State of Nevada
ENERGY SECTOR RISK PROFILE

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

NEVADA STATE FACTS

State Overview
- Population: 2.79 million (1% total U.S.)
- Housing Units: 1.19 million (1% total U.S.)
- Business Establishments: 0.06 million (1% total U.S.)

Annual Energy Consumption
- Electric Power: 35.2 TWh (1% total U.S.)
- Coal: 2,600 MSTN (<1% total U.S.)
- Natural Gas: 359 Bcf (2% total U.S.)
- Motor Gasoline: 22,300 Mbarrels (1% total U.S.)
- Distillate Fuel: 8,600 Mbarrels (1% total U.S.)

Annual Energy Production
- Electric Power Generation: 35.2 TWh (1% total U.S.)
  - Coal: 4.1 TWh, 12% [1.4 GW total capacity]
  - Petroleum: 0 TWh, 0% [0 GW total capacity]
  - Natural Gas: 25.6 TWh, 73% [8.8 GW total capacity]
  - Nuclear: 0 TWh, 0% [0 GW total capacity]
  - Hydro: 2.4 TWh, 7% [1.1 GW total capacity]
  - Other Renewable: 0.1 TWh, <1% [0.5 GW total capacity]

NATURAL HAZARDS OVERVIEW

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

- Thunderstorm & Lightning: 50
- Hurricane: 3
- Other: 2
- Tornado: 1
- Wildfire: 27
- Earthquake (3.5+): 4
- Flood: 14
- Extreme Heat: 16

As reported by NOAA, the natural hazard in Nevada that caused the greatest overall property loss during 1996 to 2014 is Flood at $5.1 million per year.

The natural hazard with the second-highest property loss in Nevada is Thunderstorm & Lightning at $2.9 million per year.

Data Source: NOAA

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

- Flood: $5.1 million per year
- Tornado: $2.9 million per year
- Wildfire: $0.4 million per year
- Earthquake: $0.2 million per year
- Other: $0.4 million per year
- Hurricane: $0.2 million per year
- Extreme Heat: $0.2 million per year
- Other: $0.2 million per year
- Earthquake: $0.1 million per year
- Tornado: $0.1 million per year
- Wildfire: $0.0 million per year
- Flood: $0.0 million per year

Data Source: NOAA

- According to NOAA, the most common natural hazard in Nevada is Thunderstorm & Lightning, which occurs once every 7.3 days on the average during the months of March to October.

- The second-most common natural hazard in Nevada is Winter Storm & Extreme Cold, which occurs once every 13.8 days on the average during the months of October to March.
Electric Power Plants: 40 (0% total U.S.)
- Coal-fired: 3 (<1% total U.S.)
- Petroleum-fired: 2 (<1% total U.S.)
- Natural Gas-fired: 19 (1% total U.S.)
- Nuclear: 0 (0% total U.S.)
- Hydro-electric: 6 (<1% total U.S.)
- Other Renewable: 10 (<1% total U.S.)

Transmission Lines:
- High-Voltage (>230 kV): 1,395 Miles
- Low-Voltage (<230 kV): 415 Miles
Electric Transmission

- According to NERC, the leading cause of electric transmission outages in Nevada is Transmission Line Faults and Overloads.
- Nevada experienced 11 electric transmission outages from 1992 to 2009, affecting a total of 442,501 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)

Electric Distribution

- Between 2008 and 2013, the greatest number of electric outages in Nevada has occurred during the month of March.
- The leading cause of electric outages in Nevada during 2008 to 2013 was Faulty Equipment/Human Error.
- On average, the number of people affected annually by electric outages during 2008 to 2013 in Nevada was 66,345.
- The average duration of electric outages in Nevada during 2008 to 2013 was 1,795 minutes or 29.9 hours a year.

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


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: 1 (1% total U.S.)
- Terminals: 11 (1% total U.S.)
- Crude Pipelines: 0 Miles (0% total U.S.)
- Product Pipelines: 1,620 Miles (<1% total U.S.)
- Bio-Refineries (Ethanol): 0 (0% total U.S.)
Petroleum Transport

The leading event type affecting the transport of petroleum product by rail and truck in Nevada during 1986 to 2014 was Incorrect Operation for rail transport and Incorrect Operation for truck transport, with an average 1.1 and 1.2 incidents per year, respectively.

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

- Outside Force
- Natural Forces
- Miscellaneous / Unknown
- Material / Weld Failures
- Incorrect Operation
- Equipment Failure
- Derailment or Collision / Rollover
- Corrosion

Economic Loss
- Annualized Loss ($ Thousands per year)
- Accident Type

Frequency
- Annualized Frequency (Average Incidents per year)
- Accident Type

Data Source: DOT PHMSA

The leading event type affecting petroleum product pipelines in Nevada during 1986 to 2014 was Equipment Failure, with an average 0.07 incidents per year (or one incident every 14.5 years). There are no crude oil pipelines in the State of Nevada.

Top Events Affecting Crude Oil and Refined Product Pipelines in Nevada (1986–2014)

- Corrosion
- Natural Forces
- Incorrect Operation
- Excavation Damage
- Miscellaneous / Unknown
- Material / Weld Failures
- Equipment Failure
- Outside Force

Economic Loss
- Annual Loss ($ Thousands per Year)

Frequency
- Annual Frequency (Average per Year)

Data Source: DOT PHMSA

Petroleum Refinery

Public data available on major incidents affecting petroleum refineries shows Nevada’s petroleum refinery experienced 0 major incidents from 2003 to 2014.
NATURAL GAS

Natural Gas Infrastructure Overview
Gas Wells: 0 (0% total U.S.)
Processing Plants: 0 (0% total U.S.)
Storage Fields: 0 (0% total U.S.)
Interstate Pipelines: 6,480 Miles (1% total U.S.)
Local Distribution Companies: 9 (1% total U.S.)
Natural Gas Transport

The leading event type affecting natural gas transmission and distribution pipelines in Nevada during 1986 to 2014 was **Outside Force** for Transmission Pipelines and **Outside Force** for Distribution Pipelines, with an average 0.19 and 0.39 incidents per year (or one incident every 5.2 and 2.6 years), respectively.

**Top Events Affecting Natural Gas Transmission and Distribution in Nevada (1986-2014)**

- **Corrosion**: $3
- **Equipment Failure**: $3
- **Excavation Damage**: $12
- **Incorrect Operation**: $6
- **Material / Weld Failures**: $6
- **Miscellaneous / Unknown**: $11
- **Natural Forces**: $0
- **Outside Force**: $12

**Economic Loss**

- **Transmission**: $355
- **Distribution**: $30

**Frequency**

- **Transmission**: 0.23
- **Distribution**: 0.39

Data Source: DOT PHMSA
Overview Information

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

Production Numbers


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_prod_wells_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.

FOR MORE INFORMATION CONTACT:

Alice Lippert
Senior Technical Advisor
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
email: energyanalysis@hq.doe.gov