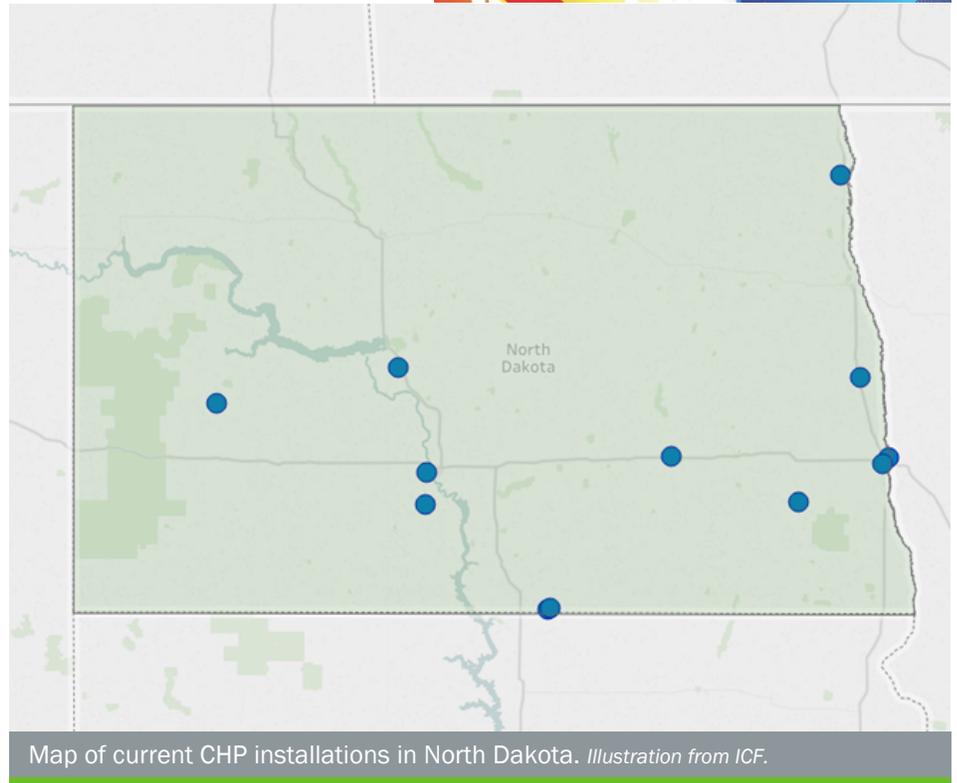




Combined heat and power (CHP) – also referred to as cogeneration – is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source. The information in this document provides a general overview of the state of CHP in North Dakota, with data on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



North Dakota: 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 North Dakota, and can be accessed by visiting energy.gov/chp-installs.

CHP Project Profiles

The Upper-West CHP TAP has compiled information on certain illustrative CHP projects in North Dakota. You can access these by visiting the Department of Energy’s CHP Project Profiles Database at energy.gov/chp-projects.

Upper-West CHP Technical Assistance Partnership

For assistance with questions about specific CHP opportunities in North Dakota, please consult with the Upper-West CHP TAP by visiting uwchptap.org or contacting the CHP TAP director.

North Dakota Existing CHP

Sector	Sites	Capacity (MW)
Industrial	6	143
Commercial/Institutional	6	23
Other	0	0
Total	12	165

**Upper-West CHP TAP
Director**

Gavin Dillingham, Ph.D.

