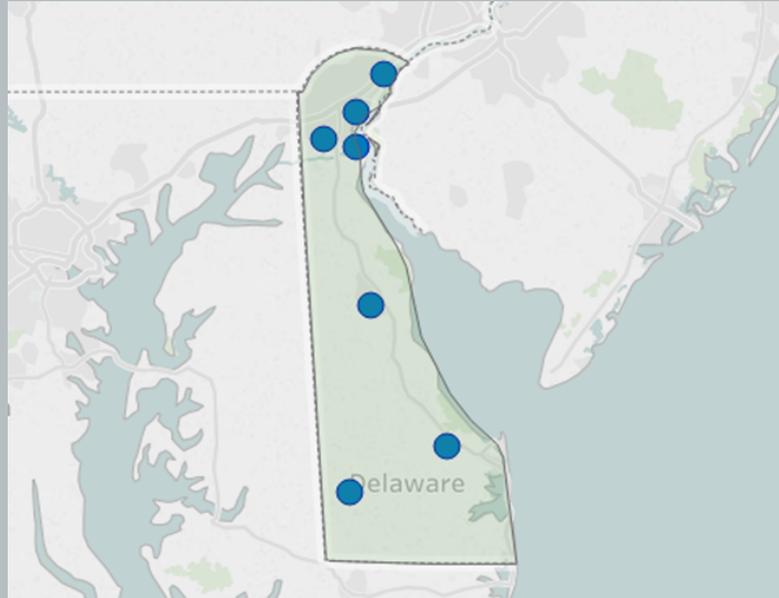




Combined heat and power (CHP) – also referred to as cogeneration – is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source. The information in this document provides a general overview of the state of CHP in Delaware, with data on current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



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

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

CHP Project Profiles

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

Mid-Atlantic CHP Technology Assistance Partnership

For assistance with questions about specific CHP opportunities in Delaware, please consult with the Mid-Atlantic CHP TAP by visiting machptap.org or contacting the TAP director.

