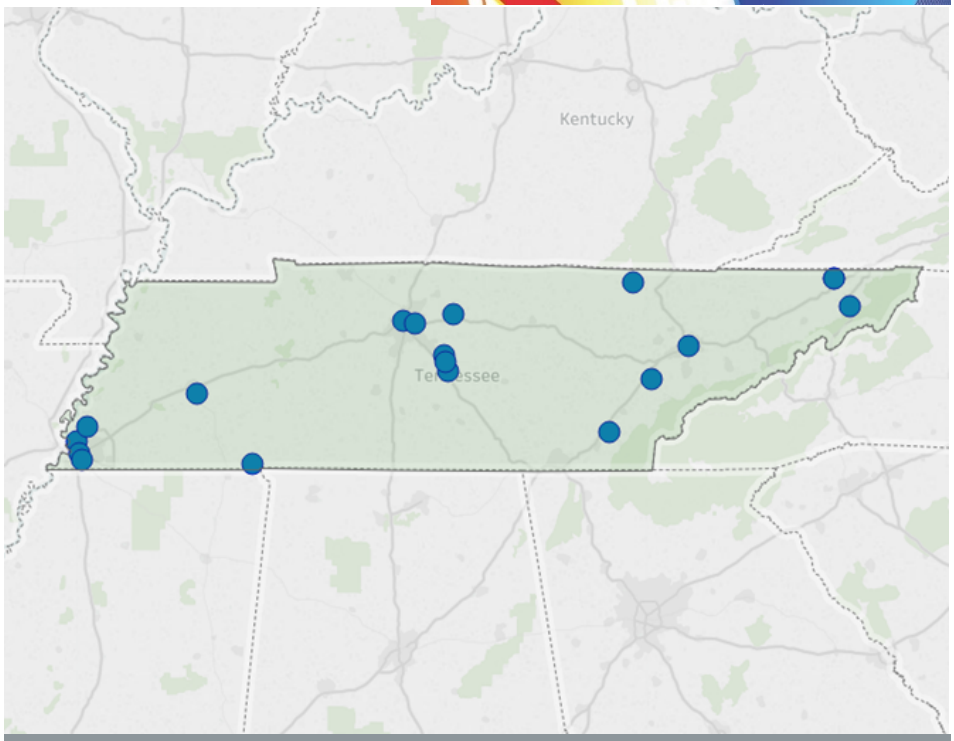
U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

The State of CHP: Tennessee



Map of current CHP installations in Tennessee. *Illustration from ICF.*

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

Tennessee: 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 Tennessee, and can be accessed by visiting https://doe.icfwebservices.com/chp.

CHP Project Profiles

The Southeast CHP TAP has compiled information on certain illustrative CHP projects in Tennessee. You can access these by visiting the Department of Energy's CHP Project Profiles Database at https://betterbuildingssolutioncenter.energy.gov/chp/chp-project-profiles-database.

Southeast CHP Technical Assistance Partnership

For assistance with questions about specific CHP opportunities in Tennessee, please consult with the Southeast CHP TAP by visiting sechptap.org or contacting the CHP TAP director.

Tennessee Existing CHP

Sector	Sites	Capacity (MW)
Industrial	11	466
Commercial/Institutional	8	55
Other	0	0
Total	19	521

