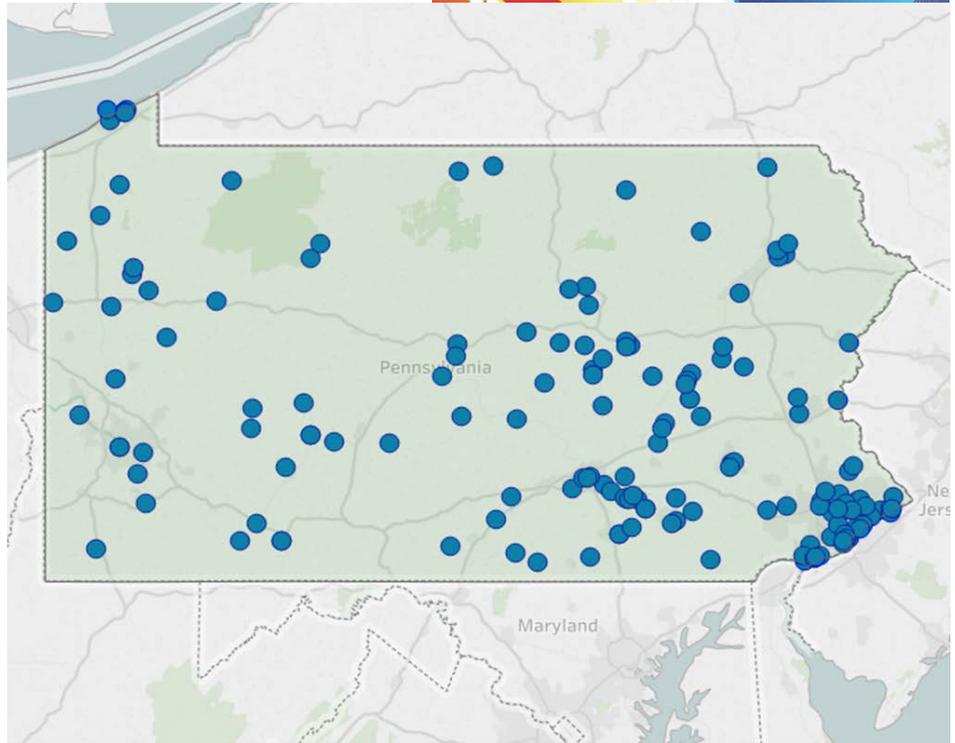


The State of CHP: Pennsylvania



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



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

Pennsylvania: 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 Pennsylvania, 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 Pennsylvania. 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 Pennsylvania, please consult with the Mid-Atlantic CHP TAP by visiting machptap.org or contacting the TAP director.

Pennsylvania Existing CHP

Sector	Sites	Capacity (MW)
Industrial	51	1,844
Commercial/Institutional	89	642
Other	29	371
Total	169	2,857

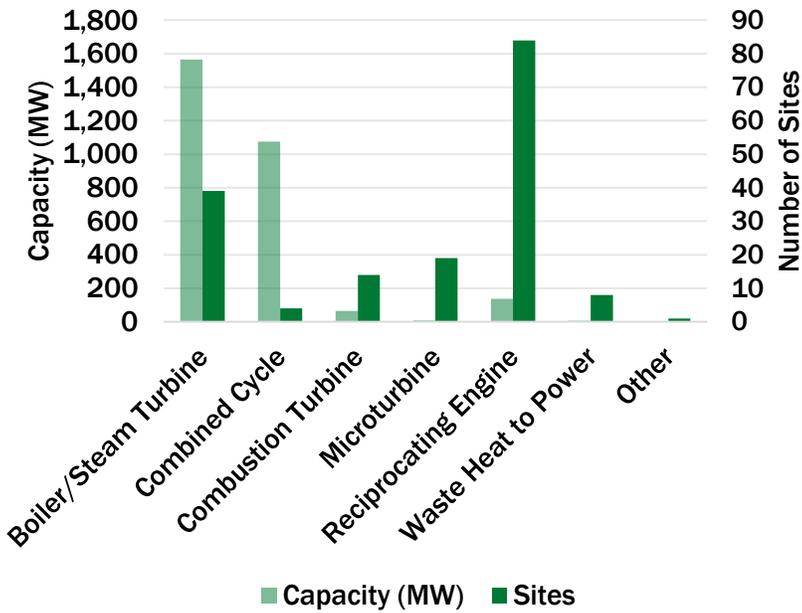
Mid-Atlantic CHP TAP Director

Jim Freihaut, Ph.D.

