State of Connecticut
ENERGY SECTOR RISK PROFILE

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

CONNECTICUT STATE FACTS

<table>
<thead>
<tr>
<th>State Overview</th>
<th>Annual Energy Production</th>
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</thead>
<tbody>
<tr>
<td>Population: 3.60 million (1% total U.S.)</td>
<td>Electric Power Generation: 36.1 TWh (1% total U.S.)</td>
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<td>Housing Units: 1.49 million (1% total U.S.)</td>
<td>Coal: 0.7 TWh, 2% [0.4 GW total capacity]</td>
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<td>Business Establishments: 0.09 million (1% total U.S.)</td>
<td>Petroleum: 0.1 TWh, &lt;1% [3.7 GW total capacity]</td>
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<td>Natural Gas: 16.5 TWh, 46% [3.4 GW total capacity]</td>
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<td>Nuclear: 17.1 TWh, 47% [2.2 GW total capacity]</td>
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<td>Hydro: 0.3 TWh, &lt;1% [0.1 GW total capacity]</td>
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<tr>
<td>Annual Energy Consumption</td>
<td>Other Renewable: 0 TWh, 0% [0 GW total capacity]</td>
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<tr>
<td>Electric Power: 29.5 TWh (1% total U.S.)</td>
<td>Coal: 400 MSTN (&lt;1% total U.S.)</td>
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<tr>
<td>Coal: 400 MSTN (&lt;1% total U.S.)</td>
<td>Natural Gas: 0 Bcf (0% total U.S.)</td>
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<tr>
<td>Natural Gas: 224 Bcf (1% total U.S.)</td>
<td>Motor Gasoline: 34,100 Mbarrels (1% total U.S.)</td>
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<td>Motor Gasoline: 34,100 Mbarrels (1% total U.S.)</td>
<td>Distillate Fuel: 17,200 Mbarrels (1% total U.S.)</td>
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NATURAL HAZARDS OVERVIEW

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

According to NOAA, the most common natural hazard in Connecticut is Thunderstorm & Lightning, which occurs once every 11.6 days on the average during the months of March to October.

The second-most common natural hazard in Connecticut is Winter Storm & Extreme Cold, which occurs once every 24.5 days on the average during the months of October to March.

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

As reported by NOAA, the natural hazard in Connecticut that caused the greatest overall property loss during 1996 to 2014 is Hurricane at $2.2 million per year.

The natural hazard with the second-highest property loss in Connecticut is Flood at $1.7 million per year.
Electric Power Plants: 73 (1% total U.S.)
- Coal-fired: 1 (<1% total U.S.)
- Petroleum-fired: 28 (1% total U.S.)
- Natural Gas-fired: 28 (1% total U.S.)
- Nuclear: 1 (1% total U.S.)
- Hydro-electric: 15 (1% total U.S.)
- Other Renewable: 0 (0% total U.S.)

Transmission Lines:
- High-Voltage (>230 kV): 373 Miles
- Low-Voltage (<230 kV): 971 Miles
Electric Transmission

According to NERC, the leading cause of electric transmission outages in Connecticut is Faulty Equipment/Human Error. Connecticut experienced 24 electric transmission outages from 1992 to 2009, affecting a total of 488,243 electric customers. Complete Electrical System Failure 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 Connecticut has occurred during the month of June. The leading cause of electric outages in Connecticut during 2008 to 2013 was Weather/Falling Trees. On average, the number of people affected annually by electric outages during 2008 to 2013 in Connecticut was 522,697. The average duration of electric outages in Connecticut during 2008 to 2013 was 2,517 minutes or 41.9 hours a year.


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

Data Source: NERC

Data Source: Eaton

Data Source: Eaton

Data Source: Eaton
PETROLEUM

Petroleum Infrastructure Overview

- **Refineries:** 0 (0% total U.S.)
- **Terminals:** 31 (2% total U.S.)
- **Crude Pipelines:** 0 Miles (0% total U.S.)
- **Product Pipelines:** 240 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 Connecticut during 1986 to 2014 was Incorrect Operation for rail transport and Miscellaneous/Unknown for truck transport, with an average 0.1 (or one incident every 10 years) and 7.5 incidents per year, respectively.

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

The leading event type affecting petroleum product pipelines in Connecticut 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 Connecticut.

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

Data Source: DOT PHMSA
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: 300 Miles (<1% total U.S.)
Local Distribution Companies: 10 (1% total U.S.)
Natural Gas Transport

The leading event type affecting natural gas transmission and distribution pipelines in Connecticut during 1986 to 2014 was Material/Weld Failures for Transmission Pipelines and Miscellaneous/Unknown for Distribution Pipelines, with an average 0.06 and 0.42 incidents per year (or one incident every 15.5 and 2.4 years), respectively.

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.