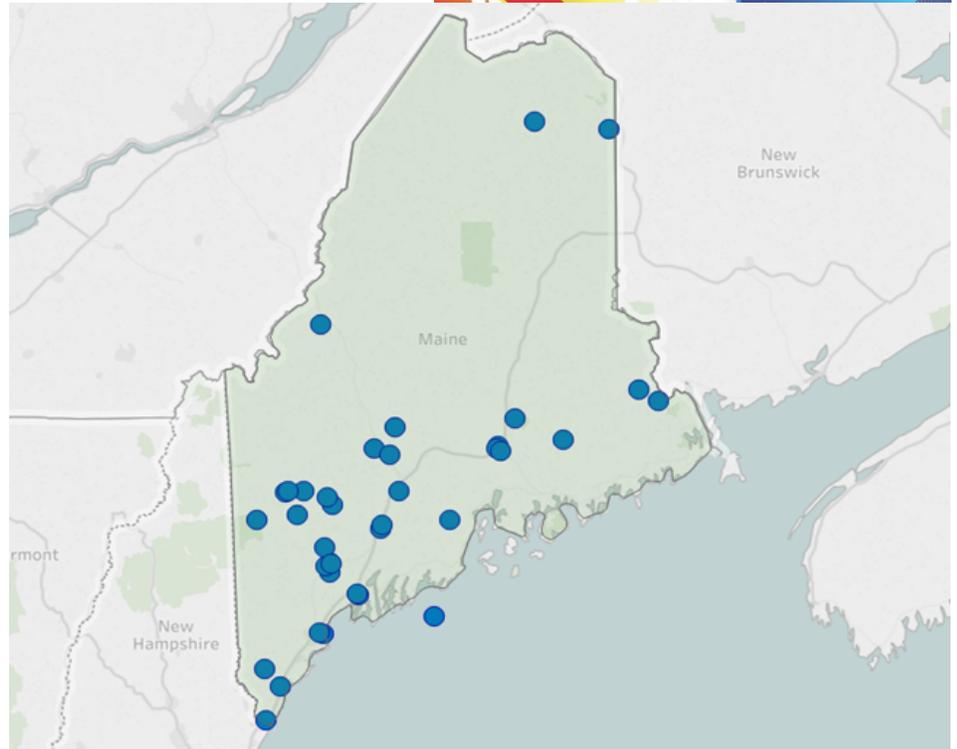


## The State of CHP: Maine



Combined heat and power (CHP) – also referred to as cogeneration – is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source. The information in this document provides a general overview of the state of CHP in Maine, with data on current installations, technical potential, and economics for CHP.



Map of current CHP installations in Maine. Illustration from ICF.

### Maine: Installed CHP

#### U.S. DOE Combined Heat and Power Installation Database

The DOE CHP Installation Database is a data collection effort sponsored by the U.S. Department of Energy. The database contains a comprehensive listing of combined heat and power installations throughout the country, including those in Maine, and can be accessed by visiting [energy.gov/chp-installs](http://energy.gov/chp-installs).

#### CHP Project Profiles

The New England CHP TAP has compiled information on certain illustrative CHP projects in Maine. You can access these by visiting the Department of Energy’s CHP Project Profiles Database at [energy.gov/chp-projects](http://energy.gov/chp-projects).

#### New England CHP Technical Assistance Partnership

For assistance with questions about specific CHP opportunities in Maine, please consult with the New England CHP TAP by visiting [nechtap.org](http://nechtap.org) or contacting the CHP TAP director.

#### Maine Existing CHP

| Sector                   | Sites     | Capacity (MW) |
|--------------------------|-----------|---------------|
| Industrial               | 18        | 630           |
| Commercial/Institutional | 20        | 26            |
| Other                    | 0         | 0             |
| <b>Total</b>             | <b>38</b> | <b>656</b>    |

