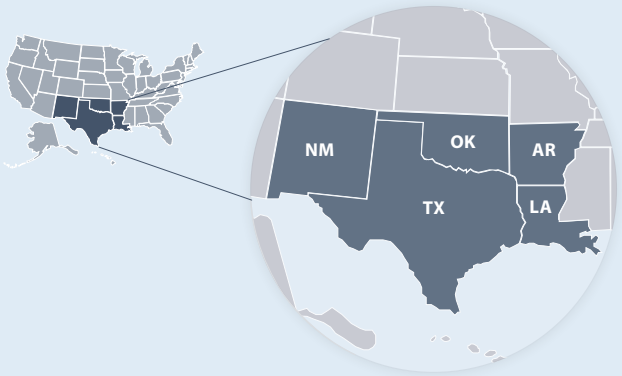
FEMA Region 6
ENERGY SECTOR RISK PROFILE

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



Region 6 Facts

POPULATION
42.41 M

HOUSING UNITS
17.24 M

BUSINESS ESTABLISHMENTS
0.89 M

ENERGY EMPLOYMENT: 910,347 jobs

POPULATION-WEIGHTED AVERAGE ELECTRICITY TARIFF: 8.35 cents/kWh

POPULATION-WEIGHTED ENERGY EXPENDITURES: $4,636/capita

POPULATION-WEIGHTED ENERGY CONSUMPTION PER CAPITA: 505 MMBtu

GDP: $2,491.1 billion

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

ANNUAL ENERGY CONSUMPTION

ELECTRIC POWER: 656,940 GWh
COAL: 119,600 MSTN
NATURAL GAS: 6,760 Bcf
MOTOR GASOLINE: 527,300 Mbbl
DISTILLATE FUEL: 351,200 Mbbl

ANNUAL ENERGY PRODUCTION

ELECTRIC POWER GENERATION: 908 plants, 768.2 TWh, *210.9 GW total capacity*
- **Coal:** 34 plants, 145.1 TWh, *35.0 GW total capacity*
- **Hydro:** 59 plants, 11.0 TWh, *3.1 GW total capacity*
- **Natural Gas:** 288 plants, 402.9 TWh, *126.0 GW total capacity*
- **Nuclear:** 5 plants, 68.9 TWh, *9.2 GW total capacity*
- **Petroleum:** 36 plants, 3.6 TWh, *1.2 GW total capacity*
- **Wind & Solar:** 396 plants, 125.5 TWh, *41.5 GW total capacity*
- **Other sources:** 90 plants, 11.2 TWh, *3.4 GW total capacity*

COAL: 52,910 MSTN
NATURAL GAS: 19,140 Bcf
CRUDE OIL: 2,442,500 Mbbl
ETHANOL: 9,400 Mbbl

Data from EIA (2018, 2019).

This Energy Risk Profile examines the relative magnitude of the risks that Federal Emergency Management Agency (FEMA) Region 6's energy infrastructure routinely encounters in comparison with the probable impacts. FEMA Region 6 includes Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

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.

