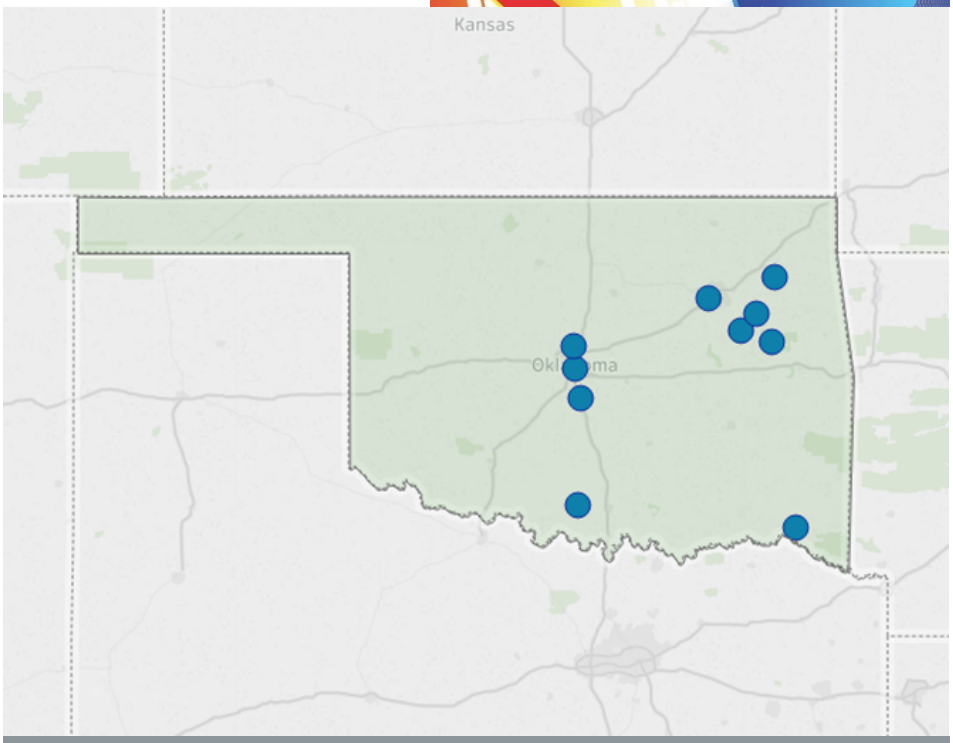
U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

The State of CHP: Oklahoma

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



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

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

CHP Project Profiles

The Southcentral CHP TAP has compiled information on certain illustrative CHP projects in Oklahoma. 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.

Southcentral CHP Technical Assistance Partnership

For assistance with questions about specific CHP opportunities in Oklahoma, please consult with the Southcentral CHP TAP by visiting scchptap.org or contacting the CHP TAP director.

Oklahoma Existing CHP

Sector	Sites	Capacity (MW)
Industrial	4	506
Commercial/Institutional	3	32
Other	3	8
Total	10	546