Delaware Existing CHP

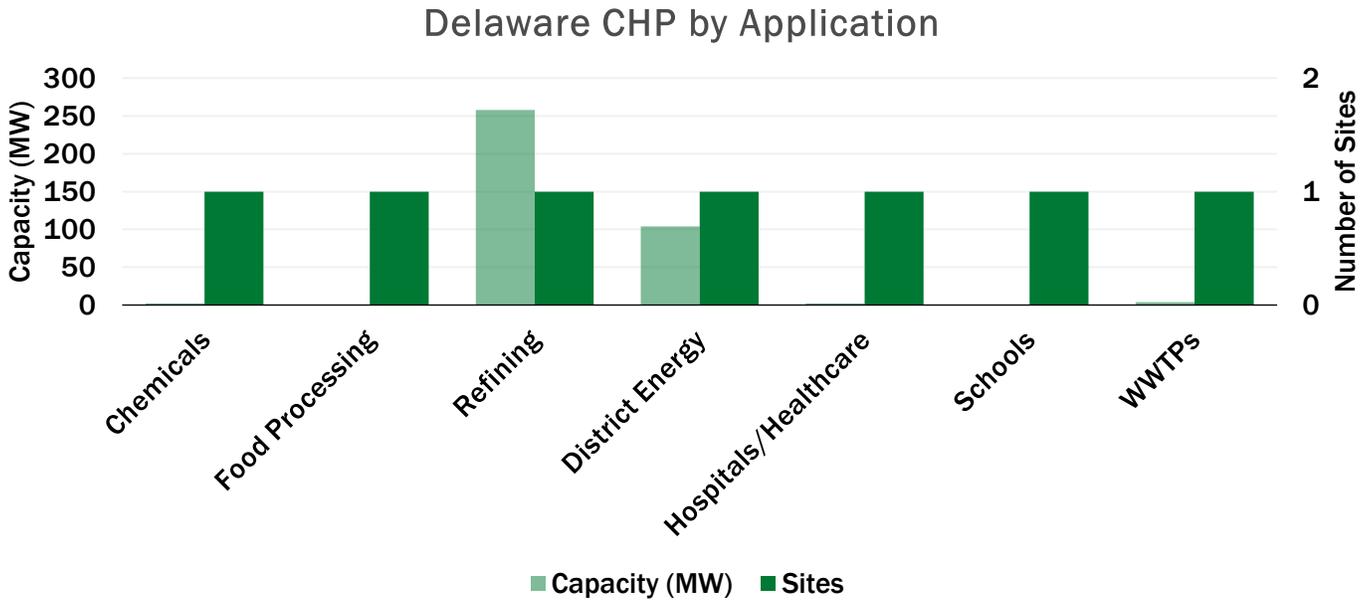
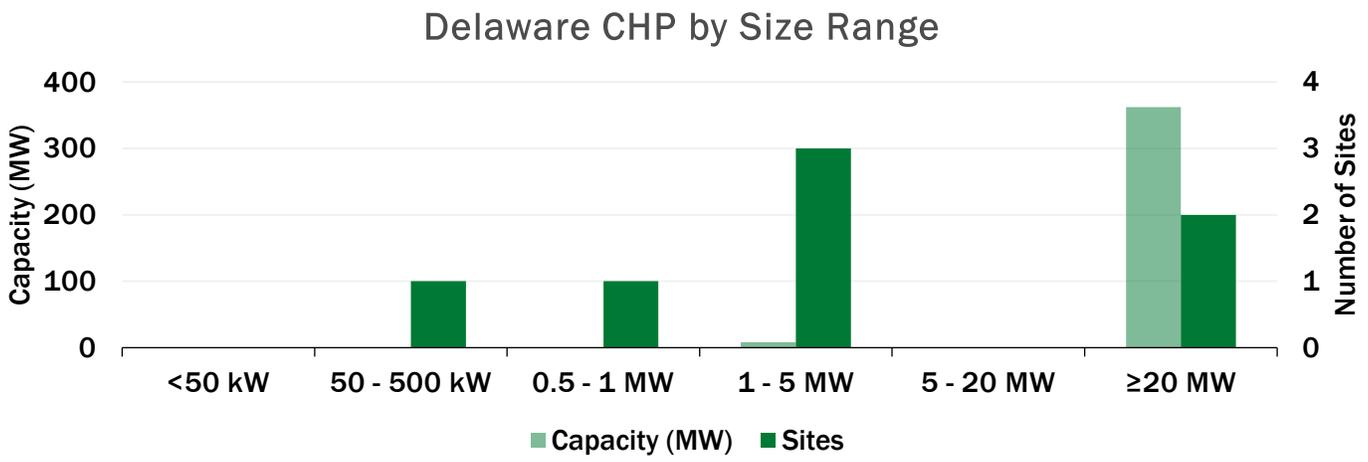
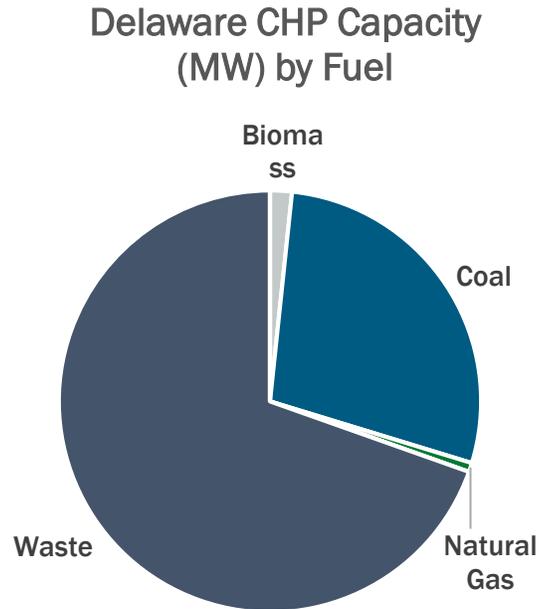
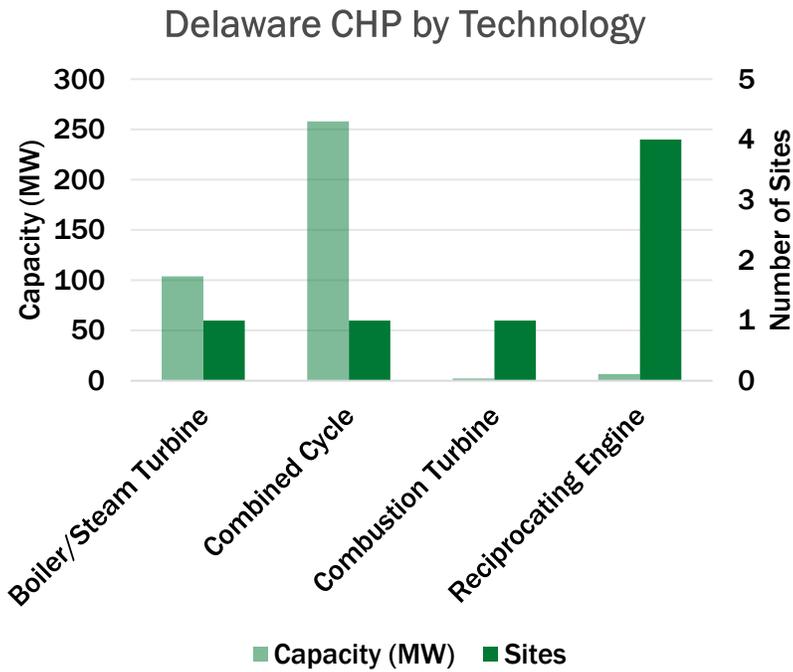
Sector	Sites	Capacity (MW)
Industrial	3	261
Commercial/Institutional	4	110
Other	0	0
Total	7	371

