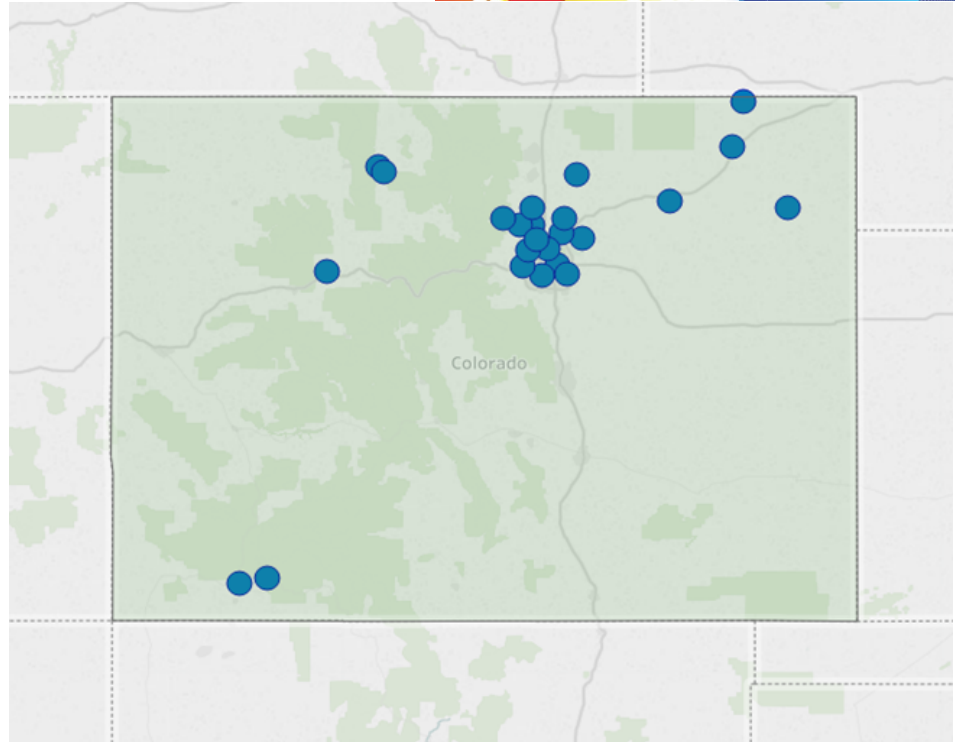


The State of CHP: Colorado



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



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

Colorado: 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 Colorado, and can be accessed by visiting <https://doe.icfwebservices.com/chp>.

CHP Project Profiles

The Upper-West CHP TAP has compiled information on certain illustrative CHP projects in Colorado. 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>.

Upper-West CHP Technical Assistance Partnership

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

Colorado Existing CHP

Sector	Sites	Capacity (MW)
Industrial	9	43
Commercial/Institutional	14	195
Other	3	273
Total	26	511

