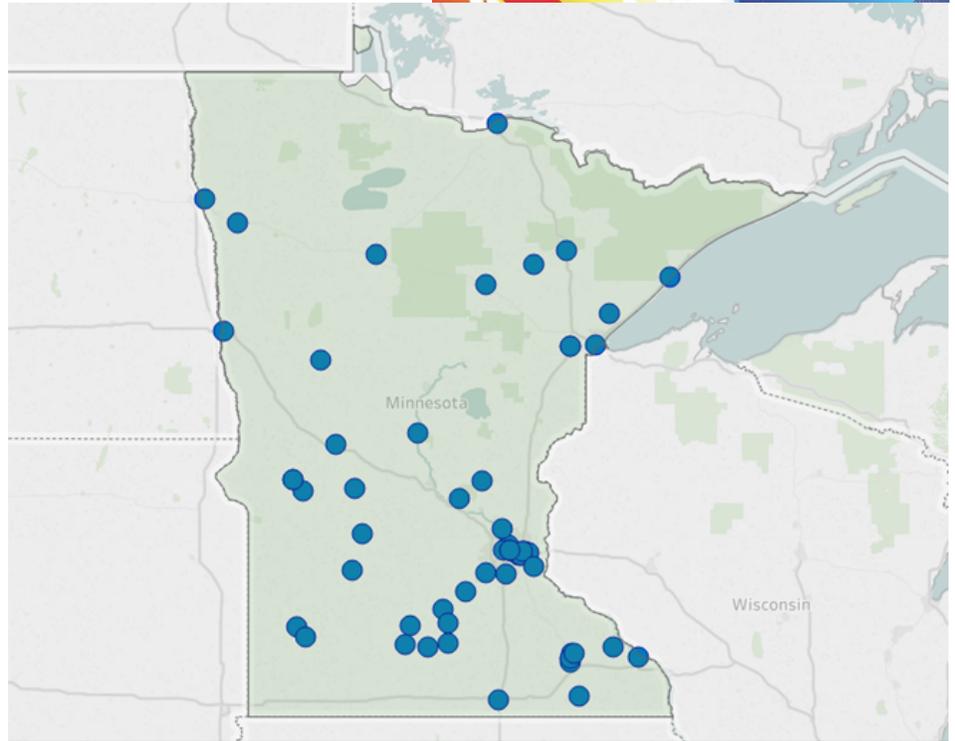


## The State of CHP: Minnesota



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 Minnesota, with data on current installations, technical potential, and economics for CHP.



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

### Minnesota: 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 Minnesota, and can be accessed by visiting [energy.gov/chp-installs](http://energy.gov/chp-installs).

#### CHP Project Profiles

The Midwest CHP TAP has compiled information on certain illustrative CHP projects in Minnesota. 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).

#### Midwest CHP Technical Assistance Partnership

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

#### Minnesota Existing CHP

Sector	Sites	Capacity (MW)
Industrial	20	595
Commercial/Institutional	30	411
Other	9	111
<b>Total</b>	<b>59</b>	<b>1,116</b>