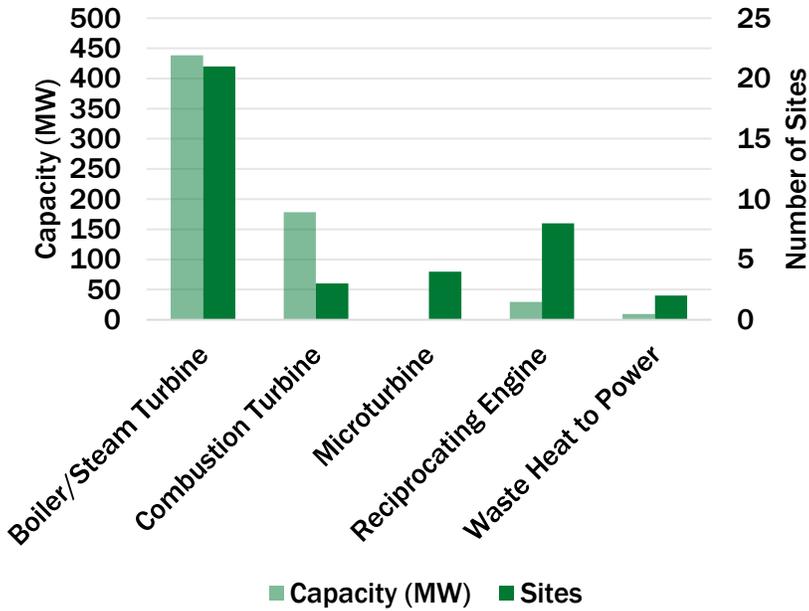
#### New England CHP TAP Director

David Dvorak, Ph.D., P.E.

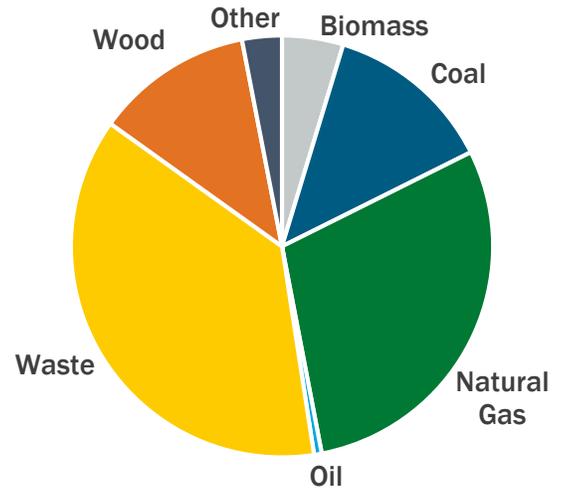
- University of Maine
- [dvorak@maine.edu](mailto:dvorak@maine.edu)
- 207-581-2338