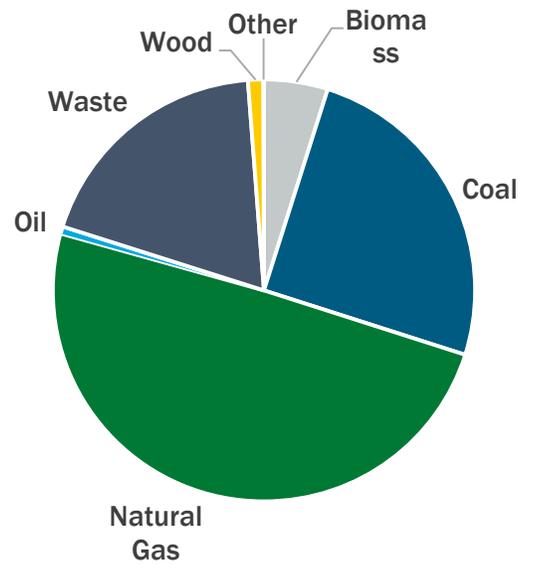
- Pennsylvania State University
- jdf11@psu.edu
- 814-863-0083



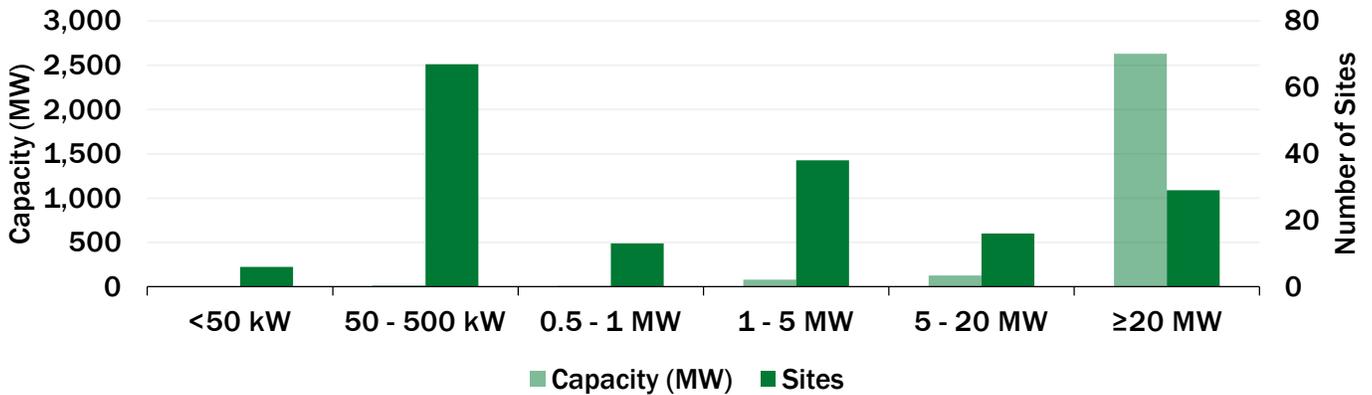
Pennsylvania CHP by Technology



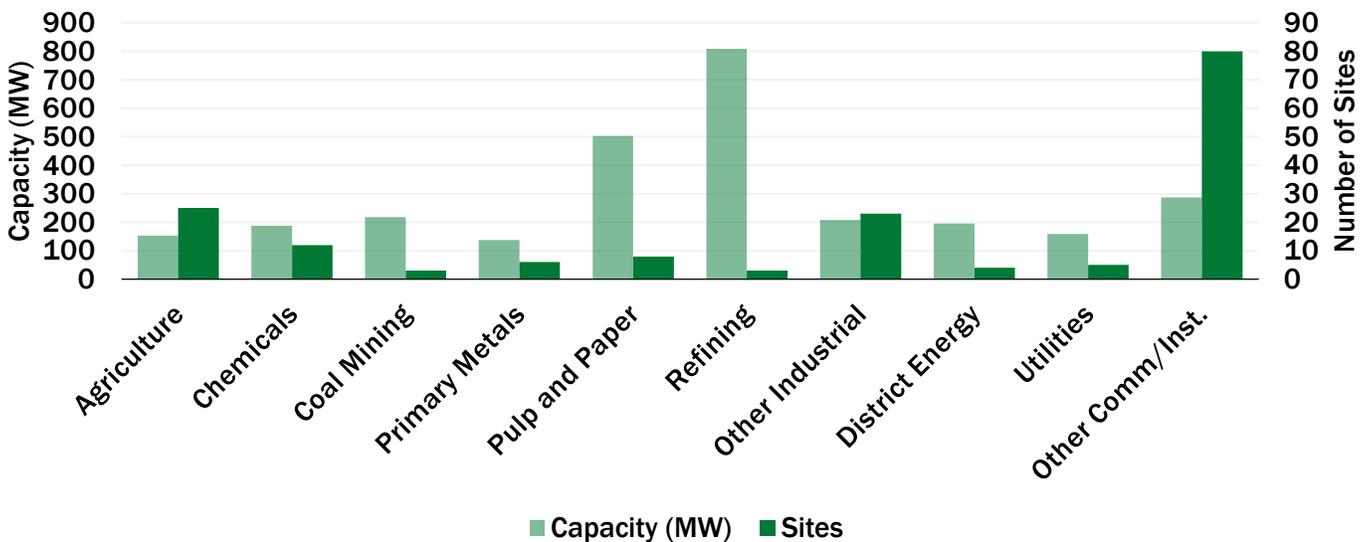
Pennsylvania CHP Capacity (MW) by Fuel