Mid-Atlantic CHP TAP Director

Jim Freihaut, Ph.D.

- Pennsylvania State University
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- 814-863-0083





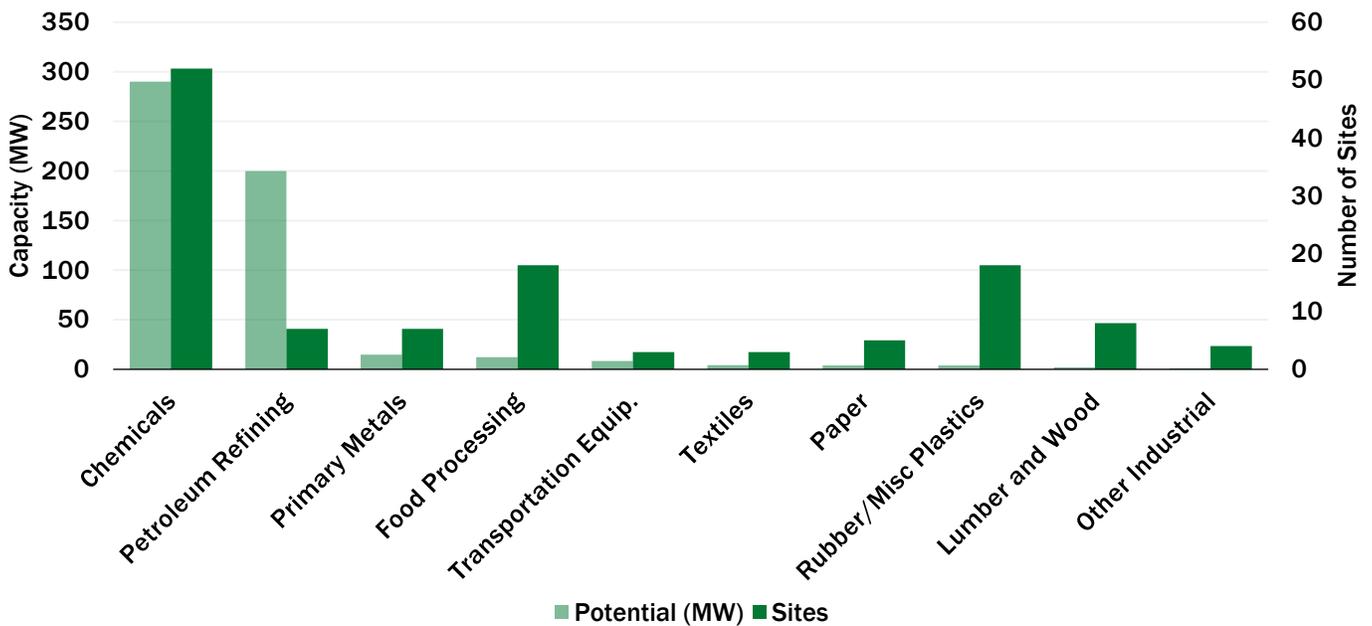
Delaware: Technical Potential for New CHP Installations

