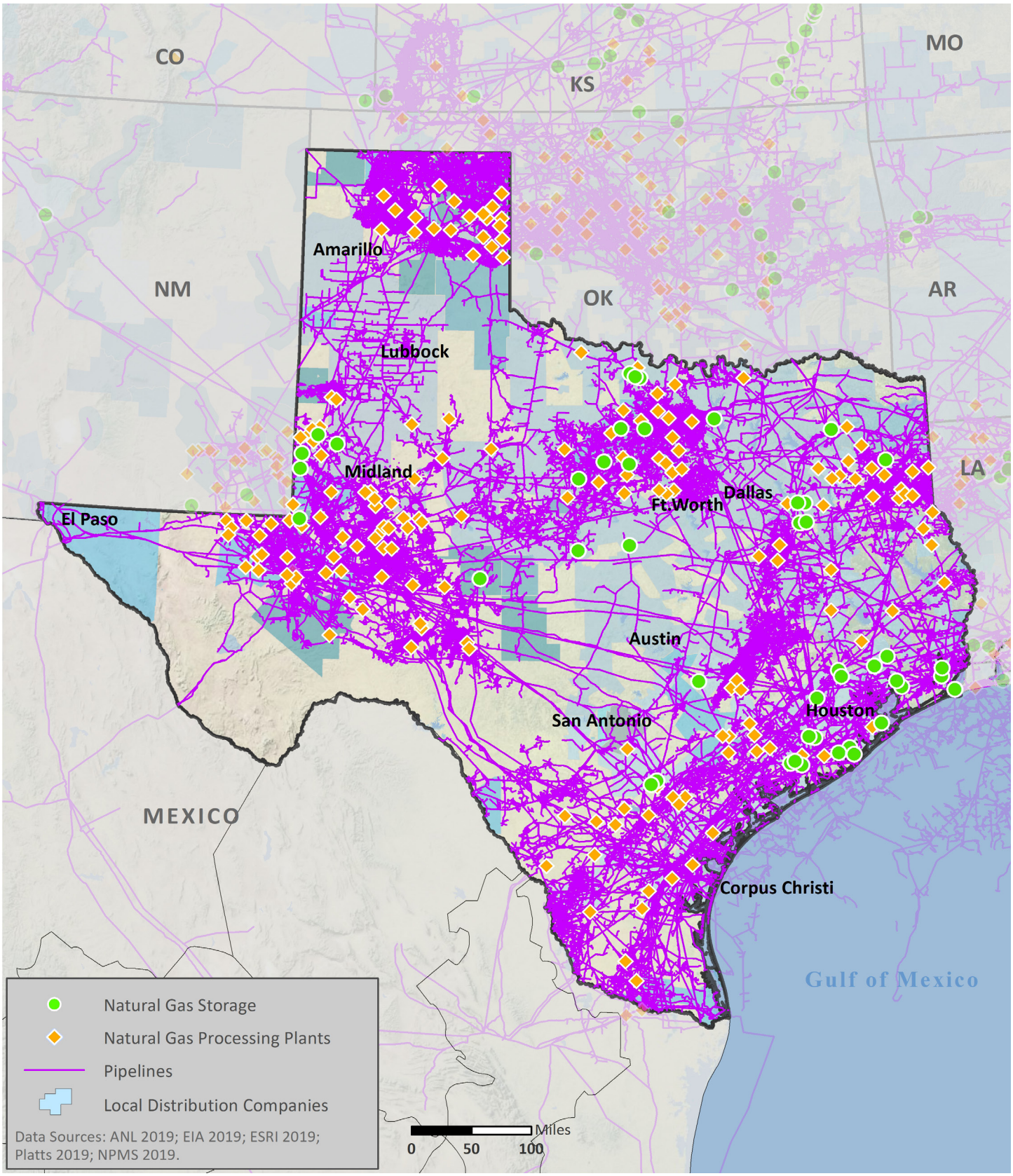
Data Source: Eaton

Electric Utility Outage Data, 2008 – 2017



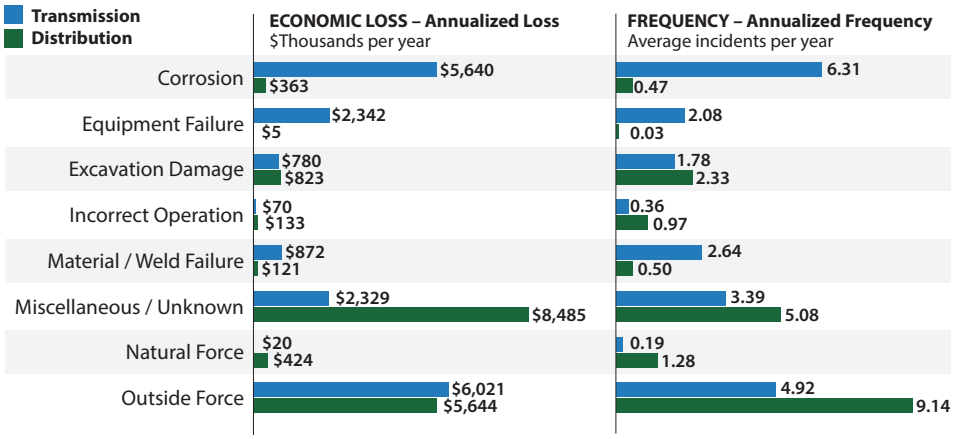
Note: This chart uses a logarithmic scale to display a very wide range of values.
Data Source: Eaton

NATURAL GAS


CO
KS
MO
NM
OK
AR
LA
MEXICO
Gulf of Mexico
Amarillo
Lubbock
Midland
El Paso
Dallas
Ft.Worth
Austin
San Antonio
Houston
Corpus Christi
Natural Gas Storage
Natural Gas Processing Plants
Pipelines
Local Distribution Companies
Data Sources: ANL 2019; EIA 2019; ESRI 2019; Platts 2019; NPMS 2019.
Miles
0
50
100

