State of Utah
ENERGY SECTOR RISK PROFILE

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

The Risk Profile highlights risk considerations relating to the electric, petroleum and natural gas infrastructures to become more aware of risks to these energy systems and assets.

UTAH STATE FACTS

State Overview
Population: 2.90 million (1% total U.S.)
Housing Units: 1.01 million (1% total U.S.)
Business Establishments: 0.07 million (1% total U.S.)

Annual Energy Consumption
Electric Power: 29.7 TWh (1% total U.S.)
Coal: 14,100 MSTN (2% total U.S.)
Natural Gas: 179 Bcf (1% total U.S.)
Motor Gasoline: 26,700 Mbarrels (1% total U.S.)
Distillate Fuel: 14,700 Mbarrels (1% total U.S.)

Annual Energy Production
Electric Power Generation: 39.4 TWh (1% total U.S.)
Coal: 30.8 TWh, 78% [5.0 GW total capacity]
Petroleum: 0.04 TWh, <1% [0.03 GW total capacity]
Natural Gas: 6.6 TWh, 17% [2.3 GW total capacity]
Nuclear: 0 TWh, 0% [0 GW total capacity]
Hydro: 0.7 TWh, 2% [0.3 GW total capacity]
Other Renewable: 0.7 TWh, 2% [0.3 GW total capacity]

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NATURAL HAZARDS OVERVIEW

Annual Frequency of Occurrence of Natural Hazards in Utah (1996–2014)

- According to NOAA, the most common natural hazard in Utah is Winter Storm & Extreme Cold, which occurs once every 7.4 days on the average during the months of October to March.
- The second-most common natural hazard in Utah is Thunderstorm & Lightning, which occurs once every 8.2 days on the average during the months of March to October.

Annualized Property Loss due to Natural Hazards in Utah (1996–2014)

- As reported by NOAA, the natural hazard in Utah that caused the greatest overall property loss during 1996 to 2014 is Flood at $15.4 million per year.
- The natural hazard with the second-highest property loss in Utah is Tornado at $12.0 million per year.
Electric Power Plants: 63 (<1% total U.S.)
- Coal-fired: 7 (1% total U.S.)
- Petroleum-fired: 3 (<1% total U.S.)
- Natural Gas-fired: 20 (1% total U.S.)
- Nuclear: 0 (0% total U.S.)
- Hydro-electric: 29 (1% total U.S.)
- Other Renewable: 4 (<1% total U.S.)

Transmission Lines:
- High-Voltage (>230 kV): 3,444 Miles
- Low-Voltage (<230 kV): 2,579 Miles
Electric Transmission

- According to NERC, the leading cause of electric transmission outages in Utah is Transmission Line Faults and Overloads.
- Utah experienced 22 electric transmission outages from 1992 to 2009, affecting a total of 686,383 electric customers.
- Transmission Line Faults and Overloads affected the largest number of electric customers as a result of electric transmission outages.


Number of NERC-Reported Electric Transmission Outages by Cause (1992–2009)

Data Source: NERC

Electric Distribution

Electric Utility Reported Power Outages by Month (2008–2013)

Between 2008 and 2013, the greatest number of electric outages in Utah has occurred during the month of August.

The leading cause of electric outages in Utah during 2008 to 2013 was Weather/Falling Trees.

On average, the number of people affected annually by electric outages during 2008 to 2013 in Utah was 181,753.

The average duration of electric outages in Utah during 2008 to 2013 was 2,350 minutes or 39.2 hours a year.


Utility Outage Data (2008–2013)

NOTE: # of Incidents – The number within each pie slice is the number of event incidents attributable to each cause.
PETROLEUM

Petroleum Infrastructure Overview
Refineries: 5 (3% total U.S.)
Terminals: 11 (1% total U.S.)
Crude Pipelines: 655 Miles (1% total U.S.)
Product Pipelines: 11,040 Miles (2% total U.S.)
Bio-Refineries (Ethanol): 0 (0% total U.S.)
Petroleum Transport

Top Events Affecting Petroleum Transport by Truck and Rail (1986–2014)

The leading event type affecting the transport of petroleum product by rail and truck in Utah during 1986 to 2014 was Incorrect Operation for rail transport and Miscellaneous/Unknown for truck transport, with an average 1.6 and 3.9 incidents per year, respectively.

Petroleum Refinery

The leading cause of petroleum refinery disruptions in Utah from 2003 to 2014 was Fire and/or Explosion. Utah’s petroleum refineries experienced 35 major incidents from 2003 to 2014. The average production impact from disruptions of Utah’s refineries from 2003 to 2014 is 6.3 thousand barrels per day.
NATURAL GAS

Natural Gas Infrastructure Overview
Gas Wells: 7,073 (1% total U.S.)
Processing Plants: 16 (3% total U.S.)
Storage Fields: 3 (1% total U.S.)
Interstate Pipelines: 8,160 Miles (2% total U.S.)
Local Distribution Companies: 8 (<1% total U.S.)

Data Sources: ANL 2013; EIA 2014; ESRI 2012; Platts 2014; NPMS 2011.
Natural Gas Transport

The leading event type affecting natural gas transmission and distribution pipelines in Utah during 1986 to 2014 was Equipment Failure for Transmission Pipelines and Outside Force for Distribution Pipelines, with an average 0.16 and 0.74 incidents per year (or one incident every 6.2 and 1.3 years), respectively.

Top Events Affecting Natural Gas Transmission and Distribution in Utah (1986–2014)

Data Source: DOT PHMSA

Natural Gas Processing

Insufficient public data are available on major incidents affecting natural gas processing plants in this state.
Overview Information

- Census Bureau (2012) State and County QuickFacts [http://quickfacts.census.gov/qfd/download_data.html]

Production Numbers

- EIA (2013) Natural Gas Gross Withdrawals and Production [http://www.eia.gov/dnav/ng/neprodsum_n_a_EPG0_VGM_mmcf_a.htm]

Consumption Numbers


Electricity

- Platts (2014 Q2) Transmission Lines (Miles by Voltage Level)
- Platts (2014 Q2) Power Plants (Production and Capacity by Type)

Petroleum

- Argonne National Laboratory (2012) Petroleum Terminal Database
- Argonne National Laboratory (2014) Ethanol Plants
- NPMS (2011) Petroleum Product Pipeline (Miles of Interstate Pipeline)
- NPMS (2011) Crude Pipeline (Miles of Interstate Pipeline)

Natural Gas

- EIA (2013) Number of Producing Gas Wells [http://www.eia.gov/dnav/ng/ng_prodwells_s1_a.htm]
- NPMS (2011) Natural Gas Pipeline (Miles of Interstate Pipeline)
- Platts (2014 Q2) Local Distribution Companies (LDCs)

Event Related


*The NERC disturbance reports are not published after 2009.

Notes

- Natural Hazard, Other, includes extreme weather events such as astronomical low tide, dense smoke, frost/freeze, and rip currents.
- Each incident type is an assembly of similar causes reported in the data source. Explanations for the indescribable incident types are below.
  - Outside Force refers to pipeline failures due to vehicular accident, sabotage, or vandalism.
  - Natural Forces refers to damage that occurs as a result of naturally occurring events (e.g., earth movements, flooding, high winds, etc.)
  - Miscellaneous/Unknown includes releases or failures resulting from any other cause not listed or of an unknowable nature.
  - Overdemand refers to outages that occur when the demand for electricity is greater than the supply, causing forced curtailment.
- Number (#) of Incidents – The number within each pie chart piece is the number of outages attributable to each cause.

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