Region 6 Risks and Hazards Overview

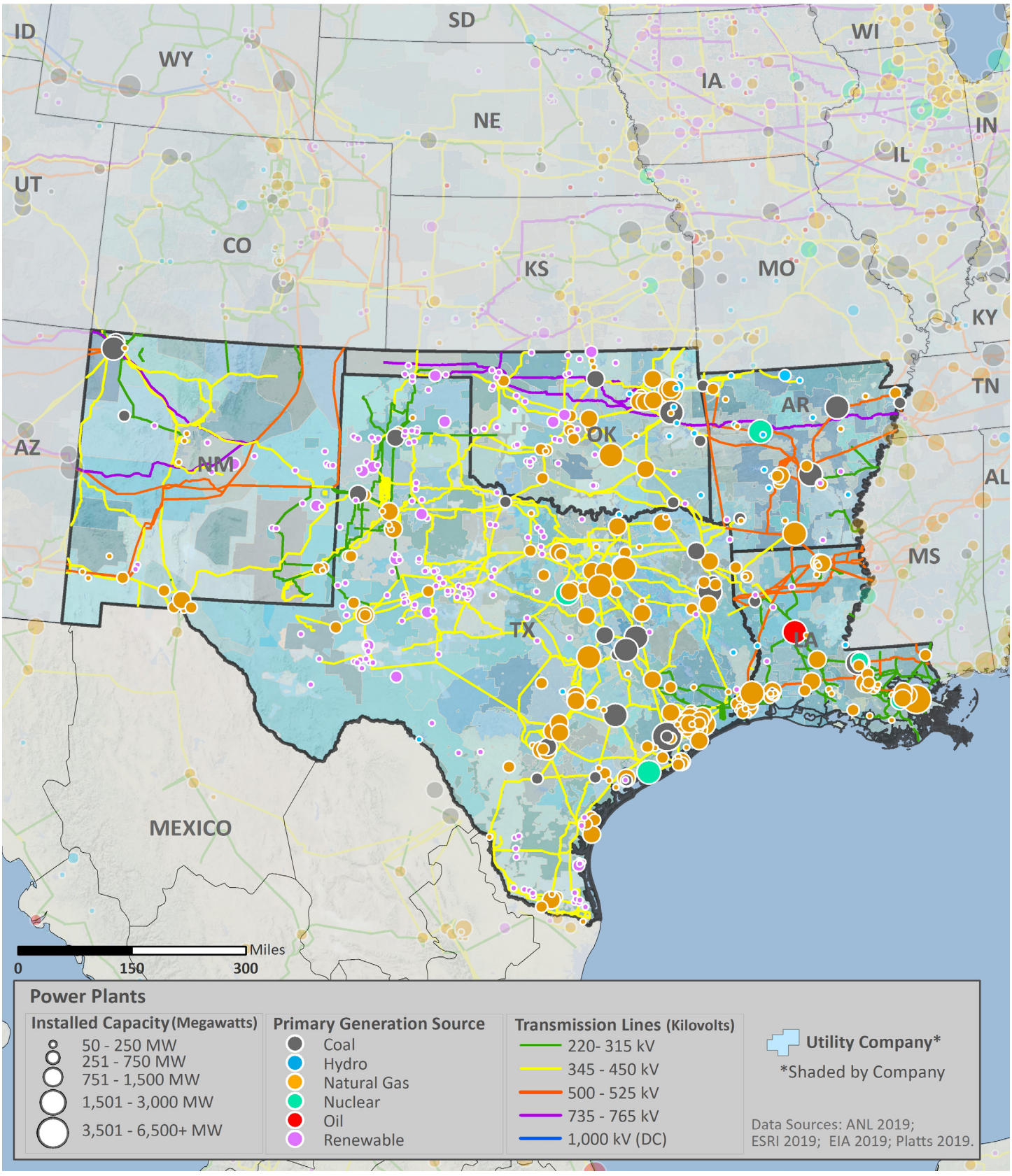
- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Flooding** at $5.5 billion per year *(leading cause nationwide at $12 billion per year)*.
- Region 6 had 1,077 Major Disaster Declarations, 118 Emergency Declarations, and 35 Fire Management Assistance Declarations for 91 events between 2013 and 2019.
- The FEMA Region 6 office is located in Denton, TX.

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

	HAZARD FREQUENCY – Annualized	PROPERTY DAMAGE – Annualized ($Million per year)
Drought	128	$88
Earthquake (≥ 3.5 M)	59	$13
Extreme Heat	36	$0
Flood	283	$5,542
Hurricane	3	$680
Landslide	1	$0
Thunderstorm & Lightning	824	$997
Tornado	131	$451
Wildfire	88	$74
Winter Storm & Extreme Cold	106	$179

Data Sources: NOAA and USGS

ELECTRIC


ID
WY
SD
NE
WI
IA
IN
IL
UT
CO
KS
MO
KY
TN
AR
OK
AZ
NM
AL
MS
TX
LA
MEXICO
Miles
0
150
300
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.

