This Energy Risk Profile examines the relative magnitude of the risks of Washington, D.C.'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. Certain natural and adversarial threats, such as cybersecurity, electromagnetic pulse, geomagnetic disturbance, pandemics, or impacts caused by infrastructure interdependencies, are ill-suited to location-based probabilistic risk assessment as they may not adhere to geographic boundaries, have limited occurrence, or have limited historic data. Cybersecurity and other threats not included in these profiles are ever present and should be included in energy security planning. A complete list of data sources and national level comparisons can be found in the Data Sources document.

### Washington, D.C. Facts

- **Population**: 0.70 M
- **Housing Units**: 0.32 M
- **Business Establishments**: 0.02 M

**Energy Employment**: 5,769 jobs

**Public Utility Commission**: Public Service Commission of the District of Columbia

**Energy Office**: District of Columbia Department of Energy and Environment

**Emergency Management Agency**: District of Columbia Homeland Security and Emergency Management Agency

**Average Electricity Tariff**: 12.03 cents/kWh

**Energy Expenditures**: $2,832/capita

**Energy Consumption per Capita**: 241 MMBtu (38th highest out of 50 states and Washington, D.C.)

**GDP**: $140.7 billion

*Data from 2020 or most recent year available. For more information, see the Data Sources document.*

### Annual Energy Consumption

**Electric Power**: 19,560 GWh

**Coal**: 0 MSTN

**Natural Gas**: 0 Bcf

**Motor Gasoline**: 1,700 Mbbl

**Distillate Fuel**: 400 Mbbl

### Annual Energy Production

**Electric Power Generation**: 6 plants, 0.2 TWh, 0.0 GW total capacity

- **Coal**: 0 plants
- **Hydro**: 0 plants
- **Natural Gas**: 3 plants, 0.1 TWh, 0.0 GW total capacity
- **Nuclear**: 0 plants
- **Petroleum**: 0 plants
- **Wind & Solar**: 2 plants, 0.0 TWh, 0.0 GW total capacity
- **Other Sources**: 1 plant, 0.1 TWh, 0.0 GW total capacity

**Coal**: 0 MSTN

**Natural Gas**: 0 Bcf

**Crude Oil**: 0 Mbbl

**Ethanol**: 0 Mbbl

*Data from EIA (2018, 2019).*

### Washington, D.C. Risks and Hazards Overview

- The natural hazard that caused the greatest overall property loss between 2009 and 2019 was **Hurricanes** at $249,000 per year (*fifth leading cause nationwide at $1.9 billion per year*).

- Washington, D.C. had 1 Major Disaster Declaration, 0 Emergency Declarations, and 0 Fire Management Assistance Declarations between 2013 and 2019.

- There is 1 Fusion Center located in Washington, D.C.

### Annualized Frequency of and Property Damage Due to Natural Hazards, 2009 – 2019

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Hazard Frequency - Annualized</th>
<th>Property Damage – Annualized ($100,000 per year)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drought</td>
<td>0</td>
<td>$0</td>
</tr>
<tr>
<td>Earthquake (≥ 3.5 M)</td>
<td>0</td>
<td>$0</td>
</tr>
<tr>
<td>Extreme Heat</td>
<td>3</td>
<td>$0</td>
</tr>
<tr>
<td>Flood</td>
<td>7</td>
<td>$45</td>
</tr>
<tr>
<td>Hurricane</td>
<td>&lt;1</td>
<td>$249</td>
</tr>
<tr>
<td>Landslide</td>
<td>0</td>
<td>$0</td>
</tr>
<tr>
<td>Thunderstorm &amp; Lightning</td>
<td>6</td>
<td>$21</td>
</tr>
<tr>
<td>Tornado</td>
<td>&lt;1</td>
<td>$0</td>
</tr>
<tr>
<td>Wildfire</td>
<td>0</td>
<td>$0</td>
</tr>
<tr>
<td>Winter Storm &amp; Extreme Cold</td>
<td>7</td>
<td>$0</td>
</tr>
</tbody>
</table>

*Property Damage scale is in thousands. State profile scale is in millions.*

Data Sources: NOAA and USGS

Produced by Department of Energy (DOE), Office of Cybersecurity, Energy Security, and Emergency Response (CESER)
Electric Infrastructure

- Washington, D.C. has 3 electric utilities:
  - 1 Investor owned
  - 0 Cooperative
  - 0 Municipal
  - 2 Other utilities
- Plant retirements scheduled by 2025: None.

