State of Idaho
ENERGY SECTOR RISK PROFILE

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

IDAHO STATE FACTS

<table>
<thead>
<tr>
<th>State Overview</th>
<th>Annual Energy Production</th>
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</thead>
<tbody>
<tr>
<td>Population: 1.61 million (1% total U.S.)</td>
<td>Electric Power Generation: 15.5 TWh (&lt;1% total U.S.)</td>
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<td>Housing Units: 0.68 million (1% total U.S.)</td>
<td>Coal: 0.1 TWh, &lt;1% [0 GW total capacity]</td>
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<td>Business Establishments: 0.04 million (1% total U.S.)</td>
<td>Petroleum: 0 TWh, 0% [0 GW total capacity]</td>
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<tr>
<td>Annual Energy Consumption</td>
<td>Natural Gas: 1.9 TWh, 12% [1.3 GW total capacity]</td>
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<tr>
<td>Electric Power: 23.7 TWh (1% total U.S.)</td>
<td>Nuclear: 0 TWh, 0% [0 GW total capacity]</td>
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<td>Coal: 200 MSTN (&lt;1% total U.S.)</td>
<td>Hydro: 10.9 TWh, 71% [2.5 GW total capacity]</td>
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<td>Natural Gas: 911 Bcf (4% total U.S.)</td>
<td>Other Renewable: 1.9 TWh, 12% [1.1 GW total capacity]</td>
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<tr>
<td>Motor Gasoline: 16,900 Mbarrels (1% total U.S.)</td>
<td>Coal: 0 MSTN (0% total U.S.)</td>
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<td>Distillate Fuel: 9,600 Mbarrels (1% total U.S.)</td>
<td>Natural Gas: 0 Bcf (0% total U.S.)</td>
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<td>Crude Oil: 0 Mbarrels (0% total U.S.)</td>
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<td>Ethanol: 1,200 Mbarrels (&lt;1% total U.S.)</td>
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NATURAL HAZARDS OVERVIEW

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

- According to NOAA, the most common natural hazard in Idaho is Winter Storm & Extreme Cold, which occurs once every 7.7 days on the average during the months of October to March.
- The second-most common natural hazard in Idaho is Thunderstorm & Lightning, which occurs once every 8.9 days on the average during the months of March to October.

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

- As reported by NOAA, the natural hazard in Idaho that caused the greatest overall property loss during 1996 to 2014 is Flood at $6.0 million per year.
- The natural hazard with the second-highest property loss in Idaho is Wildfire at $1.2 million per year.
Electric Power Plants: 117 (1% total U.S.)
- Coal-fired: 2 (<1% total U.S.)
- Petroleum-fired: 1 (<1% total U.S.)
- Natural Gas-fired: 7 (<1% total U.S.)
- Nuclear: 0 (0% total U.S.)
- Hydro-electric: 72 (2% total U.S.)
- Other Renewable: 35 (1% total U.S.)

Transmission Lines:
- High-Voltage (>230 kV): 4,366 Miles
- Low-Voltage (<230 kV): 2,925 Miles
**Electric Transmission**

- According to NERC, the leading cause of electric transmission outages in Idaho is **Faulty Equipment/Human Error**.
- Idaho experienced **39 electric transmission outages** from 1992 to 2009, affecting a total of **347,450 electric customers**.
- **Transmission Line Faults and Overloads** affected the largest number of electric customers as a result of electric transmission outages.


```
Faulty Equipment / Human Error: 242,000
Transmission Line Faults and Overloads: 35,230
Protection System Misoperation: 0
Severe Weather - Lightning: 39,000
Unknown Cause: 22,005
All Other Causes: 9,215
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**Number of NERC-Reported Electric Transmission Outages by Cause (1992–2009)**

```
- 242,000: Faulty Equipment / Human Error
- 35,230: Transmission Line Faults and Overloads
- 39,000: Severe Weather - Lightning
- 22,005: All Other Causes
- 9,215: Unknown Cause
```

**Electric Distribution**

- Between 2008 and 2013, the greatest number of electric outages in Idaho has occurred during the month of **July**.
- The leading cause of electric outages in Idaho during 2008 to 2013 was **Weather/Falling Trees**.
- On average, the number of people affected annually by electric outages during 2008 to 2013 in Idaho was **98,987**.
- The average duration of electric outages in Idaho during 2008 to 2013 was **2,113 minutes or 35.2 hours a year**.

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

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- July: 14
- June: 12
- August: 11
- September: 10
- October: 9
- November: 8
- December: 6
- January: 5
- February: 4
- March: 3
- April: 2
- May: 1

Data Source: Eaton
```


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- Faulty Equipment / Human Error: 72
- Overdemand: 26
- Planned: 23
- Theft / Vandalism: 21
- Vehicle Accident: 17
- Weather / Falling Trees: 10
- 10,000:

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**Utility Outage Data for 2008–2013**

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- Total number of people affected by outages:
  - 2007: 18,386,000
  - 2008: 117,240,000
  - 2009: 60,610,000
  - 2010: 37,720,000
  - 2011: 29,893,000
  - 2012: 117,240,000
  - 2013: 106,820,000

- Total duration of outages (minutes):
  - 2007: 6,390
  - 2008: 2,110
  - 2009: 4,410
  - 2010: 1,400
  - 2011: 1,710
  - 2012: 510
  - 2013: 510

Data Source: Eaton
```

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

Petroleum Infrastructure Overview
- Refineries: 0 (0% total U.S.)
- Terminals: 11 (1% total U.S.)
- Crude Pipelines: 0 Miles (0% total U.S.)
- Product Pipelines: 2,400 Miles (<1% total U.S.)
- Bio-Refineries (Ethanol): 2 (1% total U.S.)

Petroleum Terminals
- Storage Capacity (Thousand Barrels)
  - 50 - 250
  - 251 - 750
  - 751 - 1,500
  - 1,501 - 3,000
  - 3,001 - 6,500+

Data Sources: ACE 2012; ANL 2013; EIA 2014; ESRI 2012; NEMS 2011.
Petroleum Transport

The leading event type affecting the transport of petroleum product by rail and truck in Idaho during 1986 to 2014 was Incorrect Operation for rail transport and Collision/Rollover for truck transport, with an average 0.9 (or one incident every 1.1 years) and 1.7 incidents per year, respectively.

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

The leading event type affecting petroleum product pipelines in Idaho during 1986 to 2014 was Corrosion, with an average 0.14 incidents per year (or one incident every 7.3 years). There are no crude oil pipelines in the State of Idaho.

Top Events Affecting Crude Oil and Refined Product Pipelines in Idaho (1986–2014)
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: 6,000 Miles (1% total U.S.)
Local Distribution Companies: 7 (<1% total U.S.)
Natural Gas Transport

The leading event type affecting natural gas transmission and distribution pipelines in Idaho during 1986 to 2014 was Material/Weld Failures for Transmission Pipelines and Outside Force for Distribution Pipelines, with an average 0.32 and 0.16 incidents per year (or one incident every 3.1 and 6.2 years), respectively.

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

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:
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
Phone: 202-586-2264
Email: energyresponsecenter@hq.doe.gov