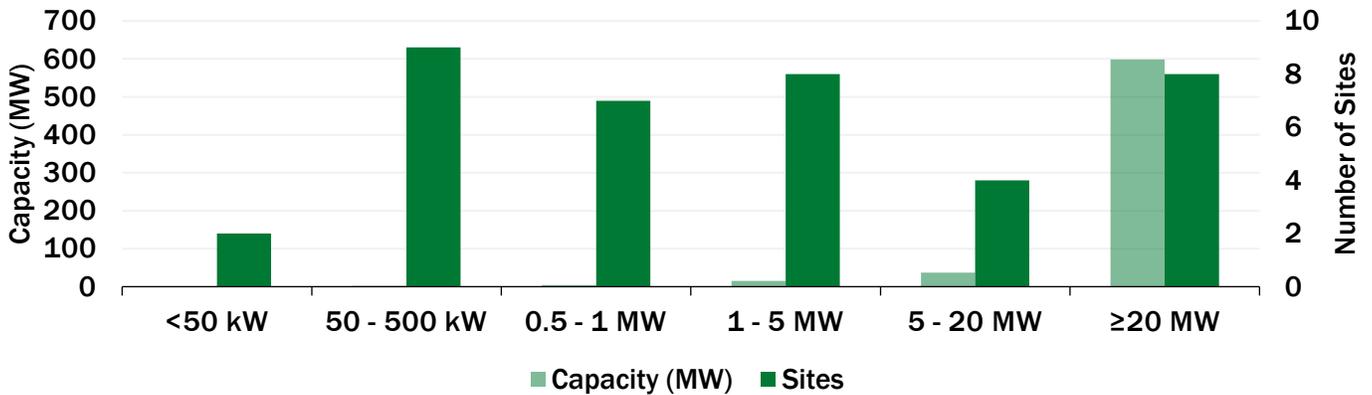
### Maine CHP by Technology



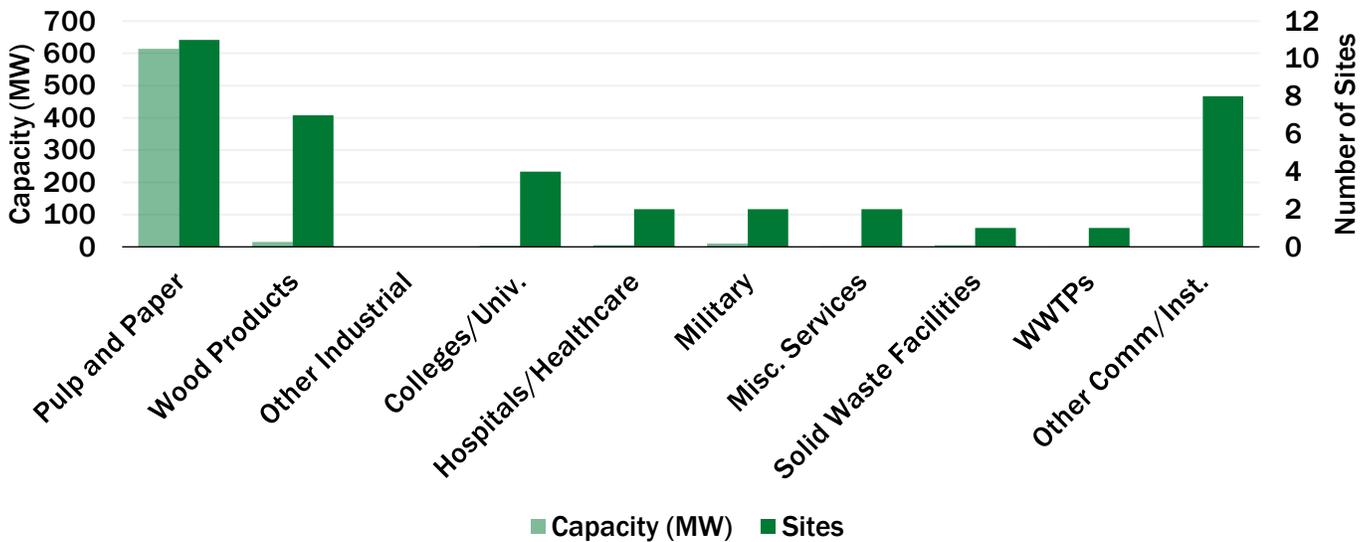
### Maine CHP Capacity (MW) by Fuel



### Maine CHP by Size Range



### Maine CHP by Application



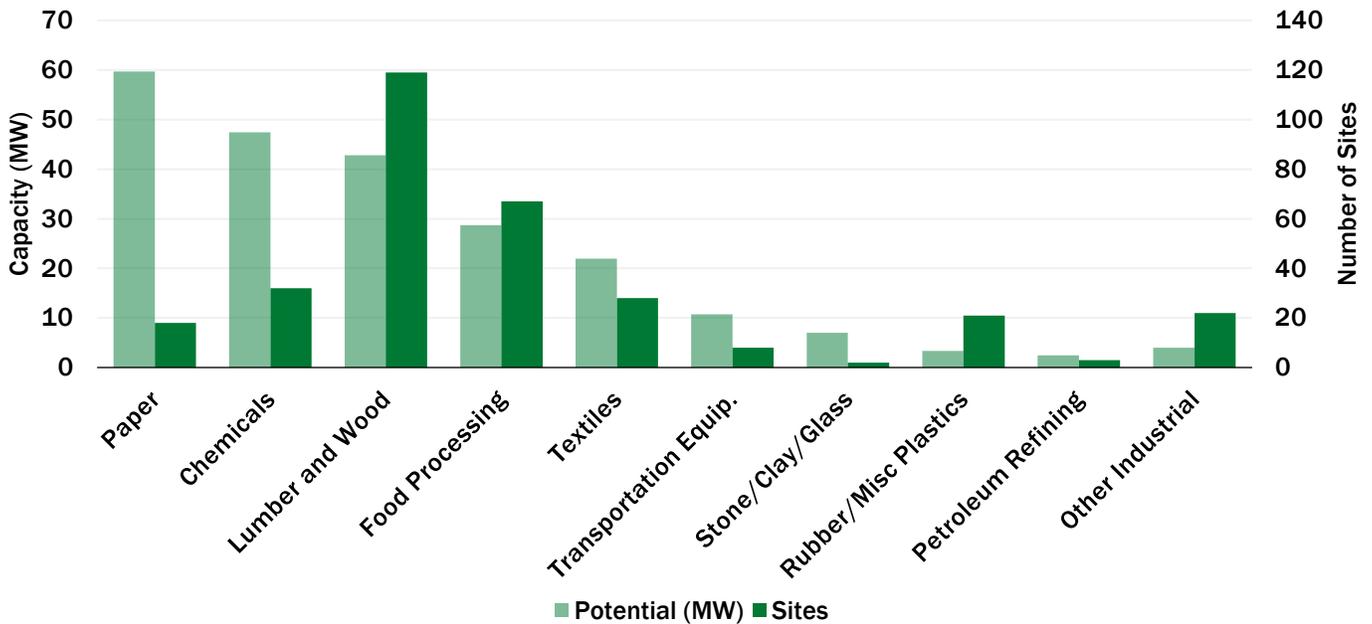
## Maine: Technical Potential for New CHP Installations