- In 2018, the average Washington, D.C. electric customer experienced 0.6 service interruptions that lasted an average of 1.8 hours.
- In Washington, D.C., between 2008 and 2017:
  - The leading cause of electric outages was Weather or Falling Trees (leading cause nationwide)

Electric Customers and Consumption by Sector, 2018

<table>
<thead>
<tr>
<th>Sector</th>
<th>Customers</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>91%</td>
<td>23%</td>
</tr>
<tr>
<td>Commercial</td>
<td>9%</td>
<td>72%</td>
</tr>
<tr>
<td>Industrial</td>
<td>&lt;1%</td>
<td>2%</td>
</tr>
<tr>
<td>Transportation</td>
<td>&lt;1%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Data Source: EIA

Electric Utility-Reported Outages by Cause, 2008 – 2017

- Animal: 5
- Faulty Equipment / Human Error: 44
- Planned: 8
- Unknown: 54
- Vehicle Accident: 3
- Weather / Falling Trees: 66

Data Source: Eaton

Washington, D.C. | ENERGY SECTOR RISK PROFILE
Natural Gas Transport

Top Events Affecting Natural Gas Transmission and Distribution, 1984 – 2019

<table>
<thead>
<tr>
<th>Event Type</th>
<th>ECONOMIC LOSS – Annualized Loss $Thousands per year</th>
<th>FREQUENCY – Annualized Frequency Average incidents per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion</td>
<td>$0</td>
<td>0.03</td>
</tr>
<tr>
<td>Equipment Failure</td>
<td>$0</td>
<td>0</td>
</tr>
<tr>
<td>Excavation Damage</td>
<td>$0</td>
<td>0.03</td>
</tr>
<tr>
<td>Incorrect Operation</td>
<td>$0</td>
<td>0</td>
</tr>
<tr>
<td>Material / Weld Failure</td>
<td>$0</td>
<td>0</td>
</tr>
<tr>
<td>Miscellaneous / Unknown</td>
<td>$0</td>
<td>0</td>
</tr>
<tr>
<td>Natural Force</td>
<td>$16</td>
<td>0.03</td>
</tr>
<tr>
<td>Outside Force</td>
<td>$40</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Data Source: DOT PHMSA

- As of 2018, Washington, D.C. had:
  - 5 miles of natural gas transmission pipelines
  - 1,216 miles of natural gas distribution pipelines
- 0% of Washington, D.C.’s natural gas transmission system and 24% of the distribution system were constructed prior to 1970 or in an unknown year.
- Between 1984 and 2019, Washington, D.C.’s natural gas supply was most impacted by:
  - Corrosion events when transported by distribution pipelines (6th leading cause nationwide at $6.52M per year)

Natural Gas Processing and Liquefied Natural Gas

Natural Gas Customers and Consumption by Sector, 2018

<table>
<thead>
<tr>
<th>Sector</th>
<th>CUSTOMERS</th>
<th>CONSUMPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>94%</td>
<td>43%</td>
</tr>
<tr>
<td>Commercial</td>
<td>6%</td>
<td>55%</td>
</tr>
<tr>
<td>Industrial</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Transportation</td>
<td>&lt;1%</td>
<td>1%</td>
</tr>
<tr>
<td>Electric Power</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Other</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

Data Source: EIA

- Washington, D.C. has 0 natural gas processing facilities.
- Washington, D.C. has 0 liquefied natural gas (LNG) facilities with a total storage capacity of 0 barrels.
Washington, D.C. | ENERGY SECTOR RISK PROFILE

PETROLEUM

Map of areas in Washington, D.C. showing petroleum terminals with storage capacities ranging from 50 to 6,500+ Mbbl.

Data Sources: ANL 2019; EIA 2019; ESRI 2019; Platts 2021
Petroleum Transport

Top Events Affecting Petroleum Transport by Truck and Rail, 1986 – 2019

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Truck</th>
<th>Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Derailment or Collision / Rollover</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Equipment Failure</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Incorrect Operation</td>
<td>$414</td>
<td>0</td>
</tr>
<tr>
<td>Material / Weld Failure</td>
<td>$931</td>
<td>0</td>
</tr>
<tr>
<td>Miscellaneous / Unknown</td>
<td>$29</td>
<td>0</td>
</tr>
<tr>
<td>Natural Force</td>
<td>$0</td>
<td>0</td>
</tr>
<tr>
<td>Outside Force</td>
<td>$1,095</td>
<td>0.09</td>
</tr>
</tbody>
</table>

ECONOMIC LOSS – Annualized Loss (Thousands per year)
FREQUENCY – Annualized Frequency (Average incidents per year)

Top Events Affecting Crude Oil and Refined Product Pipelines, 1986 – 2019

<table>
<thead>
<tr>
<th>Pipeline Type</th>
<th>Crude Pipelines</th>
<th>Product Pipelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Equipment Failure</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Excavation Damage</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Incorrect Operation</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Material / Weld Failure</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Miscellaneous / Unknown</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Natural Force</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Outside Force</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

ECONOMIC LOSS – Annualized Loss (Thousands per year)
FREQUENCY – Annualized Frequency (Average incidents per year)

Data Source: DOT PHMSA

Petroleum Refineries

- There are no operating petroleum refineries in Washington, D.C.

- As of 2018, Washington, D.C. had:
  - 0 miles of crude oil pipelines
  - 4 miles of refined product pipelines
  - 0 miles of biofuels pipelines

- 100% of Washington, D.C.’s petroleum pipeline systems were constructed prior to 1970 or in an unknown year.

- Between 1986 and 2019, Washington, D.C.’s petroleum supply was most impacted by:
  - Outside Forces when transported by truck (2nd leading cause nationwide at $60.45M per year)

- Disruptions in other states may impact supply.