Electric Infrastructure

- Region 6 has 438 electric utilities:
  - *17 Investor owned*
  - *138 Cooperative*
  - *168 Municipal*
  - *115 Other utilities*
- Plant retirements scheduled by 2025: 35 electric generating units totaling 6,217 MW of installed capacity.

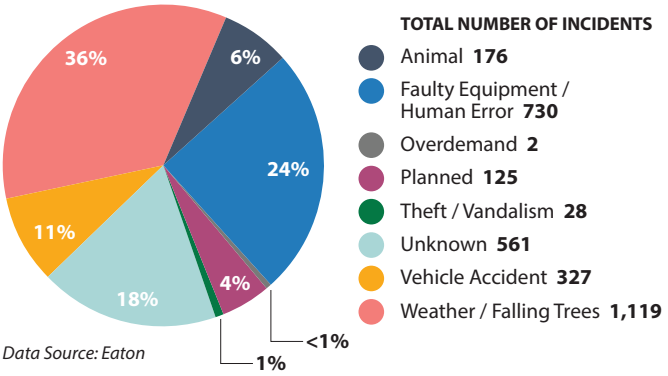
- In 2018, the average Region 6 electric customer experienced 1.5 service interruptions that lasted an average of 3.2 hours.
- Between 2008 and 2017:
  - *In Region 6, the greatest number of electric outages occurred in **August** (3rd for outages nationwide)*
  - *The leading cause of electric outages in Region 6 was **Weather or Falling Trees** (leading cause nationwide)*
  - *Electric outages affected 2,028,704 customers on average*

Electric Customers and Consumption by Sector, 2018

	CUSTOMERS	CONSUMPTION
Residential	86%	37%
Commercial	13%	32%
Industrial	1%	31%
Transportation	<1%	<1%