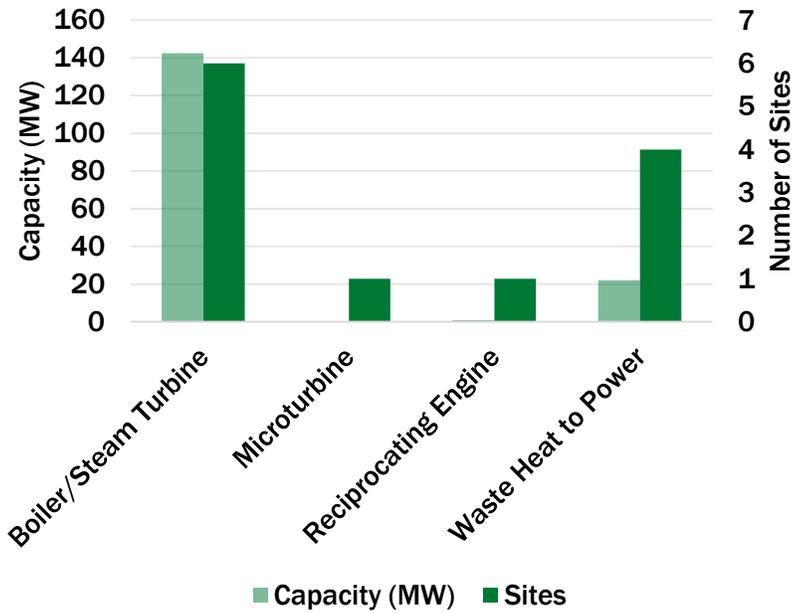
- HARC
- gdillingham@harcresearch.org
- 281-216-7147