Southeast CHP TAP Director

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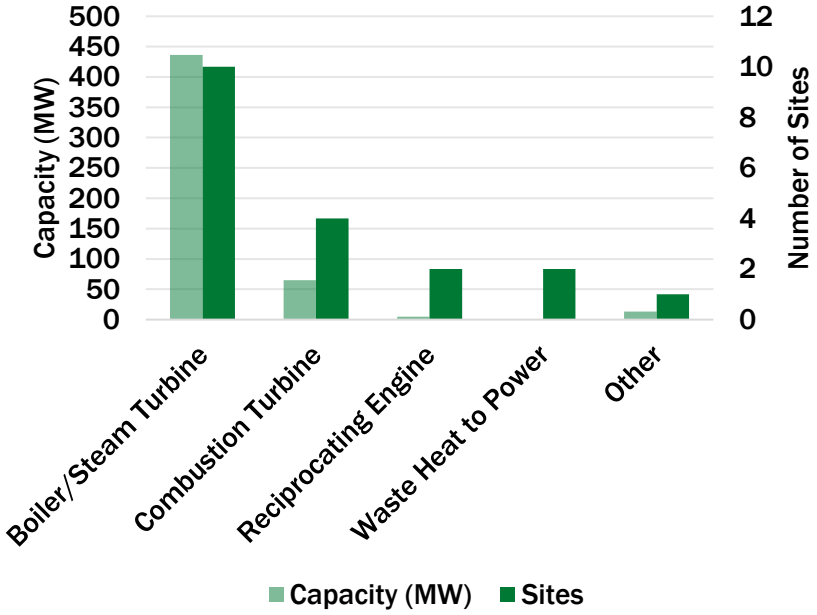
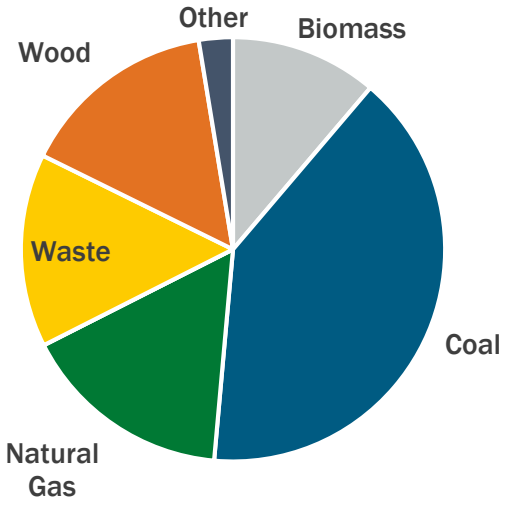
SOUTHEAST CHP Technical Assistance Partnerships

DOE CHP Installation Database (U.S. installations as of Dec. 31, 2017)