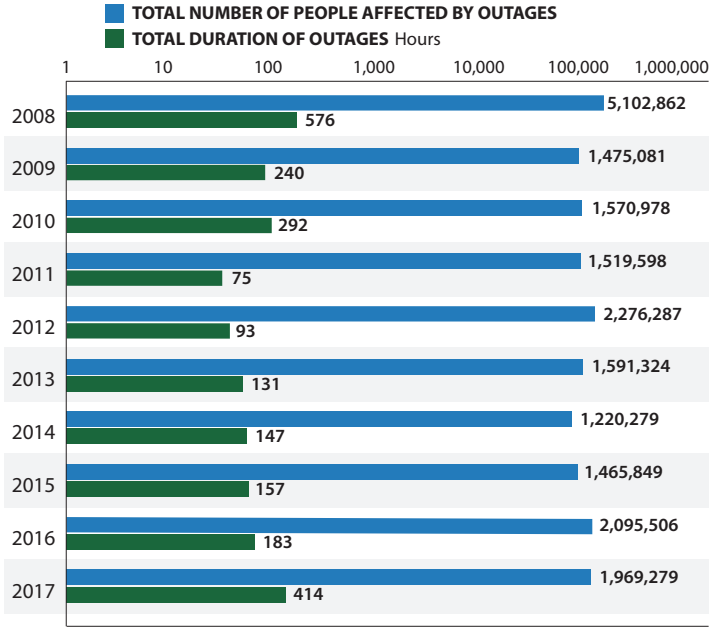
Data Source: EIA

Electric Utility-Reported Outages by Cause, 2008 – 2017



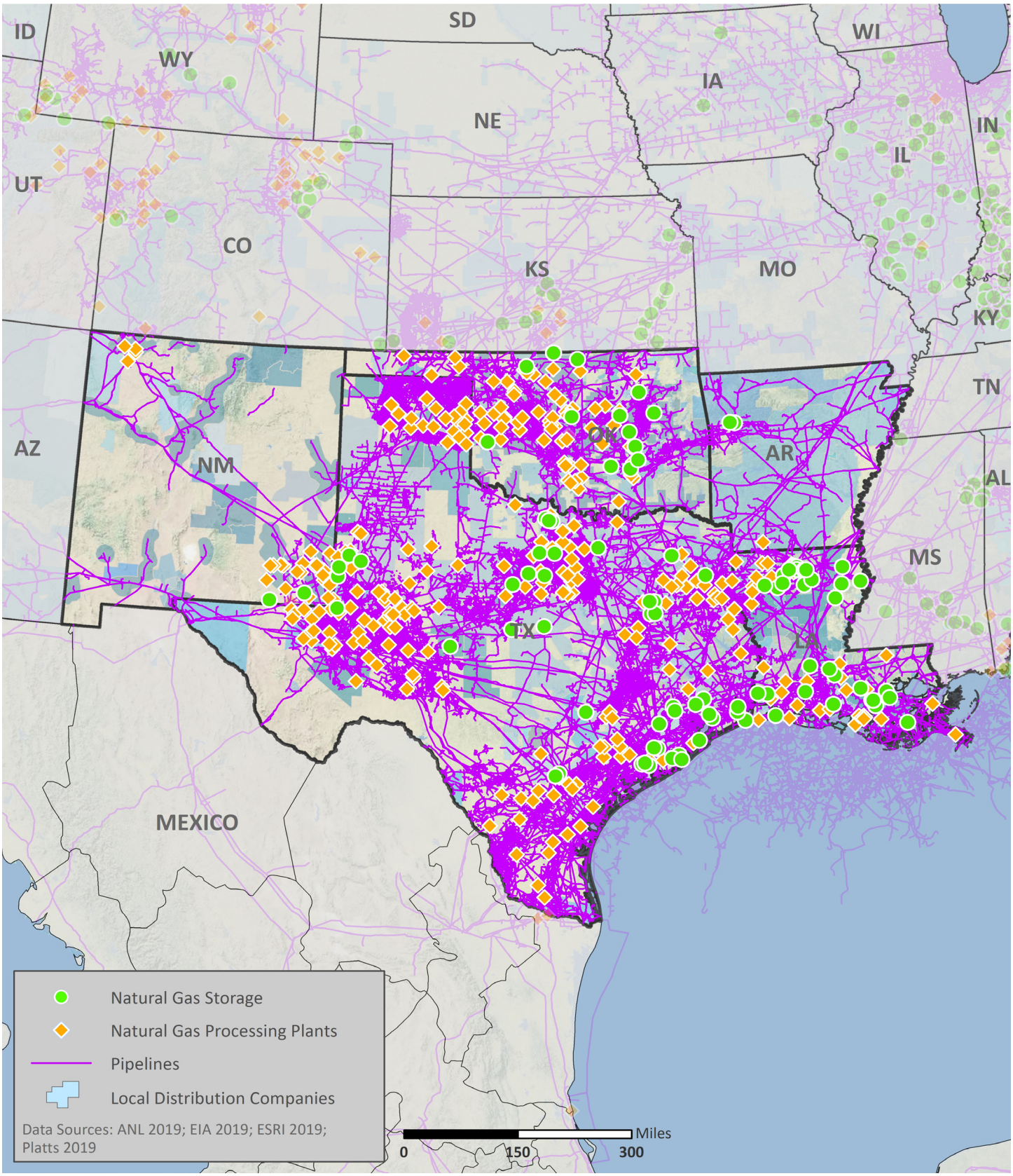
Data Source: Eaton

Electric Utility Outage Data, 2008 – 2017



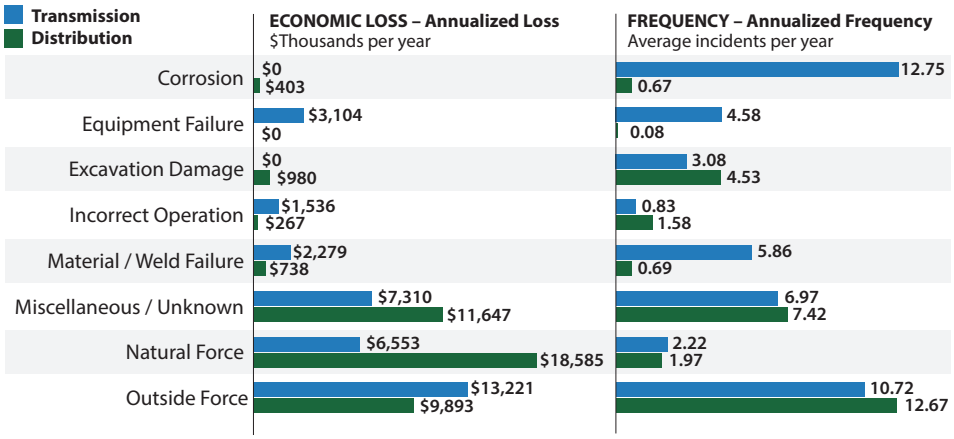
Note: This chart uses a logarithmic scale to display a very wide range of values.
Data Source: Eaton

NATURAL GAS


ID
WY
SD
WI
IA
NE
IN
IL
UT
CO
KS
MO
KY
TN
AZ
NM
OK
AR
AL
MS
TX
LA
MEXICO
Natural Gas Storage
Natural Gas Processing Plants
Pipelines
Local Distribution Companies
Data Sources: ANL 2019; EIA 2019; ESRI 2019; Platts 2019
0
150
300
Miles

Natural Gas Transport

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