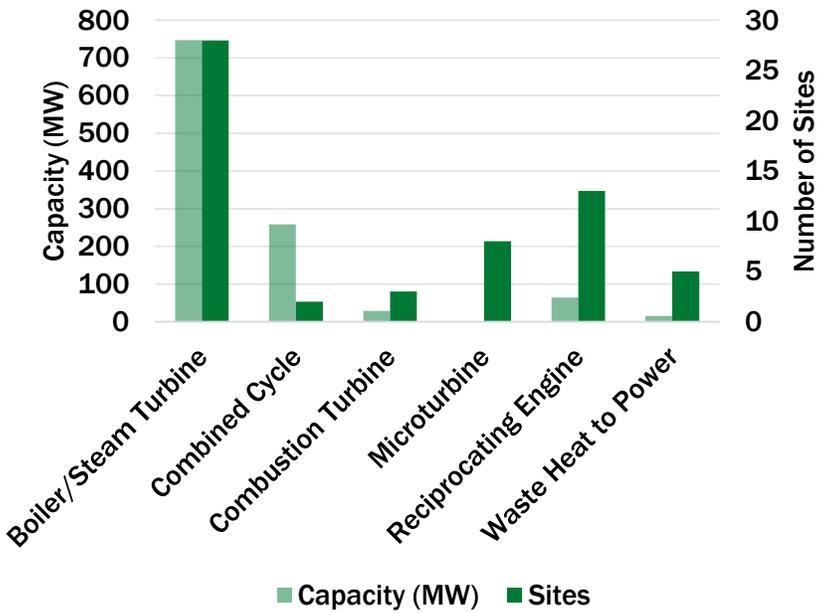
#### Midwest CHP TAP Director

**Cliff Haefke**

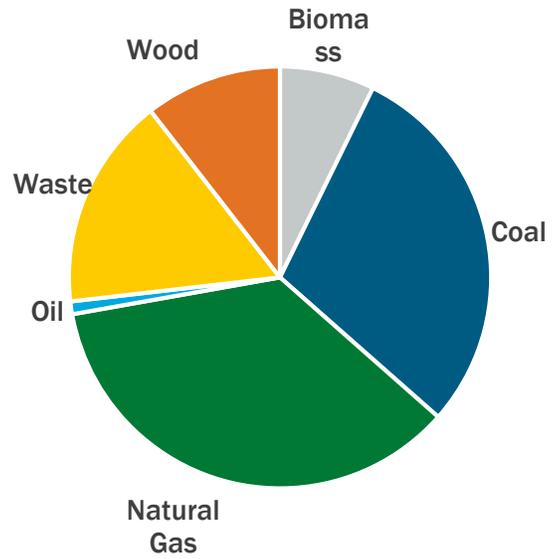
- University of Illinois at Chicago
- [chaefk1@uic.edu](mailto:chaefk1@uic.edu)
- 312-355-3476