Pennsylvania CHP by Size Range



Pennsylvania CHP by Application



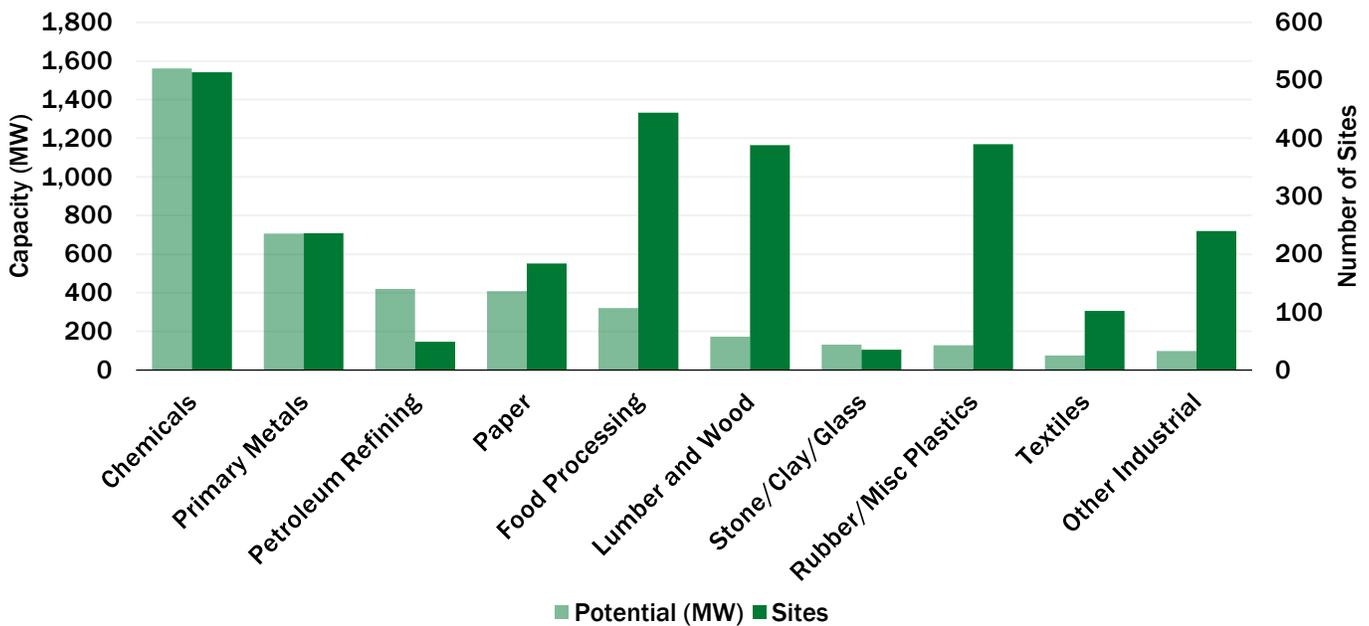
Pennsylvania: Technical Potential for New CHP Installations

Pennsylvania CHP Technical Potential

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.