UPPER-WEST

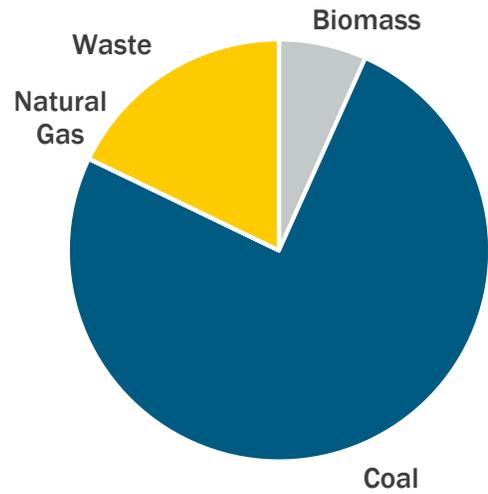


**CHP
TECHNICAL ASSISTANCE
PARTNERSHIPS**

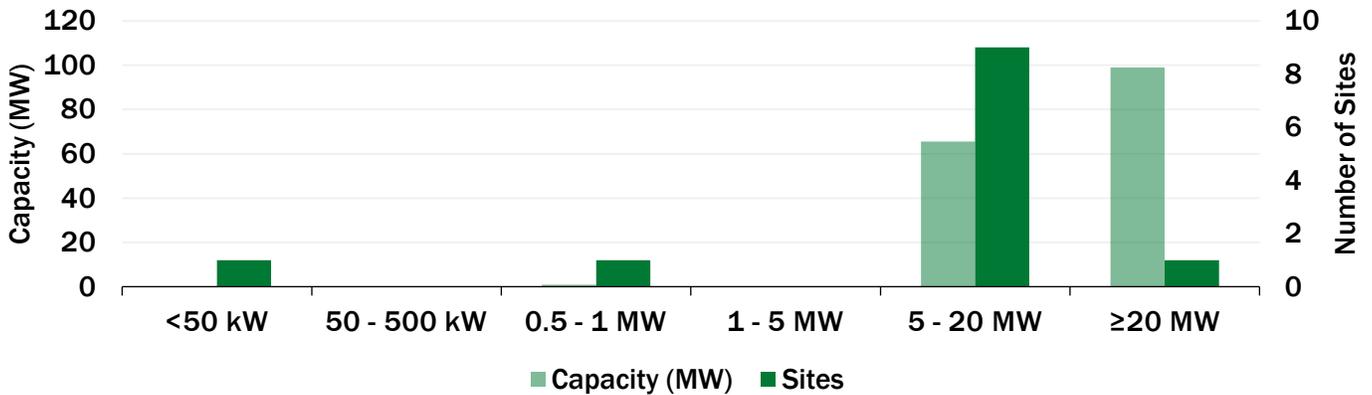
North Dakota CHP by Technology



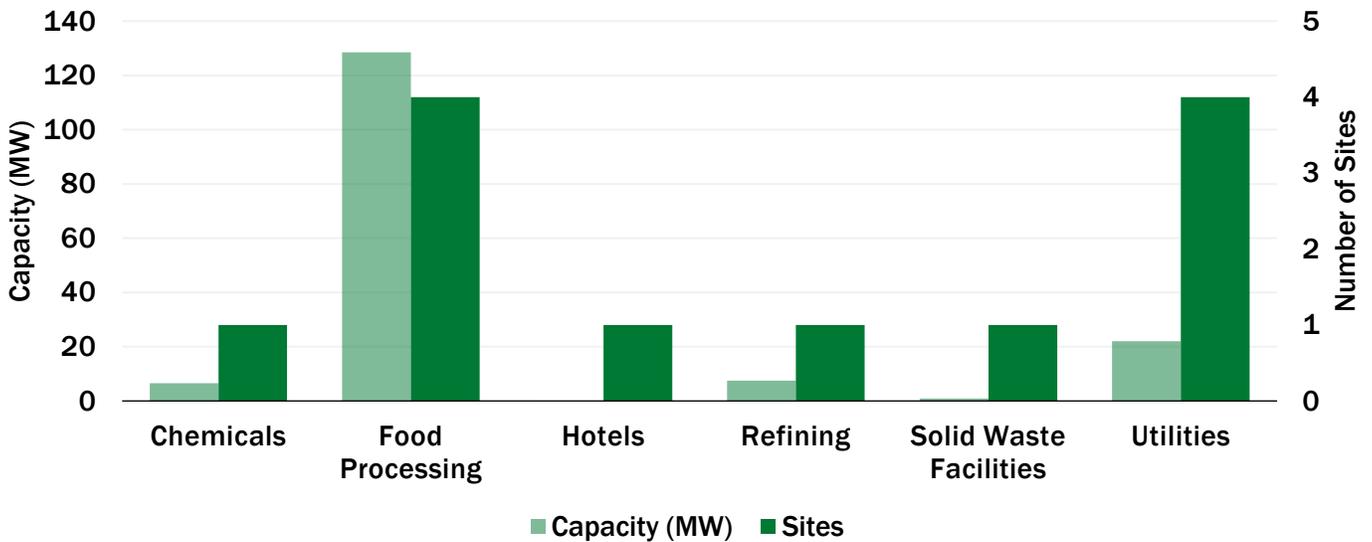
North Dakota CHP Capacity (MW) by Fuel



North Dakota CHP by Size Range



North Dakota CHP by Application



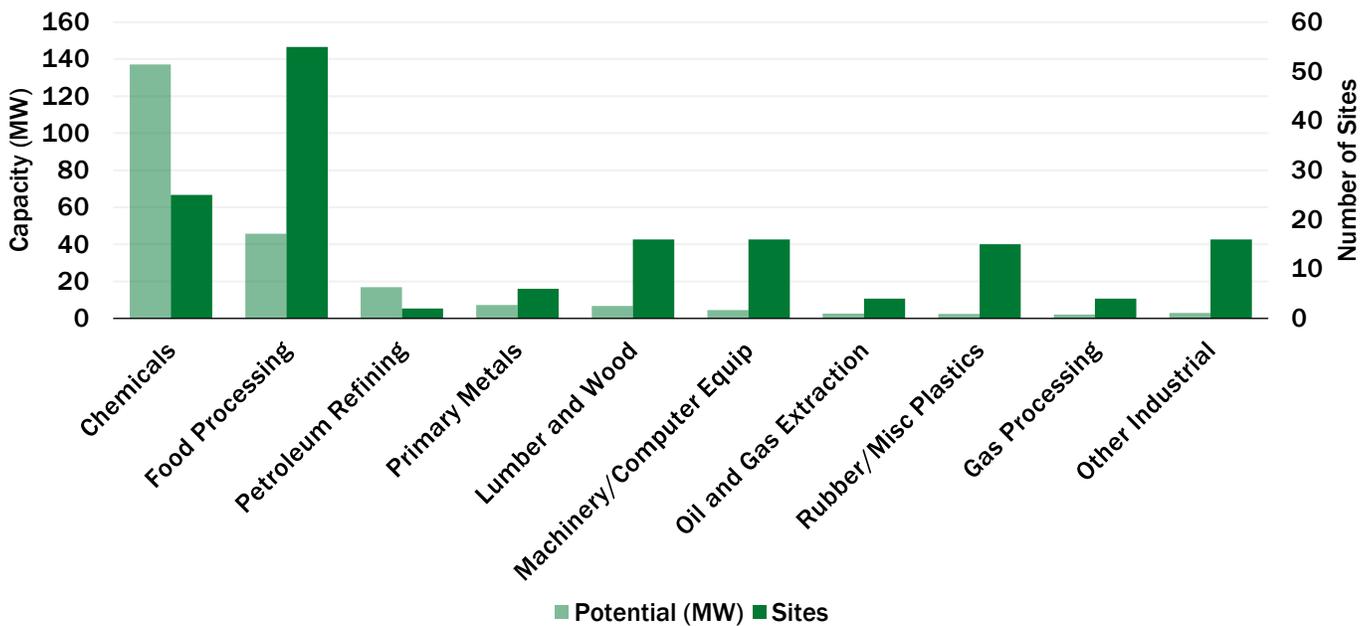
North Dakota: Technical Potential for New CHP Installations