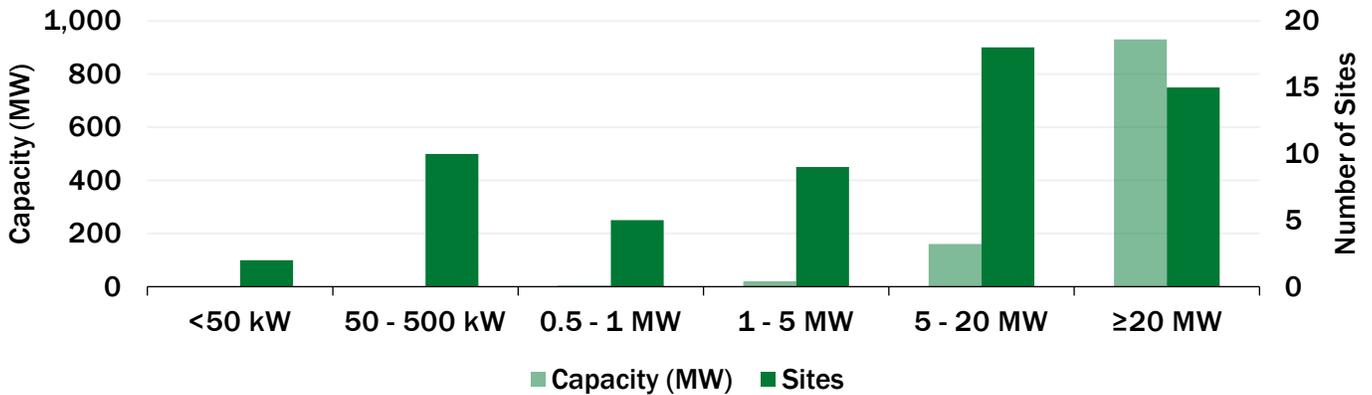
Minnesota CHP by Technology



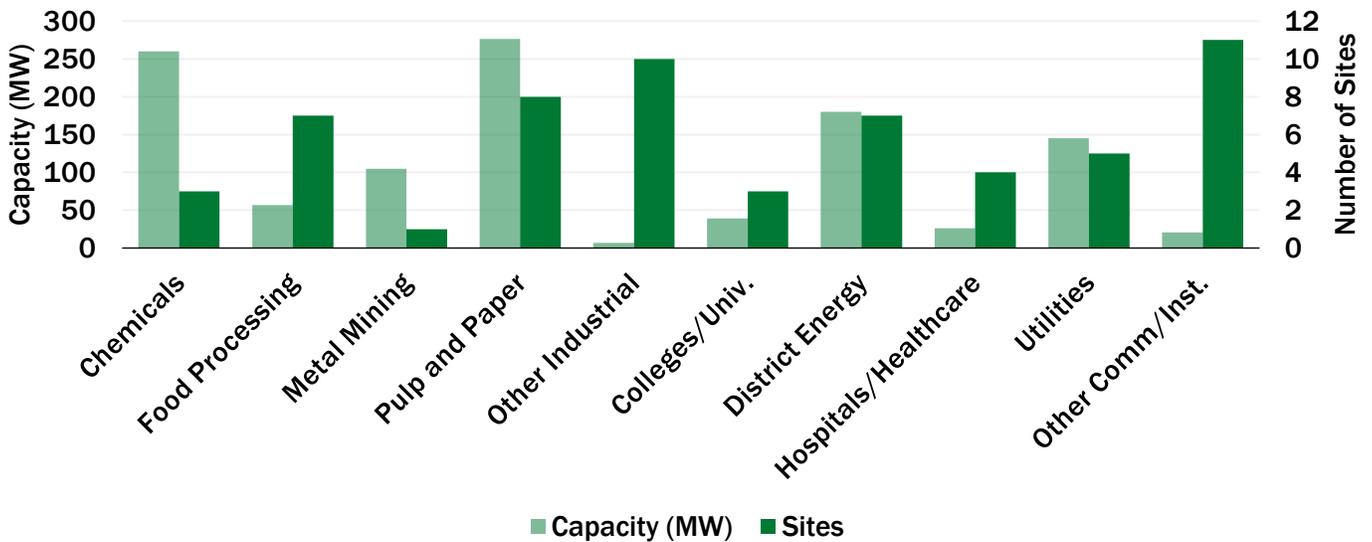
Minnesota CHP Capacity (MW) by Fuel



Minnesota CHP by Size Range



Minnesota CHP by Application



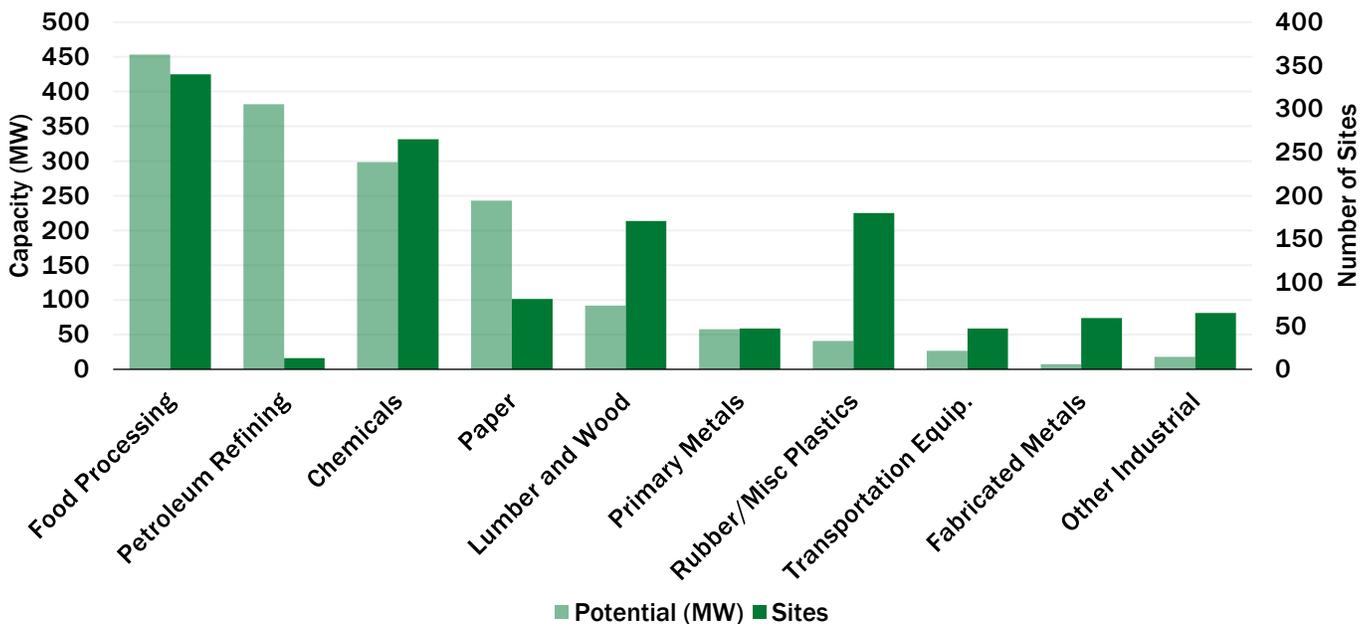
## Minnesota: Technical Potential for New CHP Installations