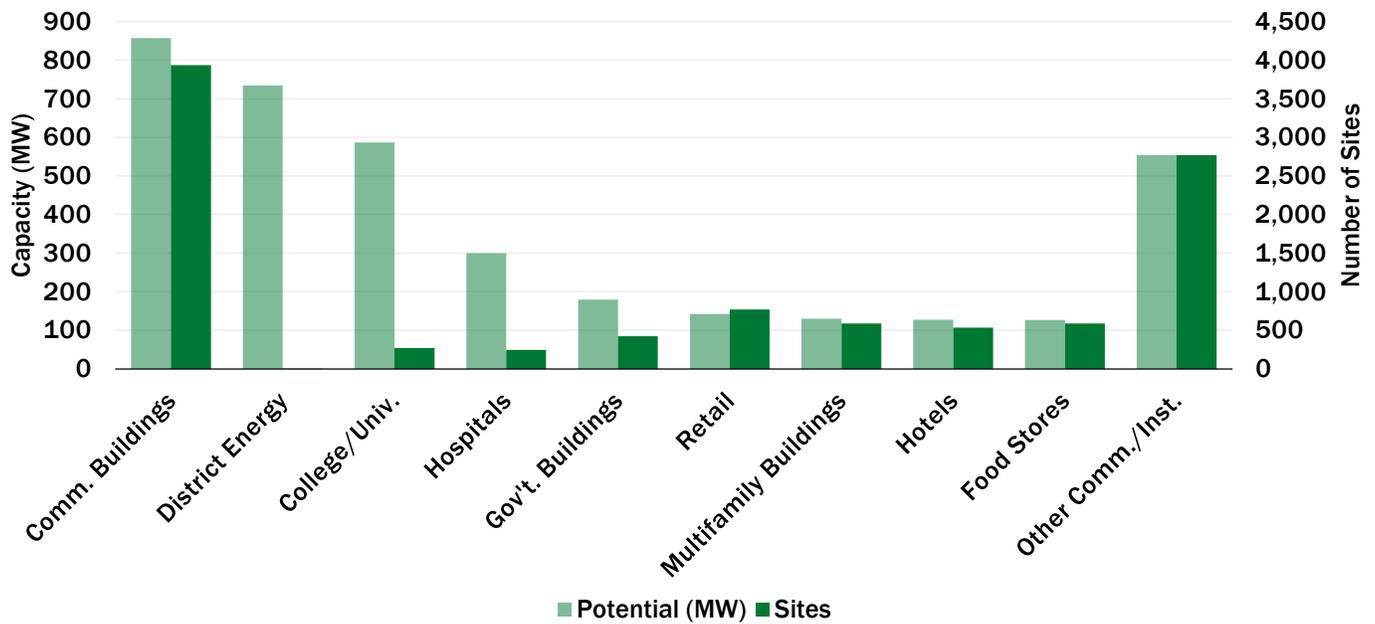
Sector	Potential Sites	Potential MW
Industrial	2,582	4,022
Commercial/Institutional	10,126	3,737
Total	12,708	7,759

Pennsylvania 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	247	44	57	42	134	301	61	543	15	631	514	1,561
Primary Metals	104	26	59	44	45	107	21	210	7	320	236	706
Petroleum Refining	3	1	15	11	22	56	2	19	7	333	49	419
Paper	98	25	30	22	37	73	15	135	4	154	184	408
Food Processing	316	59	43	32	75	156	10	74	0	0	444	321
Other Industrial	909	154	124	89	103	226	19	138	0	0	1,155	606
Total	1,677	309	328	239	416	918	128	1,118	33	1,437	2,582	4,022

Pennsylvania 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
Commercial Buildings	2,316	116	1,158	463	463	278	0	0	0	0	3,937	857
College/Univ.	150	27	22	13	64	170	28	229	5	147	269	587
Hospitals	81	23	54	37	106	204	5	35	0	0	246	300
Government Buildings	361	44	30	21	27	51	4	42	1	21	423	179
Retail	729	106	30	19	10	18	0	0	0	0	769	142
Other Comm./Inst.	4,077	513	277	157	117	191	8	75	3	734	4,482	1,672
Total	7,714	829	1,571	711	787	912	45	383	9	902	10,126	3,737

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 Resiliency Planning Guide and the CHP for Resiliency Screening Tool. For more information, visit <https://betterbuildingsinitiative.energy.gov/accelerators/combined-heat-and-power-resiliency>

Pennsylvania: 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.