The “Combined Heat and Power (CHP) Technical Potential in the United States” market analysis report provides data on the technical potential in industrial facilities and commercial buildings for “topping cycle” CHP, waste heat to power (WHP) CHP, and district energy CHP in the U.S. This report can be accessed at [energy.gov/chp-potential](http://energy.gov/chp-potential).

## Maine CHP Technical Potential

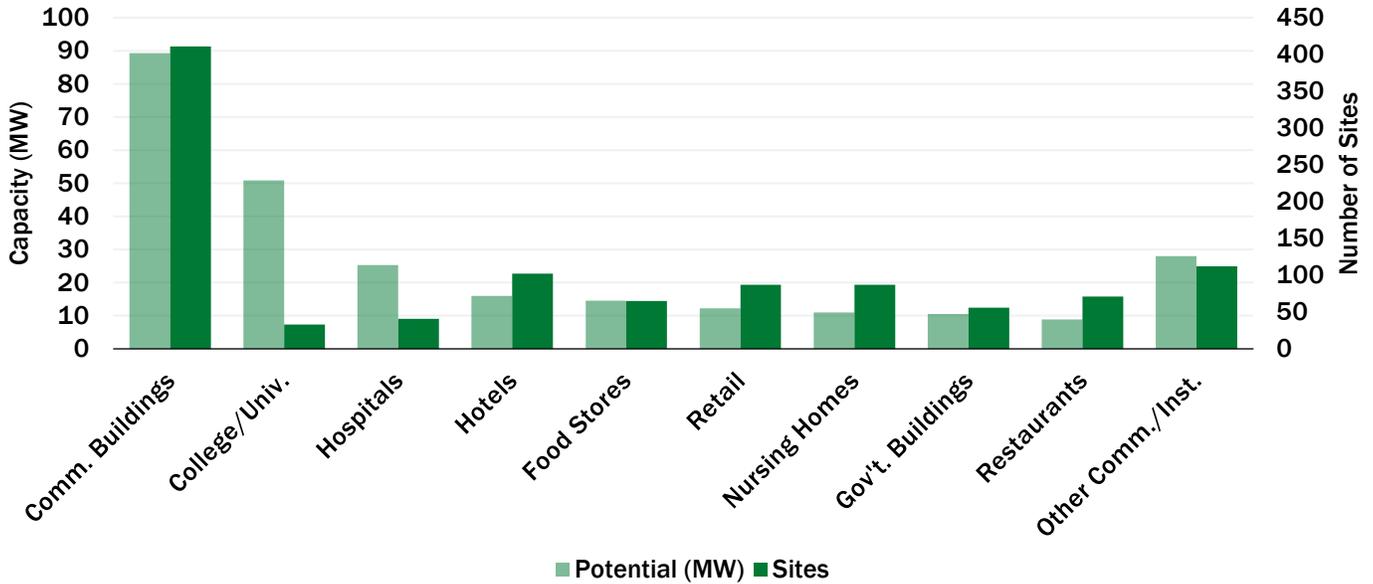
| Sector                   | Potential Sites | Potential MW |
|--------------------------|-----------------|--------------|
| Industrial               | 320             | 228          |
| Commercial/Institutional | 1,065           | 266          |
| <b>Total</b>             | <b>1,385</b>    | <b>494</b>   |