Data Source: DOT PHMSA

- As of 2018, Region 6 had:
  - *89,291 miles of natural gas transmission pipelines*
  - *183,440 miles of natural gas distribution pipelines*
- 52% of Region 6's natural gas transmission system and 37% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Region 6's natural gas supply was most impacted by:
  - ***Outside Forces** when transported by transmission pipelines (3rd leading cause nationwide at $20.65M per year)*
  - ***Natural Forces** when transported by distribution pipelines (4th leading cause nationwide at $26.42M per year)*

Natural Gas Processing and Liquefied Natural Gas

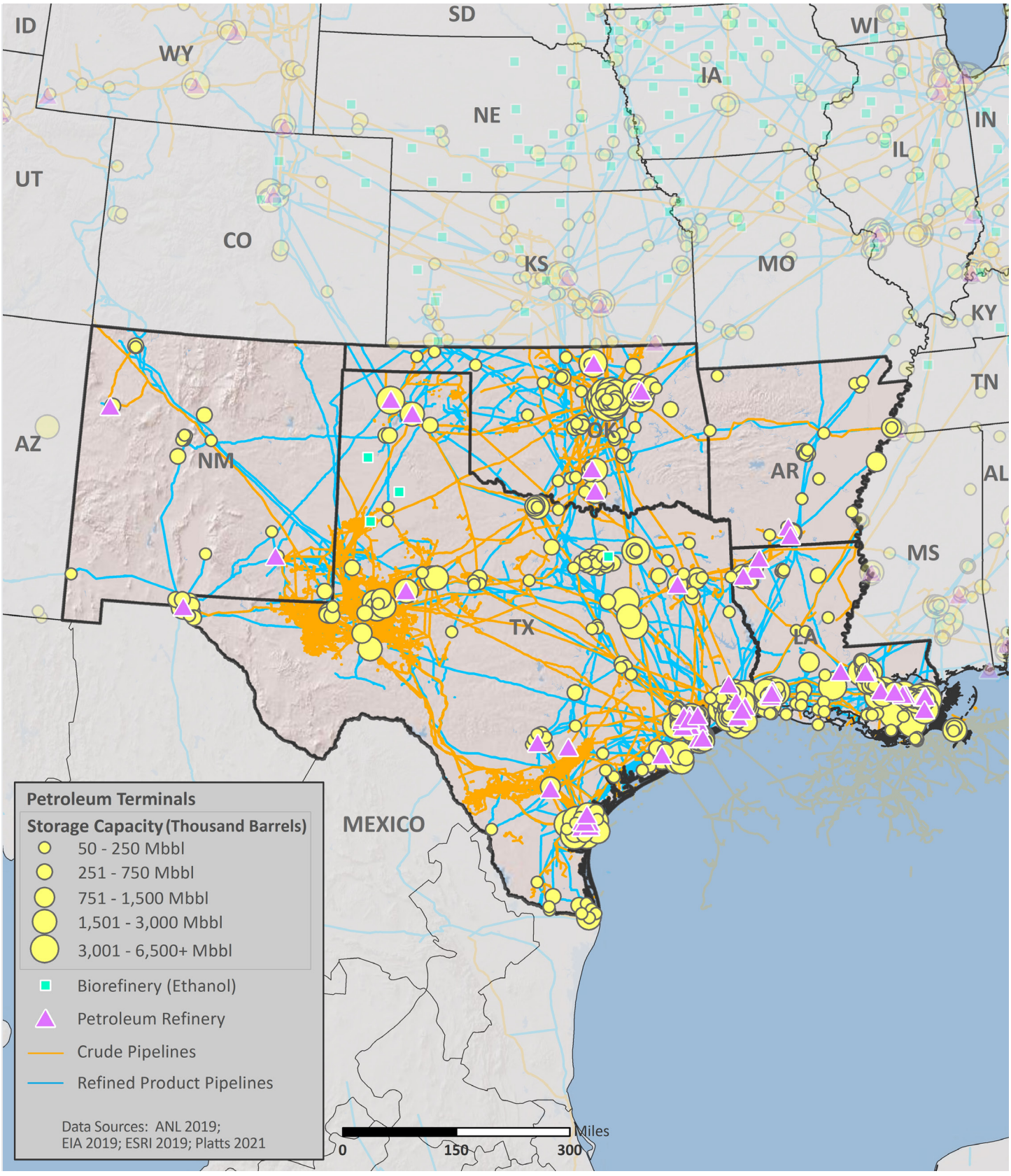
Natural Gas Customers and Consumption by Sector, 2018