Southcentral CHP TAP Director

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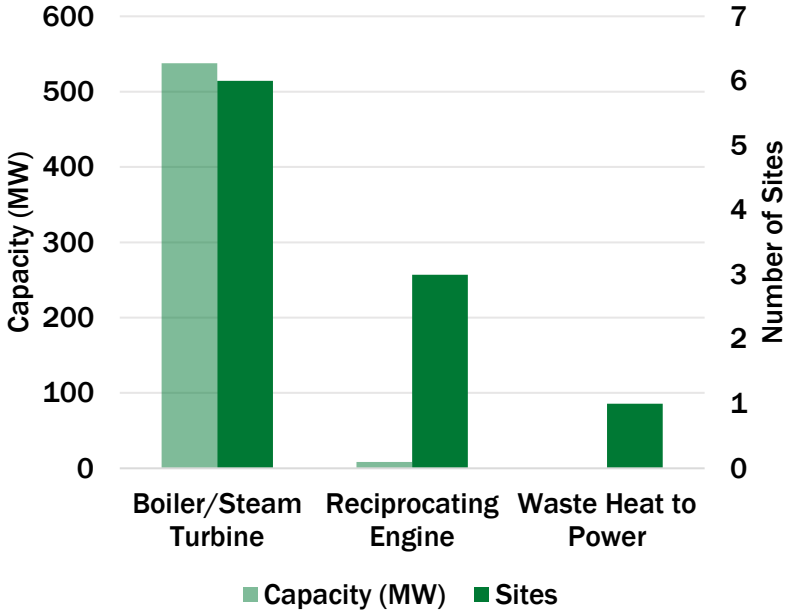
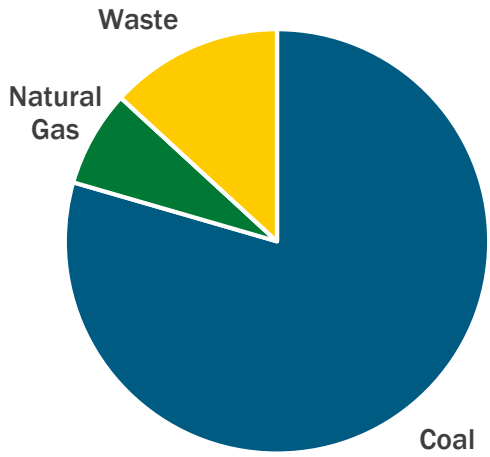
SOUTHCENTRAL CHP TECHNICAL ASSISTANCE PARTNERSHIPS