Maine Technical Potential (MW) for Industrial CHP Applications



| Application      | 50-500 kW  |           | 0.5 - 1 MW |           | 1 - 5 MW  |           | 5 - 20 MW |           | >20 MW   |           | Total       |            |
|------------------|------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-------------|------------|
|                  | Sites      | MW        | Sites      | MW        | Sites     | MW        | Sites     | MW        | Sites    | MW        | Total Sites | Total MW   |
| Paper            | 5          | 1         | 2          | 1         | 9         | 21        | 1         | 7         | 1        | 30        | 18          | 60         |
| Chemicals        | 18         | 3         | 4          | 3         | 7         | 12        | 3         | 30        | 0        | 0         | 32          | 47         |
| Lumber and Wood  | 101        | 17        | 10         | 7         | 8         | 19        | 0         | 0         | 0        | 0         | 119         | 43         |
| Food Processing  | 50         | 8         | 10         | 8         | 7         | 12        | 0         | 0         | 0        | 0         | 67          | 29         |
| Textiles         | 18         | 4         | 4          | 3         | 6         | 15        | 0         | 0         | 0        | 0         | 28          | 22         |
| Other Industrial | 48         | 7         | 4          | 3         | 3         | 10        | 1         | 7         | 0        | 0         | 56          | 27         |
| <b>Total</b>     | <b>240</b> | <b>41</b> | <b>34</b>  | <b>25</b> | <b>40</b> | <b>88</b> | <b>5</b>  | <b>43</b> | <b>1</b> | <b>30</b> | <b>320</b>  | <b>228</b> |

## Maine Technical Potential (MW) for Commercial/Institutional CHP Applications



| Application          | 50-500 kW  |           | 0.5 - 1 MW |           | 1 - 5 MW  |           | 5 - 20 MW |           | >20 MW   |          | Total        |            |
|----------------------|------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|----------|----------|--------------|------------|
|                      | Sites      | MW        | Sites      | MW        | Sites     | MW        | Sites     | MW        | Sites    | MW       | Total Sites  | Total MW   |
| Commercial Buildings | 242        | 12        | 121        | 48        | 48        | 29        | 0         | 0         | 0        | 0        | 411          | 89         |
| College/Univ.        | 18         | 3         | 4          | 3         | 8         | 19        | 3         | 25        | 0        | 0        | 33           | 51         |
| Hospitals            | 24         | 6         | 9          | 6         | 8         | 14        | 0         | 0         | 0        | 0        | 41           | 25         |
| Hotels               | 96         | 12        | 5          | 3         | 1         | 1         | 0         | 0         | 0        | 0        | 102          | 16         |
| Food Stores          | 64         | 14        | 1          | 1         | 0         | 0         | 0         | 0         | 0        | 0        | 65           | 15         |
| Other Comm./Inst.    | 388        | 43        | 17         | 11        | 6         | 10        | 1         | 5         | 0        | 0        | 413          | 70         |
| <b>Total</b>         | <b>832</b> | <b>90</b> | <b>157</b> | <b>72</b> | <b>71</b> | <b>73</b> | <b>4</b>  | <b>31</b> | <b>0</b> | <b>0</b> | <b>1,065</b> | <b>266</b> |

## Department of Energy CHP Accelerators

### Packaged CHP Accelerator

Standardized packaged CHP systems can reduce risk for both CHP users and suppliers by reducing design errors, limiting uncertainty about performance, shortening project development time, and reducing overall costs. Accelerator partners will validate the installation, performance, and economic and resiliency benefits of packaged CHP systems, evaluate the integration of new technologies and packaged CHP, and identify R&D challenges. For more information, visit

<https://betterbuildingsinitiative.energy.gov/accelerators/packaged-chp>

### CHP for Resiliency Accelerator

The U.S. DOE collaborated with cities, states, utilities, and other stakeholders who are actively pursuing CHP as a consideration in resiliency planning for critical infrastructure in their jurisdictions. This included defining resiliency, identifying critical infrastructure, and assessing CHP opportunities. This process was documented in the DG for Resilience Planning Guide and the CHP for Resilience Screening Tool. For more information, visit

<https://betterbuildingsinitiative.energy.gov/accelerators/combined-heat-and-power-resiliency>

## Maine: CHP Economics

The most important indicators for CHP economics are electricity and gas prices. For most potential CHP installations, natural gas and electricity rates for host facilities will fall within the range of average commercial and industrial prices. Lower energy prices may be possible for large CHP applications.