Natural Gas Transport

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



Data Source: DOT PHMSA

- 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

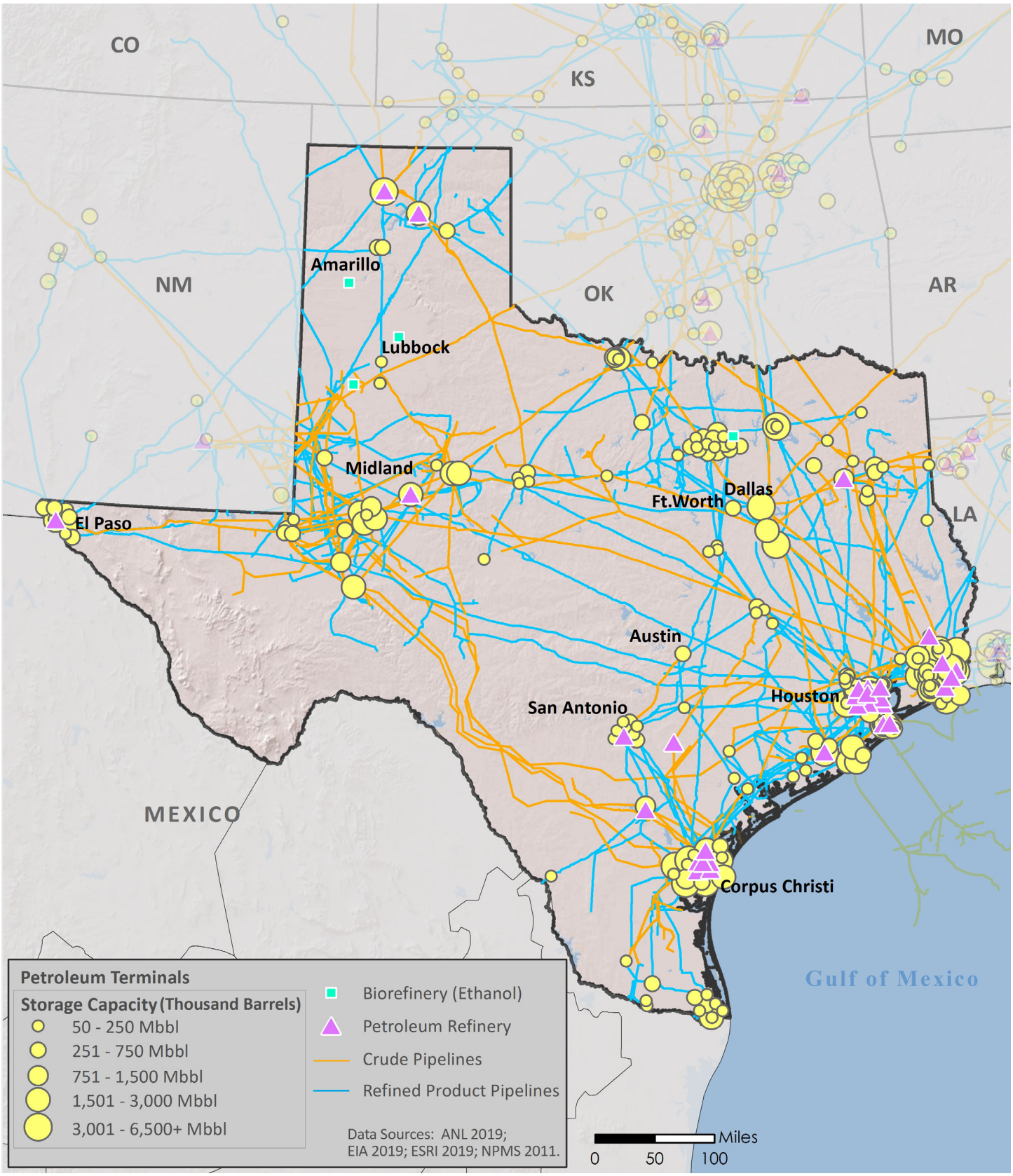
Natural Gas Customers and Consumption by Sector, 2018

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

Data Source: EIA

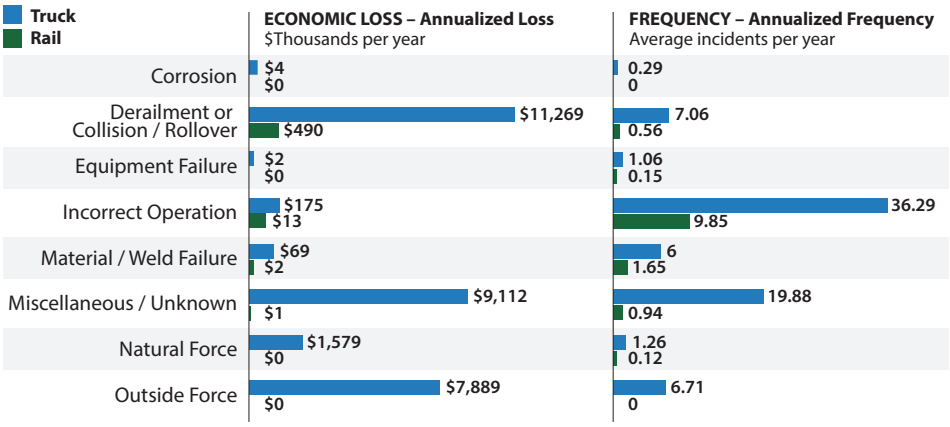
- Texas has 176 natural gas processing facilities with a total capacity of 26,593 MMcf/d.
- Texas has 6 liquefied natural gas (LNG) facilities with a total storage capacity of 11,315,246 barrels.