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.

Delaware CHP Technical Potential

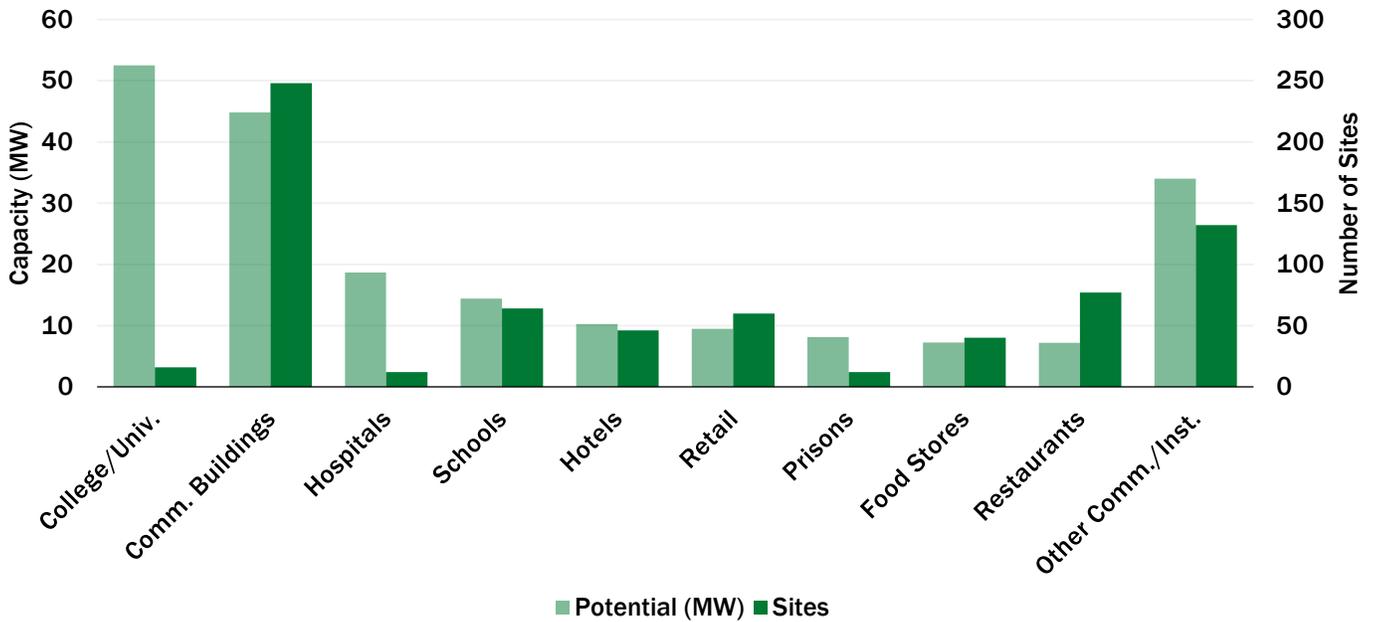
Sector	Potential Sites	Potential MW
Industrial	125	501
Commercial/Institutional	707	207
Total	834	808