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

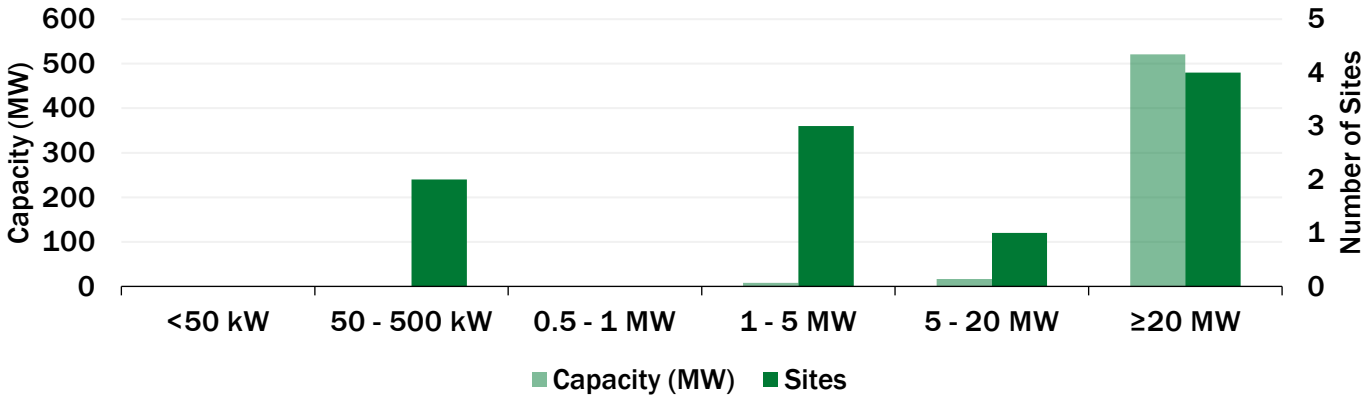
Oklahoma CHP by Technology



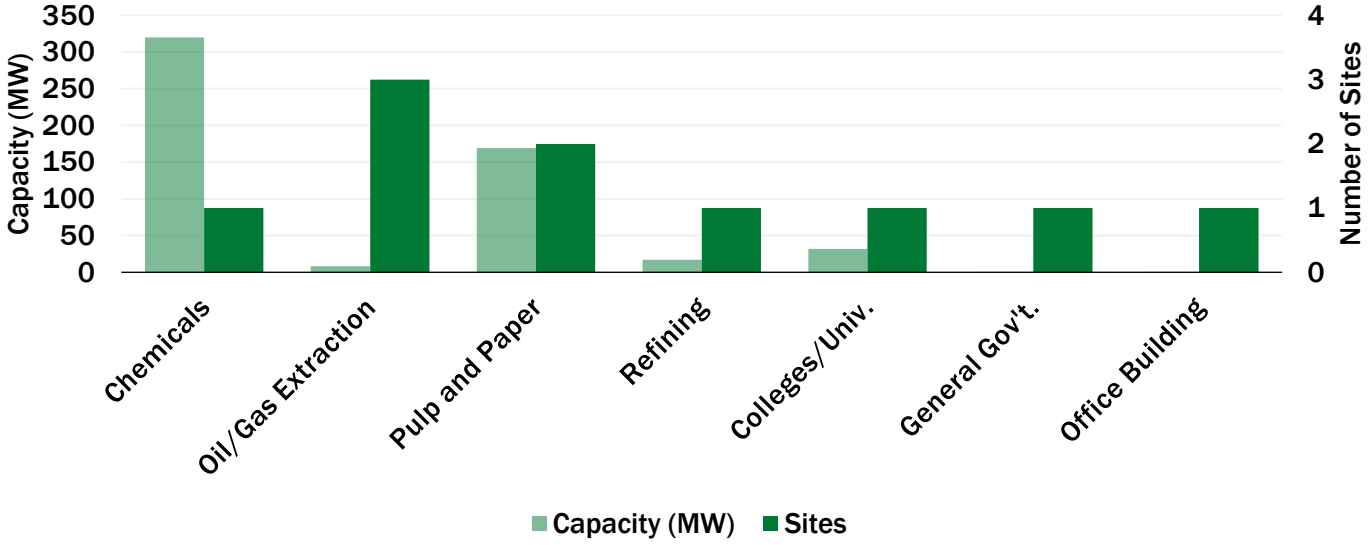
Oklahoma CHP Capacity (MW) by Fuel



Oklahoma CHP by Size Range



Oklahoma CHP by Application

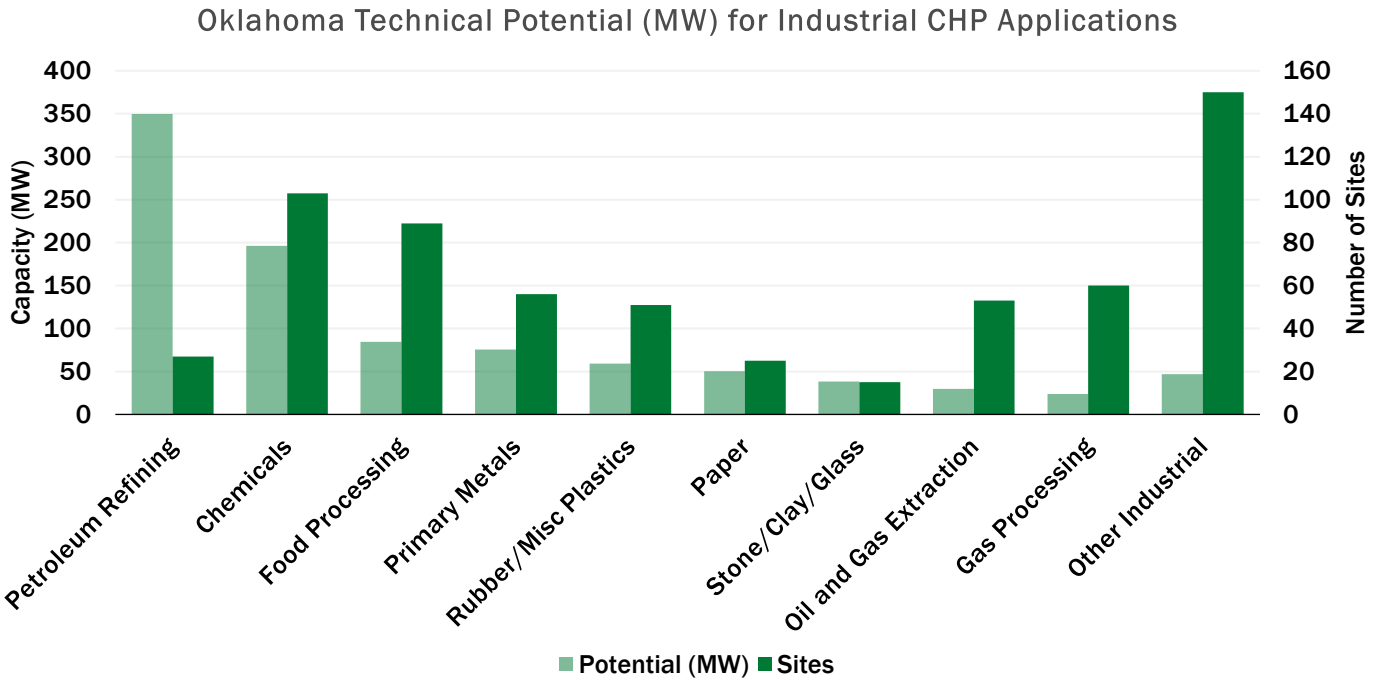


Oklahoma: Technical Potential for New CHP Installations