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).

## Minnesota CHP Technical Potential

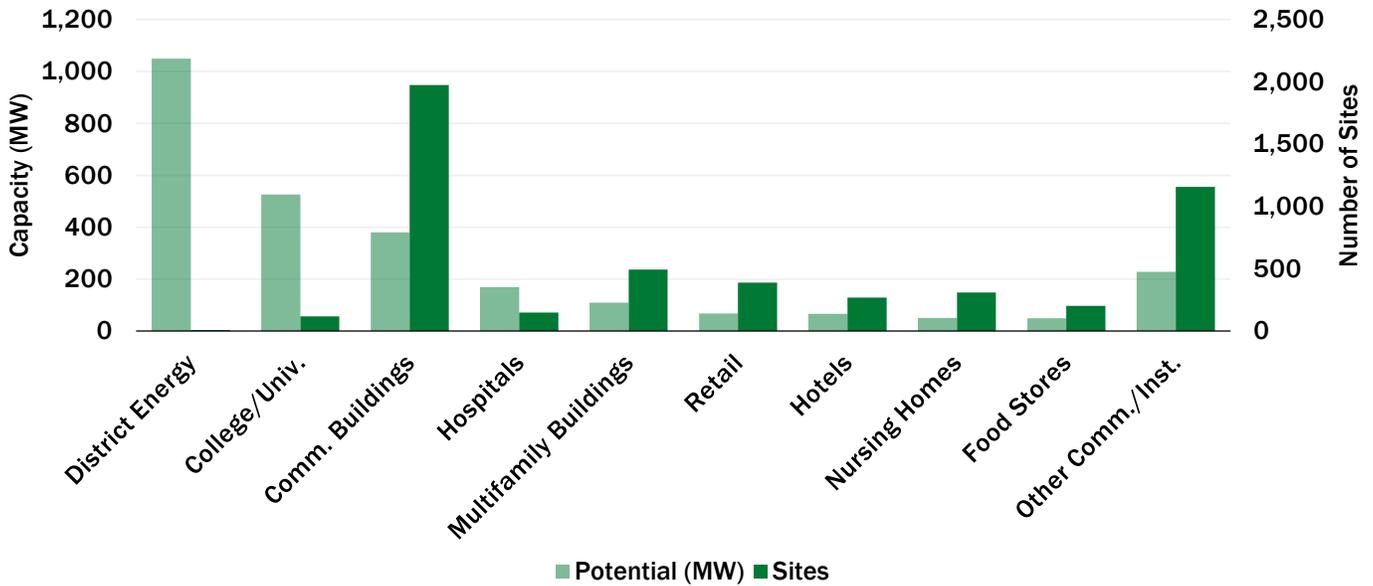
Sector	Potential Sites	Potential MW
Industrial	1,268	1,619
Commercial/Institutional	5,058	2,691
<b>Total</b>	<b>6,326</b>	<b>4,310</b>

Minnesota 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
Food Processing	214	44	39	30	66	127	19	174	2	79	340	453
Petroleum Refining	0	0	5	3	1	4	2	17	5	358	13	382
Chemicals	165	28	24	18	60	137	16	116	0	0	265	298
Paper	44	13	13	8	16	37	4	49	4	135	81	243
Lumber and Wood	137	23	17	12	12	17	5	39	0	0	171	92
Other Industrial	344	52	31	21	19	38	4	39	0	0	398	150
<b>Total</b>	<b>904</b>	<b>159</b>	<b>129</b>	<b>93</b>	<b>174</b>	<b>360</b>	<b>50</b>	<b>435</b>	<b>11</b>	<b>571</b>	<b>1,268</b>	<b>1,619</b>