PETROLEUM


CO
KS
MO
NM
OK
AR
LA
MEXICO
Amarillo
Lubbock
Midland
El Paso
Dallas
Ft.Worth
Austin
San Antonio
Houston
Corpus Christi
Gulf of Mexico
Petroleum Terminals
Storage Capacity (Thousand Barrels)
50 - 250 Mbbl
251 - 750 Mbbl
751 - 1,500 Mbbl
1,501 - 3,000 Mbbl
3,001 - 6,500+ Mbbl
Biorefinery (Ethanol)
Petroleum Refinery
Crude Pipelines
Refined Product Pipelines
Data Sources: ANL 2019;
EIA 2019; ESRI 2019; NPMS 2011.
Miles
0
50
100

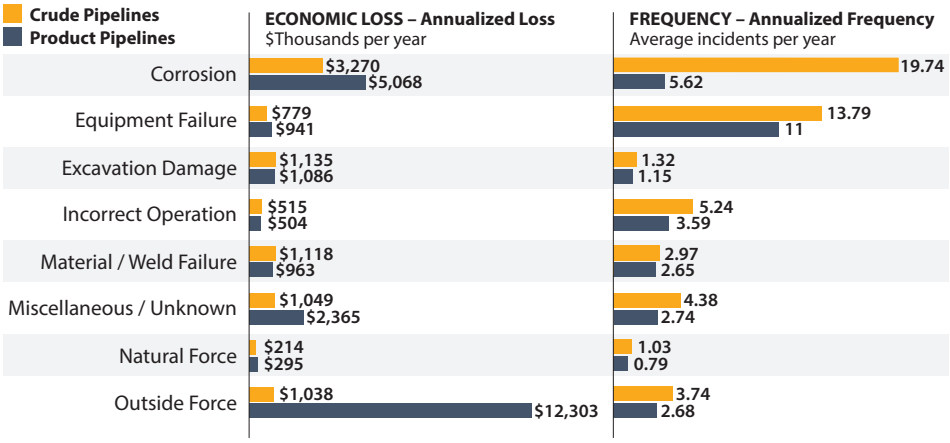
Petroleum Transport

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



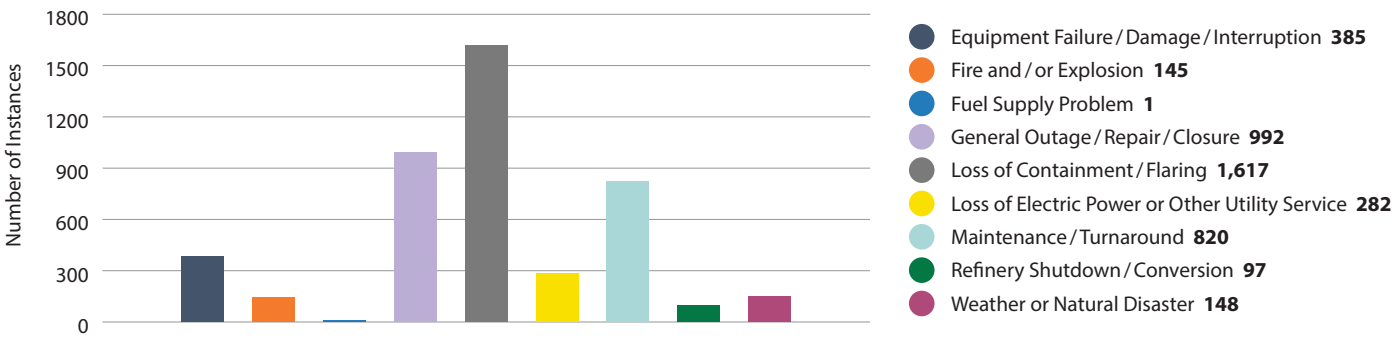
Data Source: DOT PHMSA

- As of 2018, Texas had:
  - *23,785 miles of crude oil pipelines*
  - *10,247 miles of refined product pipelines*
  - *0 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