State of New Jersey
ENERGY SECTOR RISK PROFILE

This State Energy Risk Profile examines the relative magnitude of the risks that the State of New Jersey'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.

NEW JERSEY STATE FACTS

<table>
<thead>
<tr>
<th>State Overview</th>
<th>Annual Energy Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population: 8.90 million (3% total U.S.)</td>
<td>Electric Power Generation: 65.3 TWh (2% total U.S.)</td>
</tr>
<tr>
<td>Housing Units: 3.58 million (3% total U.S.)</td>
<td>Coal: 1.9 TWh, 3% [2.1 GW total capacity]</td>
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<tr>
<td>Business Establishments: 0.23 million (3% total U.S.)</td>
<td>Petroleum: 0.1 TWh, &lt;1% [1.4 GW total capacity]</td>
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<tr>
<td></td>
<td>Natural Gas: 28.3 TWh, 43% [12.1 GW total capacity]</td>
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<tr>
<td>Annual Energy Consumption</td>
<td>Nuclear: 33.1 TWh, 51% [4.2 GW total capacity]</td>
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<tr>
<td>Electric Power: 75.1 TWh (2% total U.S.)</td>
<td>Hydro: 0.2 TWh, 0% [0.5 GW total capacity]</td>
</tr>
<tr>
<td>Coal: 1,000 MSTN (&lt;1% total U.S.)</td>
<td>Other Renewable: 0 TWh, &lt;1% [0.2 GW total capacity]</td>
</tr>
<tr>
<td>Natural Gas: 152 Bcf (1% total U.S.)</td>
<td>Coal: 0 MSTN (0% total U.S.)</td>
</tr>
<tr>
<td>Motor Gasoline: 97,200 Mbarrels (3% total U.S.)</td>
<td>Natural Gas: 0 Bcf (0% total U.S.)</td>
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<tr>
<td>Distillate Fuel: 27,300 Mbarrels (2% total U.S.)</td>
<td>Crude Oil: 0 Mbarrels (0% total U.S.)</td>
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<tr>
<td></td>
<td>Ethanol: 0 Mbarrels (0% total U.S.)</td>
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</tbody>
</table>

NATURAL HAZARDS OVERVIEW

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

According to NOAA, the most common natural hazard in New Jersey is Thunderstorm & Lightning, which occurs once every 5.5 days on the average during the months of March to October.

The second-most common natural hazard in New Jersey is Flood, which occurs once every 10.1 days on the average.

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

As reported by NOAA, the natural hazard in New Jersey that caused the greatest overall property loss during 1996 to 2014 is Flood at $131.4 million per year.

The natural hazard with the second-highest property loss in New Jersey is Tornado at $86.5 million per year.
**Electric Power Plants:** 146 (1% total U.S.)
- Coal-fired: 5 (<1% total U.S.)
- Petroleum-fired: 15 (1% total U.S.)
- Natural Gas-fired: 47 (1% total U.S.)
- Nuclear: 3 (2% total U.S.)
- Hydro-electric: 3 (<1% total U.S.)
- Other Renewable: 73 (3% total U.S.)

**Transmission Lines:**
- High-Voltage (>230 kV): 516 Miles
- Low-Voltage (<230 kV): 578 Miles

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**Energy Sector Risk Profile**

State of New Jersey

**Electric**
Electric Transmission

- According to NERC, the leading cause of electric transmission outages in New Jersey is **Major Generation Inadequacy**.
- New Jersey experienced **14 electric transmission outages** from 1992 to 2009, affecting a total of **1,633,790 electric customers**.
- **Complete Electrical System Failure** affected the largest number of electric customers as a result of electric transmission outages.

![Electric Customers Disrupted by NERC-Reported Electric Transmission Outages by Cause (1992–2009) graph](image)

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

<table>
<thead>
<tr>
<th>Cause</th>
<th># of Incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Generation Inadequacy</td>
<td>88,000</td>
</tr>
<tr>
<td>Faulty Equipment / Human Error</td>
<td>80,000</td>
</tr>
<tr>
<td>Severe Weather - High Winds</td>
<td>54,790</td>
</tr>
<tr>
<td>Complete Electrical System Failure</td>
<td>382,000</td>
</tr>
<tr>
<td>Natural Disaster - Hurricane / Tropical Storm</td>
<td>29,001</td>
</tr>
<tr>
<td>All Other Causes</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>

Data Source: NERC

Electric Distribution

- Between 2008 and 2013, the greatest number of electric outages in New Jersey have occurred during the month of **July**.
- The leading cause of electric outages in New Jersey during 2008 to 2013 was **Weather/Falling Trees**.
- On average, the number of people affected annually by electric outages during 2008 to 2013 in New Jersey was **1,131,997**.
- The average duration of electric outages in New Jersey during 2008 to 2013 was **5,188 minutes or 86.5 hours a year**.

![Electric Utility Reported Power Outages by Month (2008–2013) graph](image)

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

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- **The average duration of electric outages in New Jersey during 2008 to 2013 was 5,188 minutes or 86.5 hours a year.**

![Causes of Electric-Utility Reported Outages (2008–2013) pie chart](image)


- **Animal**: 196
- **Faulty Equipment / Human Error**: 164
- **Overdemand**: 101
- **Planned**: 55
- **Theft / Vandalism**: 10
- **Unknown**: 7
- **Vehicle Accident**: 1
- **Weather / Falling Trees**: 0

**Utility Outage Data (2008–2013)**

- **Total number of people affected by outages**
- **Total duration of outages (minutes)**

Data Source: Eaton

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

Petroleum Infrastructure Overview
- Refineries: 3 (2% total U.S.)
- Terminals: 47 (2% total U.S.)
- Crude Pipelines: 0 Miles (0% total U.S.)
- Product Pipelines: 3,840 Miles (1% 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 New Jersey during 1986 to 2014 was Incorrect Operation for rail transport and Miscellaneous/Unknown for truck transport, with an average 0.8 and 8.6 incidents per year, respectively.

Petroleum Refinery

The leading cause of petroleum refinery disruptions in New Jersey from 2003 to 2014 was Equipment Failure or Damage. New Jersey’s petroleum refineries experienced 164 major incidents from 2003 to 2014. The average production impact from disruptions of New Jersey’s refineries from 2003 to 2014 is 37.2 thousand barrels per day.
NATURAL GAS

Natural Gas Infrastructure Overview
Gas Wells: 0 (0% total U.S.)
Processing Plants: 0 (0% total U.S.)
Storage Fields: 1 (<1% total U.S.)
Interstate Pipelines: 1,680 Miles (<1% total U.S.)
Local Distribution Companies: 12 (1% total U.S.)
Natural Gas Transport

The leading event type affecting natural gas transmission and distribution pipelines in New Jersey during 1986 to 2014 was Outside Force for Transmission Pipelines and Miscellaneous/Unknown for Distribution Pipelines, with an average 0.23 and 0.94 incidents per year (or one incident every 4.4 and 1.1 years), respectively.

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

Data Source: DOT PHMSA
**DATA SOURCES**

**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.

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**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

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