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.

North Dakota CHP Technical Potential

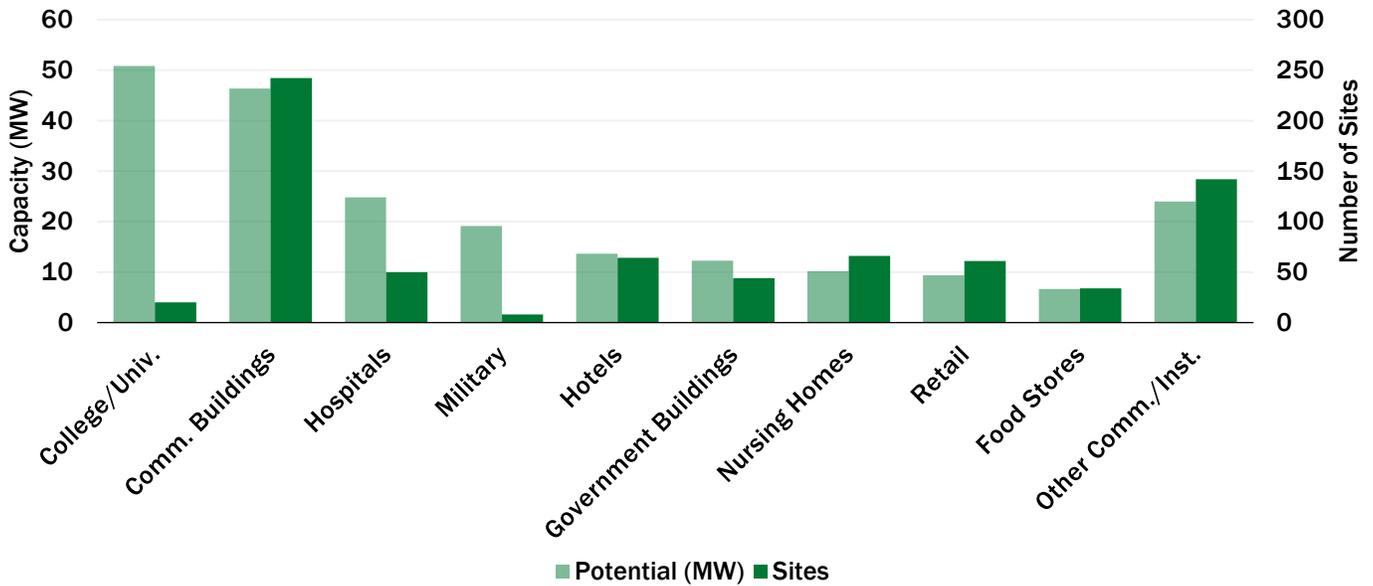
Sector	Potential Sites	Potential MW
Industrial	159	731
Commercial/Institutional	731	218
Total	890	445

North Dakota 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
Chemicals	18	3	0	0	4	10	1	5	2	119	25	137
Food Processing	36	7	8	6	9	21	2	13	0	0	55	46
Petroleum Refining	0	0	0	0	0	0	2	17	0	0	2	17
Primary Metals	2	0.4	2	1	2	6	0	0	0	0	6	7
Lumber and Wood	12	2	2	1	2	3	0	0	0	0	16	7
Other Industrial	47	8	7	5	1	2	0	0	0	0	55	14
Total	115	20	19	13	18	41	5	35	2	119	159	228