	CUSTOMERS	CONSUMPTION
Residential	93%	6%
Commercial	7%	5%
Industrial	<1%	51%
Transportation	<1%	<1%
Electric Power	<1%	38%
Other	<1%	<1%

Data Source: EIA

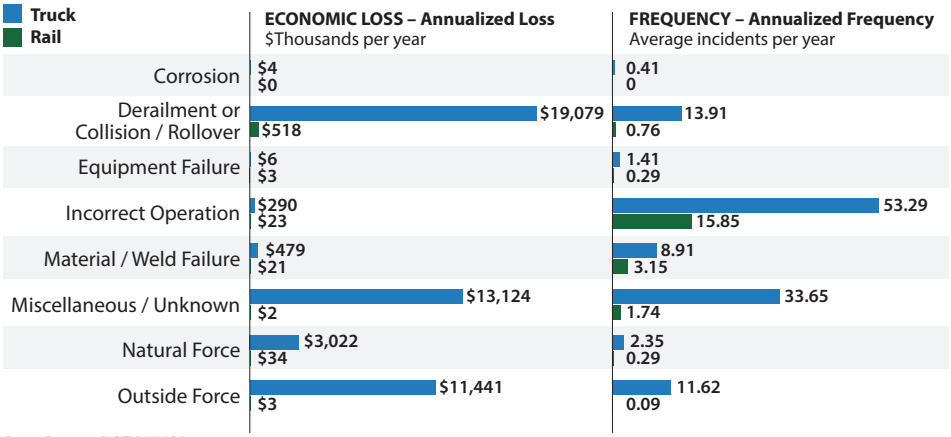
- Region 6 has 307 natural gas processing facilities.
- Region 6 has 10 liquefied natural gas (LNG) facilities with a total storage capacity of 22,240,666 barrels.