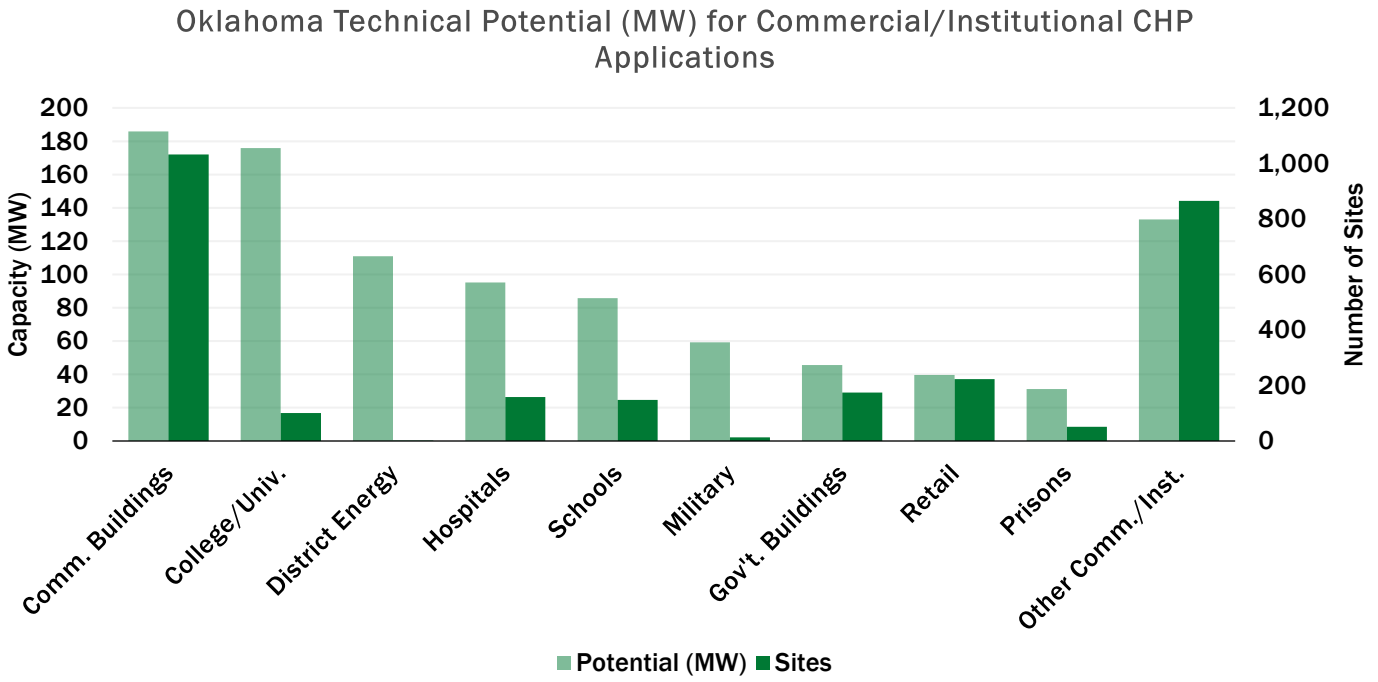
The "Combined Heat and Power (CHP) Technical Potential in the United States" market analysis report provides data on the technical potential in industrial facilities and commercial buildings for "topping cycle" CHP, waste heat to power (WHP) CHP, and district energy CHP in the U.S. Read the report **here**.