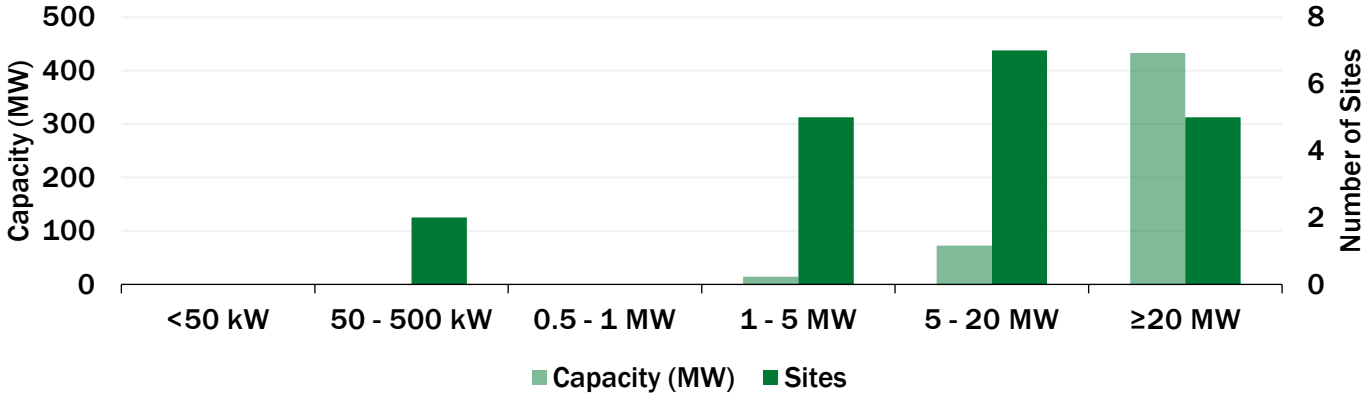
Tennessee CHP by Technology



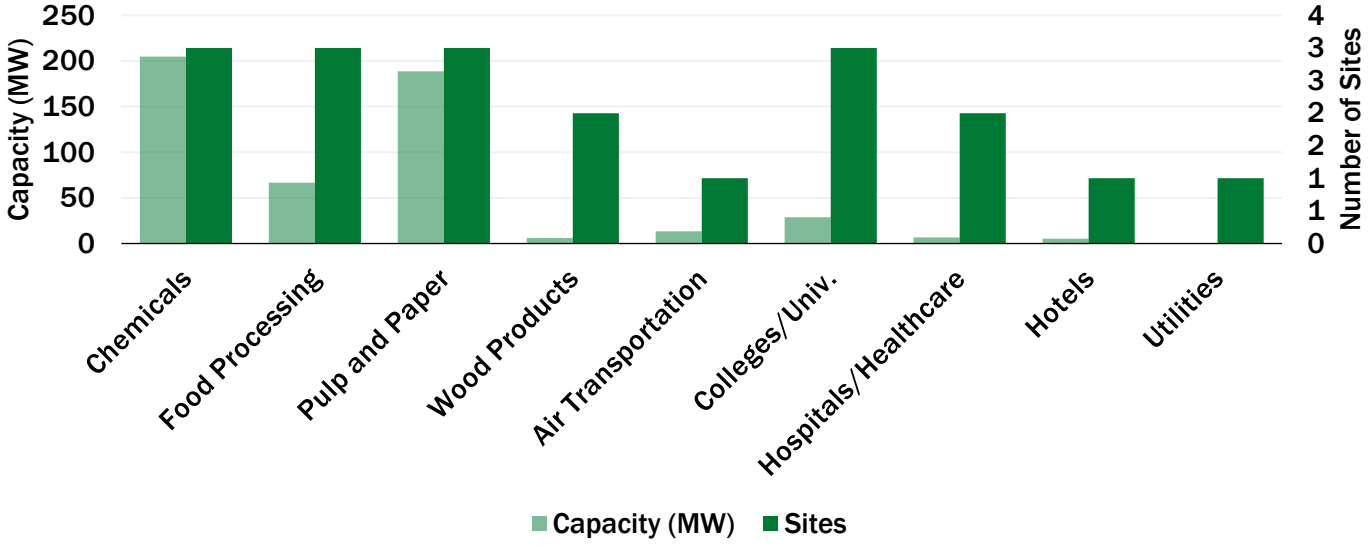
Tennessee CHP Capacity (MW) by Fuel



Tennessee CHP by Size Range



Tennessee CHP by Application

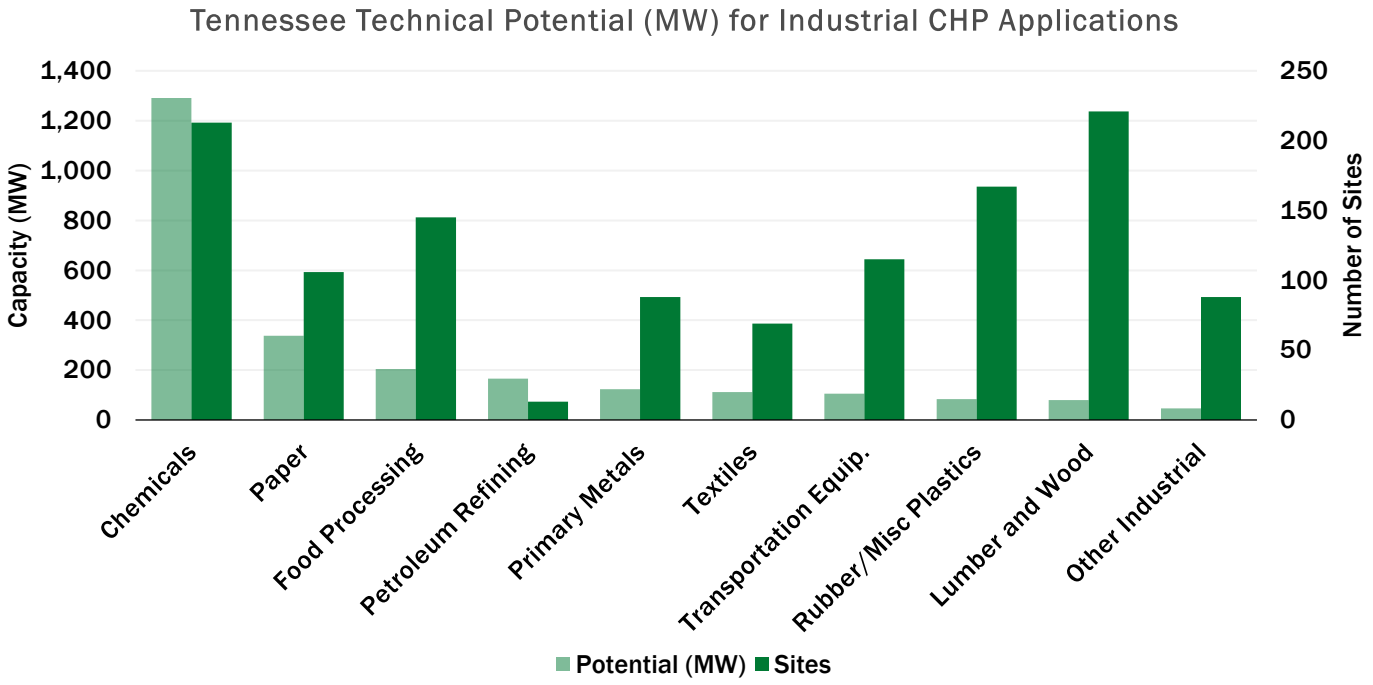


Tennessee: Technical Potential for New CHP Installations

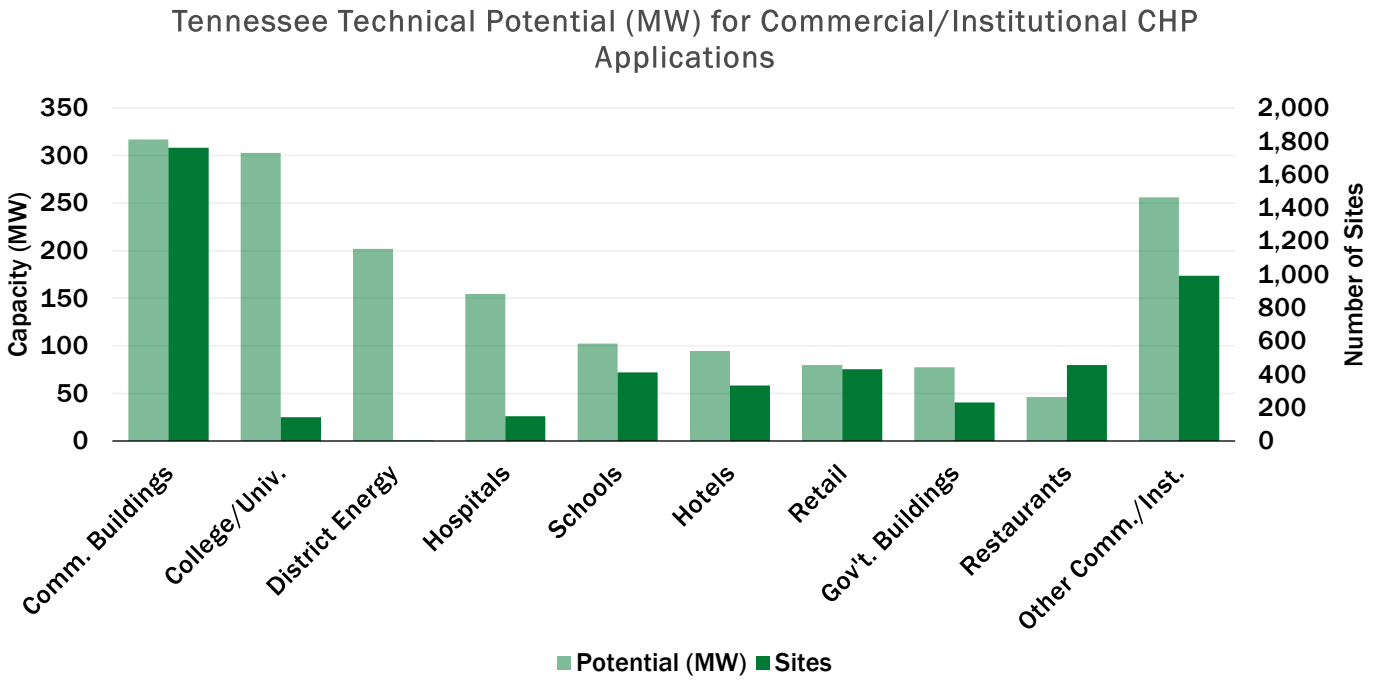
The "Combined Heat and Power (CHP) Technical Potential in the United States" market analysis report provides data on the technical potential in industrial facilities and commercial buildings for "topping cycle" CHP, waste heat to power (WHP) CHP, and district energy CHP in the U.S. Read the report **here**.

Tennessee CHP Technical Potential

Sector	Potential Sites	Potential MW
Industrial	1,225	2,551
Commercial/Institutional	4,909	1,632
Total	6,134	4,183



	50-500 kW		0.5 - 1 MW		1 - 5 MW		5 - 20 MW		>20 MW		Total	
Application	Sites	MW	Sites	MW	Sites	MW	Sites	MW	Sites	MW	Total Sites	Total MW
Chemicals	91	16	16	11	58	125	38	330	10	810	213	1,291
Paper	55	14	17	11	22	52	9	87	3	175	106	338
Food Processing	76	15	21	15	42	78	5	45	1	51	145	205
Petroleum Refining	1	0	5	3	4	9	0	0	3	153	13	165
Primary Metals	56	12	15	10	12	24	4	53	1	25	88	124
Other Industrial	484	91	80	57	84	175	12	105	0	0	660	427
Total	763	147	154	107	222	462	68	620	18	1,214	1,225	2,551