## Minnesota 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
College/Univ.	56	10	11	7	31	68	13	128	5	312	116	525
Commercial Buildings	1,264	63	553	221	158	95	0	0	0	0	1,975	379
Hospitals	82	17	36	24	28	56	1	6	1	67	148	169
Multifamily Buildings	348	26	126	63	20	20	0	0	0	0	493	109
Retail	373	56	12	8	3	4	0	0	0	0	388	67
Other Comm./Inst.	1,811	230	71	48	46	73	4	41	6	1,050	1,938	1,441
<b>Total</b>	<b>3,934</b>	<b>402</b>	<b>809</b>	<b>371</b>	<b>286</b>	<b>315</b>	<b>18</b>	<b>175</b>	<b>12</b>	<b>1,428</b>	<b>5,058</b>	<b>2,691</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>

## Minnesota: 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.

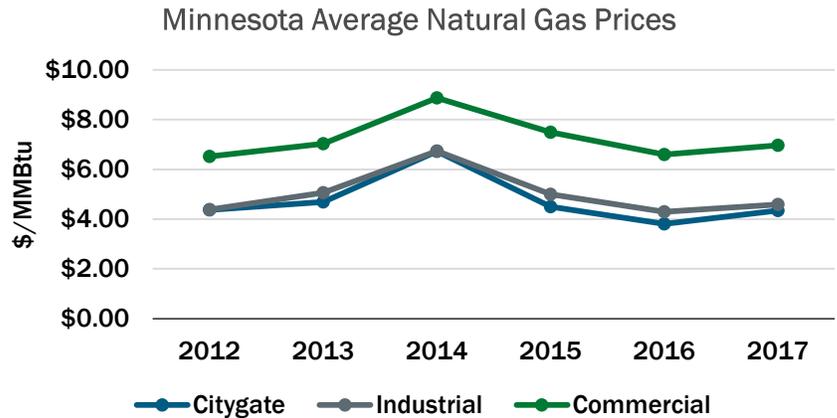
### Minnesota Natural Gas Prices

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.

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

Sector	MN Price	U.S. Price
Citygate*	4.35	4.26
Industrial	4.59	4.20
Commercial	6.97	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.

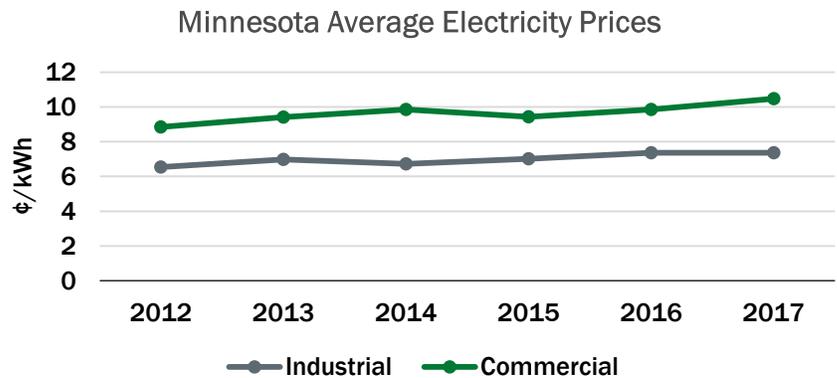


### Minnesota Electricity Prices

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

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

Sector	MN Price	U.S. Price
Industrial	7.37	6.88
Commercial	10.48	10.66



#### Minnesota Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
North Star Elec Coop	-	12.24	12.24
Arrowhead Electric Coop	-	11.23	11.23
Beltrami Electric Coop	-	10.76	10.76
Itasca-Mantrap Coop	9.02	12.43	10.73
Southwest MN Elec Coops	8.51	10.65	9.58
Xcel Energy	7.84	10.80	9.32
Minnesota Power	6.47	9.63	8.05
Otter Tail Power	5.44	8.46	6.95