Oklahoma CHP Technical Potential

Sector	Potential Sites	Potential MW
Industrial	629	955
Commercial/Institutional	2,768	962
Total	3,397	1,916



	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
Petroleum Refining	1	0	1	1	13	27	7	91	5	231	27	350
Chemicals	60	11	11	8	21	52	11	125	0	0	103	196
Food Processing	51	11	18	14	17	34	3	26	0	0	89	85
Primary Metals	33	8	7	5	12	24	4	39	0	0	56	76
Rubber/Misc Plastics	38	6	8	5	3	6	1	18	1	23	51	59
Other Industrial	223	42	41	30	31	59	8	58	0	0	303	189
Total	406	78	86	64	97	202	34	357	6	254	629	955



	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	688	34	275	110	69	41	0	0	0	0	1,032	186
College/Univ.	64	9	8	6	16	47	12	92	1	21	101	176
Hospitals	110	24	24	16	22	44	2	11	0	0	158	95
Schools	91	38	42	29	15	18	0	0	0	0	148	86
Military	6	1	1	1	2	5	4	52	0	0	13	59
Other Comm./Inst.	1,207	145	69	43	37	61	0	0	2	111	1,316	360
Total	2,166	253	419	204	161	217	18	155	3	132	2,768	962

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

Oklahoma: 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.

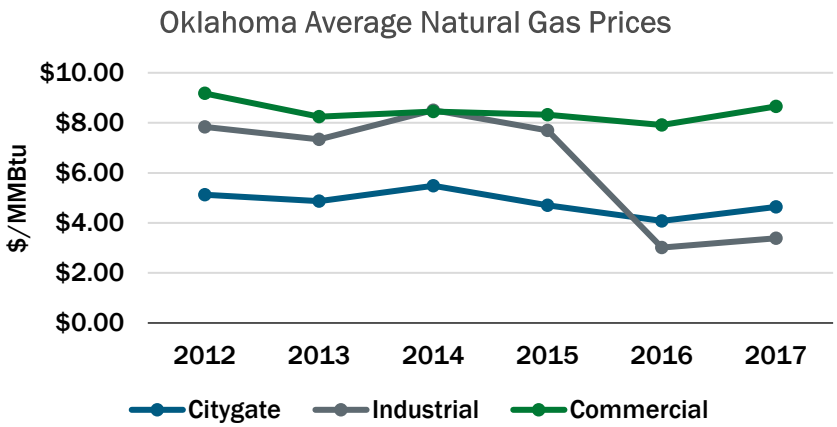
Oklahoma Natural Gas Prices

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.

Oklahoma Average Gas Prices ($/MMBtu) - 2017

Sector	OK Price	U.S. Price
Citygate*	4.63	4.26
Industrial	3.38	4.20
Commercial	8.65	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.

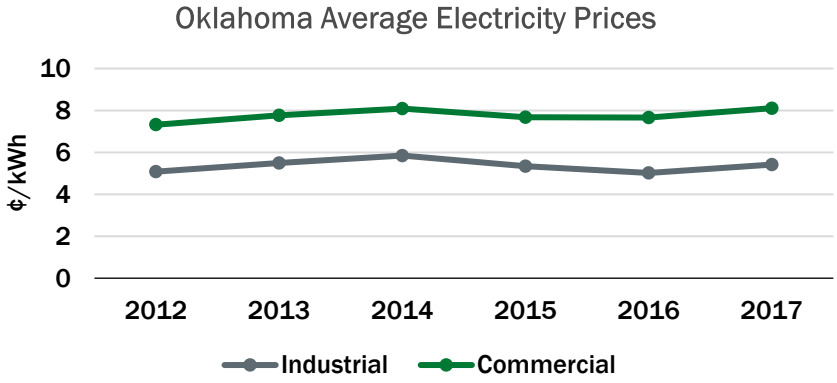


Oklahoma Electricity Prices

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

Oklahoma Average Electricity Prices (¢/kWh) - 2017

Sector	OK Price	U.S. Price
Industrial	5.42	6.88
Commercial	8.11	10.66



Oklahoma Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
Tri-County Electric Coop	10.00	22.34	16.17
East Central OK Elec Coop	-	10.43	10.43
Oklahoma Electric Coop	6.49	11.19	8.84
Grand River Dam Authority	5.11	8.96	7.03
Oklahoma Gas & Electric	5.52	7.42	6.47
Public Service Co of OK	4.82	7.47	6.15