	50-500 kW		0.5 - 1 MW		1 - 5 MW		5 - 20 MW		>20 MW		Total	
Application	Sites	MW	Sites	MW	Sites	MW	Sites	MW	Sites	MW	Total Sites	Total MW
Commercial Buildings	1,174	59	470	188	117	70	0	0	0	0	1,761	317
College/Univ.	100	17	6	3	23	58	11	94	2	130	142	303
Hospitals	68	18	31	21	47	100	2	16	0	0	148	154
Schools	377	81	35	21	0	0	0	0	0	0	412	102
Hotels	307	33	15	9	8	14	3	38	0	0	333	95
Other Comm./Inst.	1,934	242	112	66	59	105	6	46	2	202	2,113	661
Total	3,960	451	669	308	254	348	22	193	4	332	4,909	1,632

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://betterbuildingssolutioncenter.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://betterbuildingssolutioncenter.energy.gov/accelerators/combined-heat-and-power-resiliency

Tennessee: 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.

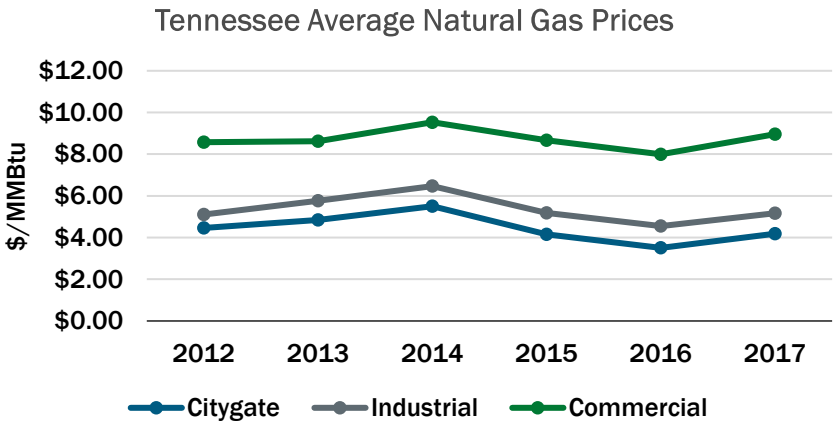
Tennessee Natural Gas Prices

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.

Tennessee Average Gas Prices ($/MMBtu) - 2017

Sector	TN Price	U.S. Price
Citygate*	4.19	4.26
Industrial	5.17	4.20
Commercial	8.96	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.

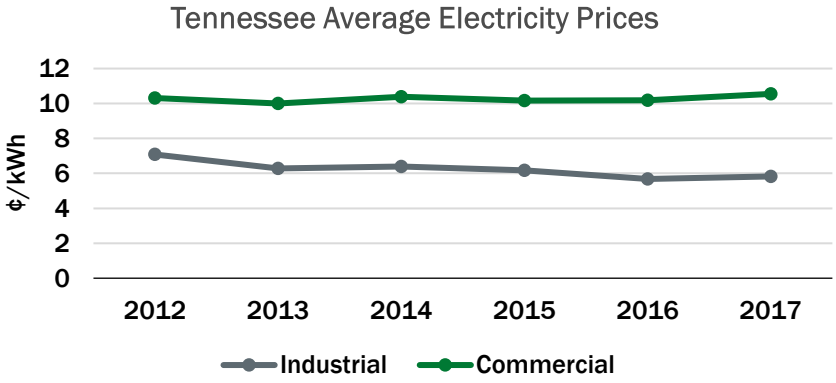


Tennessee Electricity Prices

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

Tennessee Average Electricity Prices (¢/kWh) - 2017

Sector	TN Price	U.S. Price
Industrial	5.83	6.88
Commercial	10.55	10.66



Tennessee Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
Hickman-Fulton Counties	-	13.74	13.74
Tri-State Elec Corp.	-	12.73	12.73
City of Chattanooga	9.11	11.76	10.44
State coop average	6.87	12.12	9.50
State municipal average	7.10	10.85	8.98
City of Memphis	7.27	10.12	8.70
Nashville Electric Service	6.31	10.58	8.45
Knoxville Utilities Board	6.22	10.48	8.35
Middle TN EMC	5.62	10.22	7.92
Appalachian Power	6.17	9.82	7.99