PETROLEUM


ID
WY
SD
NE
WI
IA
IL
IN
UT
CO
KS
MO
KY
TN
AZ
NM
OK
AR
AL
MS
TX
LA
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; Platts 2021
0
150
300
Miles

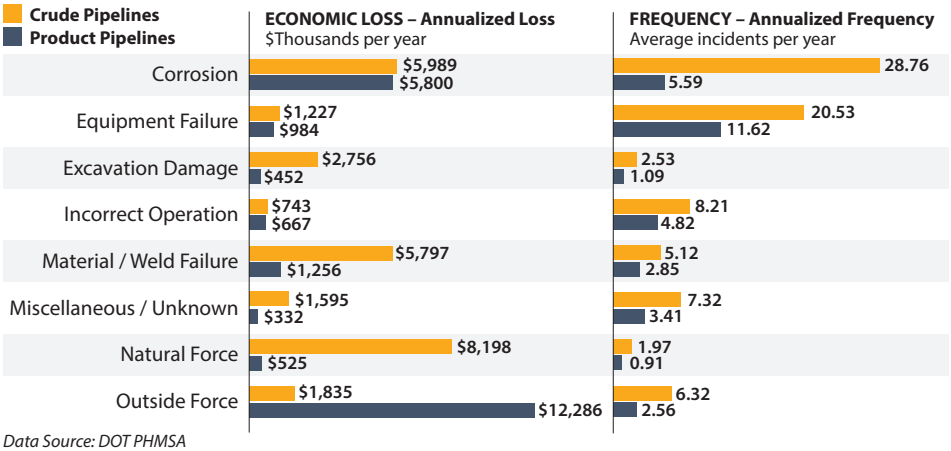
Petroleum Transport

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



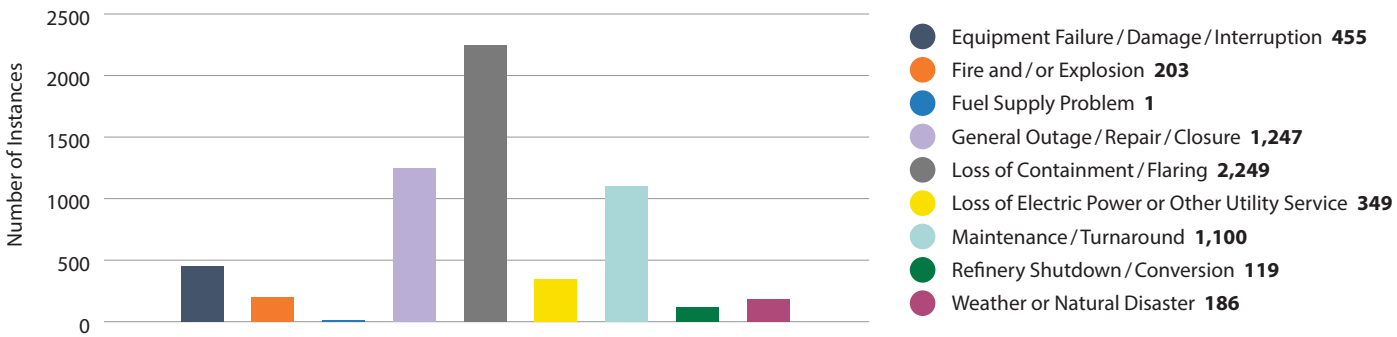
Data Source: DOT PHMSA

- Region 6 is part of Petroleum Administration for Defense Districts (PADDs) 2 and 3.
- As of 2018, Region 6 had:
  - *38,217 miles of crude oil pipelines*
  - *16,740 miles of refined product pipelines*
  - *0 miles of biofuels pipelines*
- 47% of Region 6's petroleum pipeline systems were constructed prior to 1970 or in an unknown year.
- Between 1986 and 2019, Region 6'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)*
  - ***Outside Forces*** *when transported by crude pipelines (4th leading cause nationwide at $8.71M per year)*
  - ***Equipment Failures*** *when transported by product pipelines (6th leading cause nationwide at $4.66M per year)*
- Disruptions in other states may impact supply.

Petroleum Refineries

- Region 6 has 57 petroleum refineries with a total operable capacity of 9,931 Mb/d.

Causes and Frequency of Petroleum Refinery Disruptions, 2009 – 2019



Data Source: Hydrocarbon Publishing