North Dakota 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.	9	2	3	2	6	16	2	31	0	0	20	51
Commercial Buildings	155	8	68	27	19	11	0	0	0	0	242	46
Hospitals	38	7	7	5	5	13	0	0	0	0	50	25
Military	5	1	1	1	0	0	2	18	0	0	8	19
Hotels	56	7	5	3	3	4	0	0	0	0	64	14
Other Comm./Inst.	323	39	18	11	5	7	1	5	0	0	347	63
Total	586	64	102	49	38	52	5	54	0	0	731	218

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>

North Dakota: 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.

North Dakota Natural Gas Prices

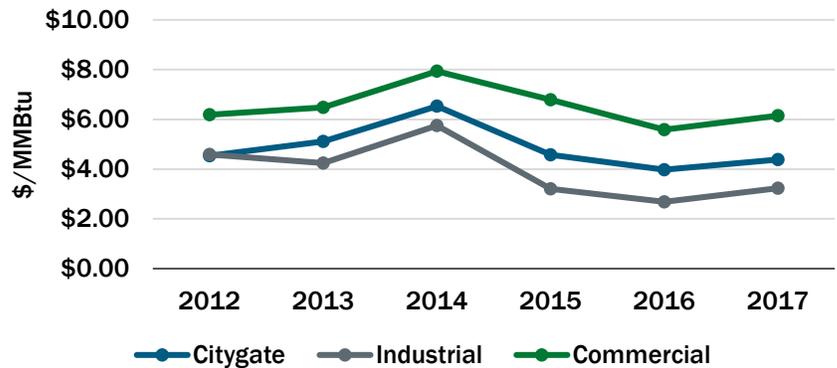
The EIA industrial natural gas price is a full tariff rate, and most large consumers are purchasing gas commodities from marketers at a lower rate.

North Dakota Average Gas Prices (\$/MMBtu) - 2017

Sector	ND Price	U.S. Price
Citygate*	4.39	4.26
Industrial	3.23	4.20
Commercial	6.15	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.

North Dakota Average Natural Gas Prices



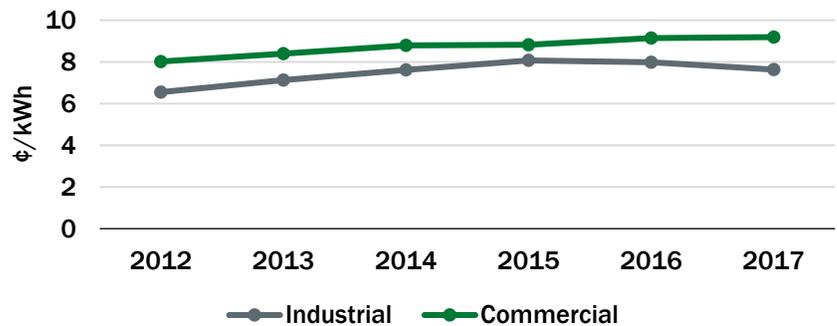
North Dakota Electricity Prices

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

North Dakota Average Electricity Prices (¢/kWh) - 2017

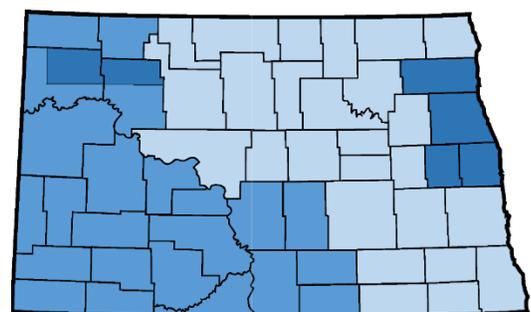
Sector	ND Price	U.S. Price
Industrial	7.63	6.88
Commercial	9.19	10.66

North Dakota Average Electricity Prices



North Dakota Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
Xcel Energy	7.84	10.80	9.32
Montana-Dakota Utilities	5.92	8.34	7.13
Otter Tail Power	5.44	8.46	6.95



Otter Tail Power
 Montana-Dakota Utilities
 Xcel Energy