Delaware 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	21	3	6	4	10	22	12	124	3	137	52	290
Petroleum Refining	0	0	0	0	5	11	0	0	2	189	7	200
Primary Metals	3	1	2	1	1	1	1	11	0	0	7	15
Food	11	2	3	2	4	8	0	0	0	0	18	12
Transportation Equip.	2	0.3	0	0	0	0	1	8	0	0	3	9
Other Industrial	32	6	4	3	2	6	0	0	0	0	38	15
Total	69	13	15	11	22	47	13	132	4	277	125	501

Delaware Technical Potential (MW) for Comm./Inst. 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
Colleges/Univ.	8	2	1	1	5	11	1	15	1	24	16	53
Commercial Buildings	165	8	66	26	17	10	0	0	0	0	248	45
Hospitals	3	1	2	1	6	9	1	7	0	0	12	19
Schools	62	13	2	1	0	0	0	0	0	0	64	14
Hotels	42	5	3	2	1	4	0	0	0	0	46	10
Other Comm./Inst.	299	40	15	9	5	12	1	5	0	0	321	66
Total	579	69	89	40	34	46	3	27	1	24	707	207

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>

Delaware: 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.

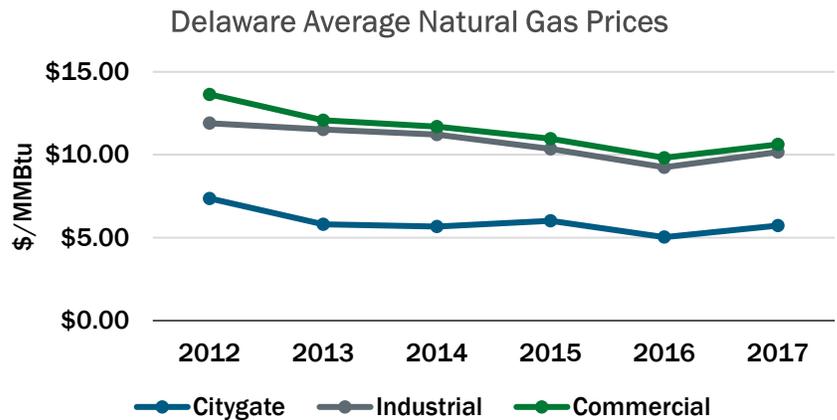
Delaware Natural Gas Prices

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.

Delaware Average Gas Prices (\$/MMBtu) - 2017

Sector	DE Price	U.S. Price
Citygate*	5.74	4.26
Industrial	10.16	4.20
Commercial	10.63	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.

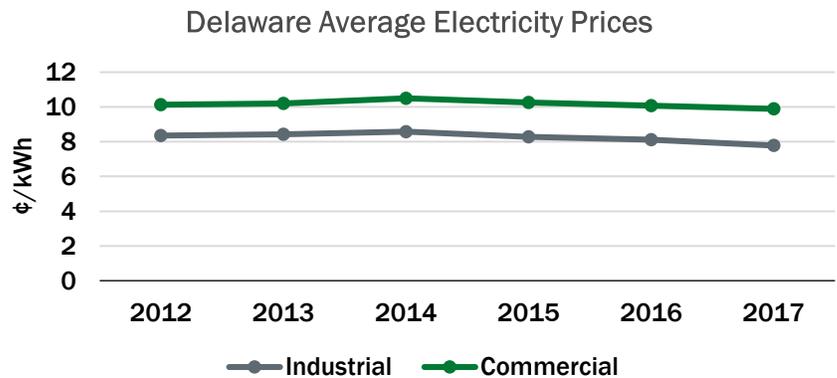


Delaware Electricity Prices

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

Delaware Average Electricity Prices (¢/kWh) - 2017

Sector	DE Price	U.S. Price
Industrial	7.78	6.88
Commercial	9.89	10.66



Delaware Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
City of Newark	10.96	14.30	12.63
Town of Middletown	9.53	14.88	12.21
Delmarva Power	10.26	11.67	10.96
Delaware Elec Coop	-	10.84	10.84
City of Dover	8.61	11.58	10.10



■ Delaware Coop / Delmarva Power / Dover
■ Middletown / Newark