Pennsylvania Natural Gas Prices

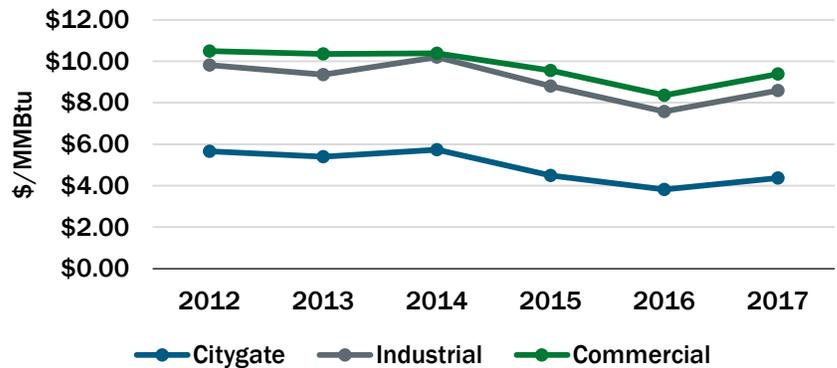
The EIA industrial natural gas price is a full tariff rate, and most large consumers are purchasing gas commodities from marketers at a lower rate.

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

Sector	PA Price	U.S. Price
Citygate*	4.37	4.26
Industrial	8.59	4.20
Commercial	9.39	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.

Pennsylvania Average Natural Gas Prices



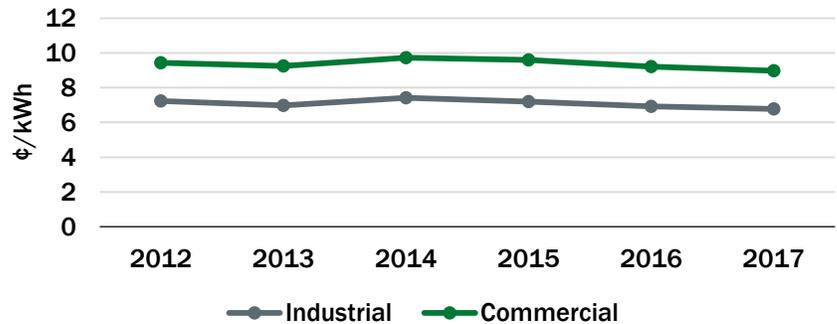
Pennsylvania Electricity Prices

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

Pennsylvania Average Electricity Prices (¢/kWh) - 2017

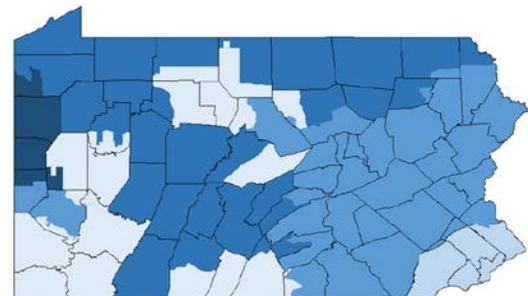
Sector	PA Price	U.S. Price
Industrial	6.77	6.88
Commercial	8.98	10.66

Pennsylvania Average Electricity Prices



Pennsylvania Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
Duquesne Light	13.09	11.79	12.44
FirstEnergy (Penelec)	10.59	9.47	10.03
PPL Electric Utilities	8.74	11.11	9.93
FirstEnergy (Met-Ed)	8.63	10.93	9.78
UGI Utilities	8.43	10.35	9.39
FirstEnergy (Penn Power)	7.90	10.32	9.11
PECO Energy	6.24	10.59	8.42
FirstEnergy (West Penn)	5.26	9.27	7.26



- West Penn
- PECO Energy
- Met-Ed / Penn Power / PPL / UGI
- Penelec
- Duquesne Light