### Maine Natural Gas Prices

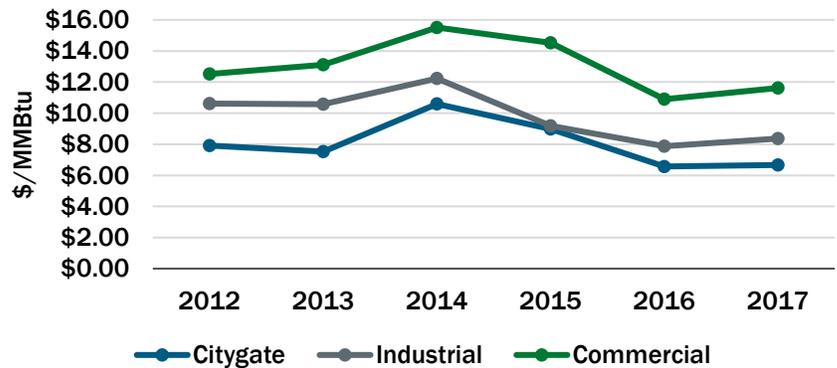
The EIA industrial natural gas price is a full tariff rate, and most large consumers are purchasing gas commodities from marketers at a lower rate.

#### Maine Average Gas Prices (\$/MMBtu) - 2017

| Sector     | ME Price | U.S. Price |
|------------|----------|------------|
| Citygate*  | 6.66     | 4.26       |
| Industrial | 8.35     | 4.20       |
| Commercial | 11.61    | 8.08       |

\*Citygate is a point or measuring station at which a distributing gas utility receives gas from a NG pipeline company or transmission system.

#### Maine Average Natural Gas Prices



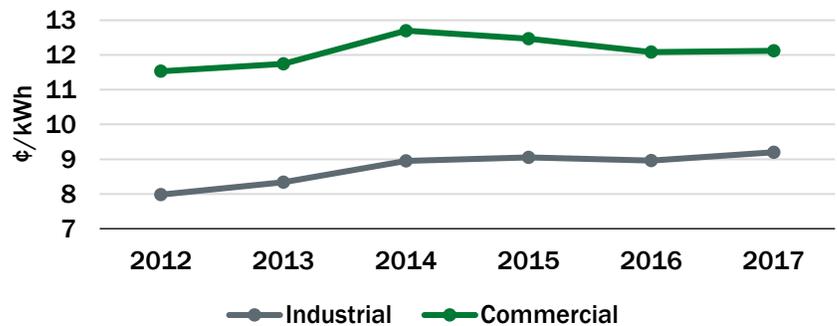
### Maine Electricity Prices

Electricity rates can vary greatly by utility and facility size range. The rates below from EIA represent general averages; individual facility rates may vary.

#### Maine Average Electricity Prices (¢/kWh) - 2017

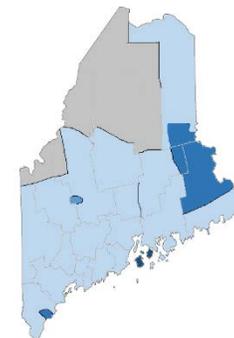
| Sector     | ME Price | U.S. Price |
|------------|----------|------------|
| Industrial | 9.20     | 6.88       |
| Commercial | 12.12    | 10.66      |

#### Maine Average Electricity Prices



#### Maine Average Delivered Electricity Prices by Utility

| Utility                   | Industrial Price (¢/kWh) | Commercial Price (¢/kWh) | Average Price (¢/kWh) |
|---------------------------|--------------------------|--------------------------|-----------------------|
| Fox Islands Electric Coop | -                        | 24.76                    | 24.76                 |
| Kennebunk Light & Power   | 17.68                    | 12.47                    | 15.08                 |
| Eastern Maine Electric    | 14.05                    | 15.79                    | 14.92                 |
| Town of Madison           | 10.13                    | 15.84                    | 12.99                 |
| Emera Maine               | 9.96                     | 11.77                    | 10.86                 |
| Central Maine Power Co    | 9.20                     | 11.49                    | 10.35                 |
| Houlton Water Company     | 9.57                     | 10.43                    | 10.00                 |



- Emera Maine / Houlton / Central Maine Power
- Town of Madison
- Eastern Maine Electric / Kennebunk
- Fox Islands Electric Coop
- No utility information