Upper-West CHP TAP Director

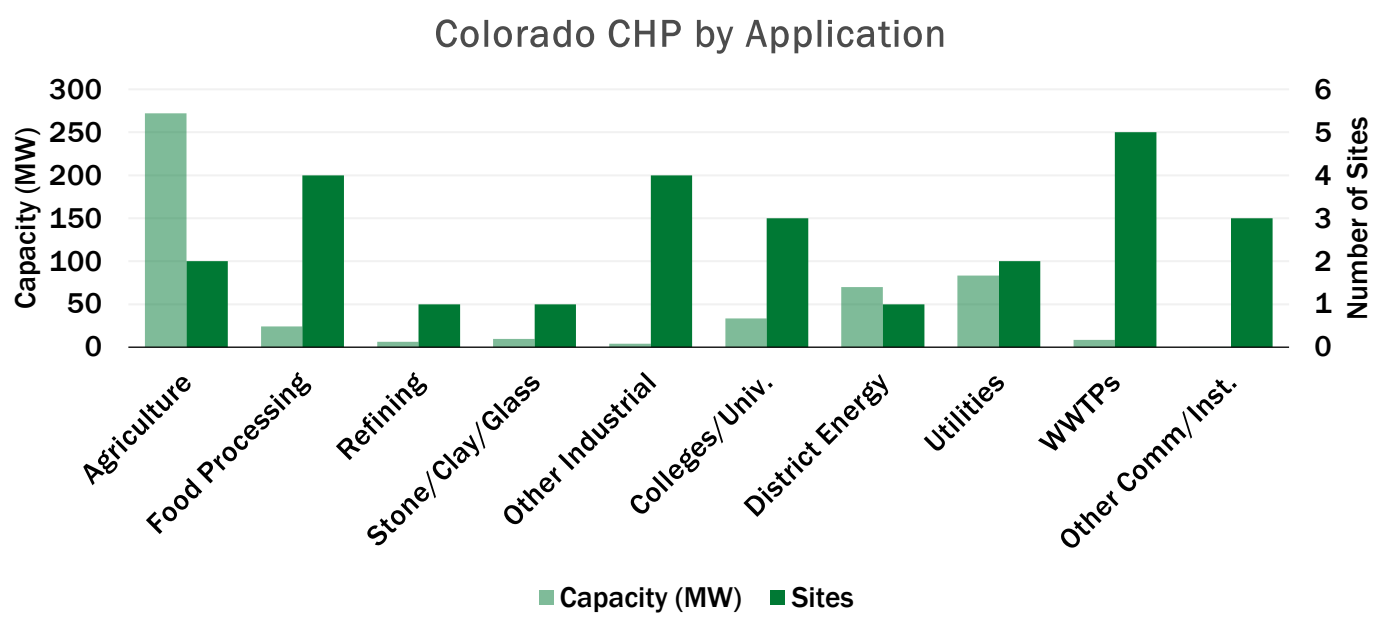
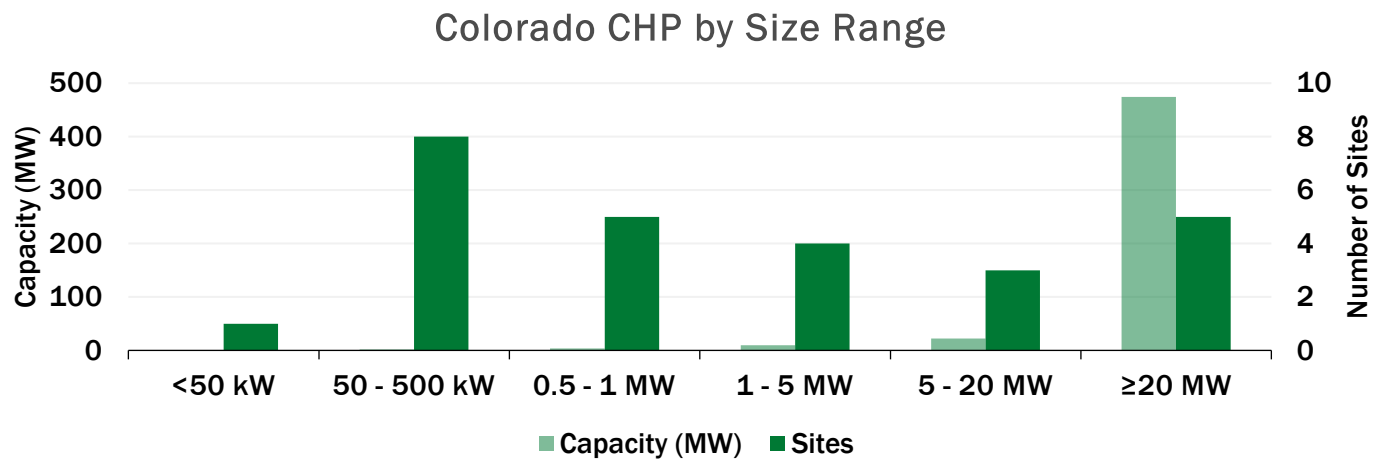
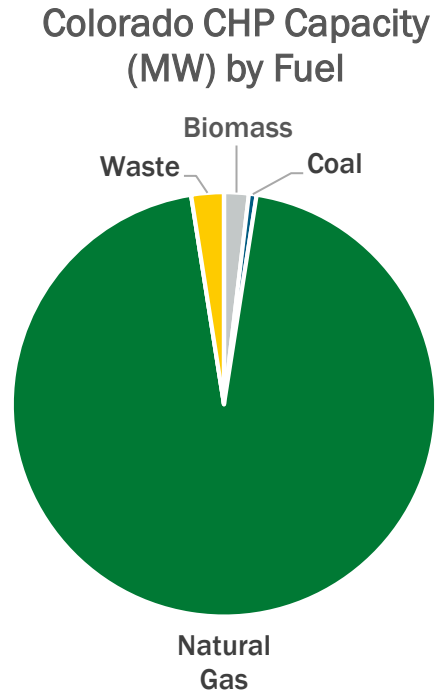
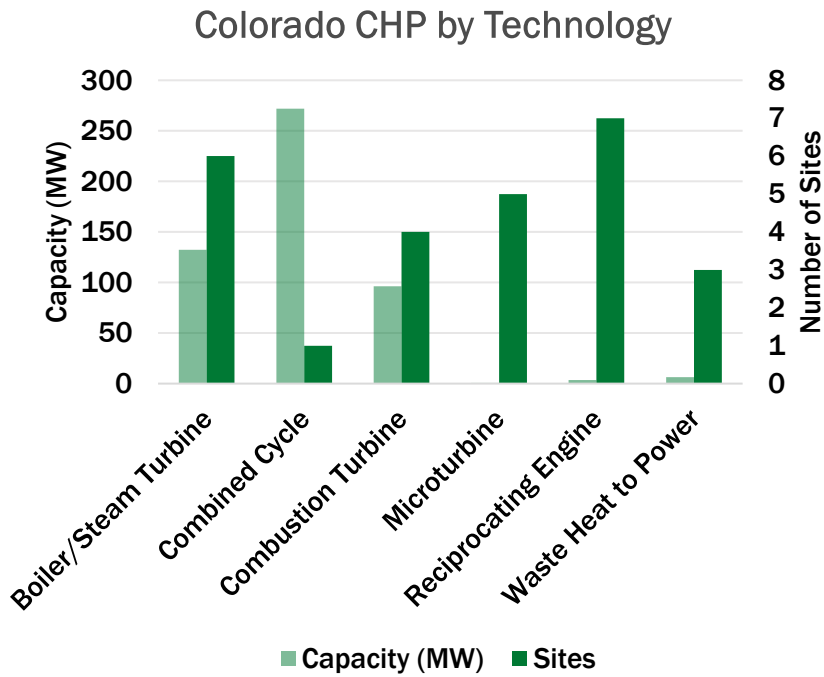
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UPPER-WEST



CHP
TECHNICAL ASSISTANCE
PARTNERSHIPS



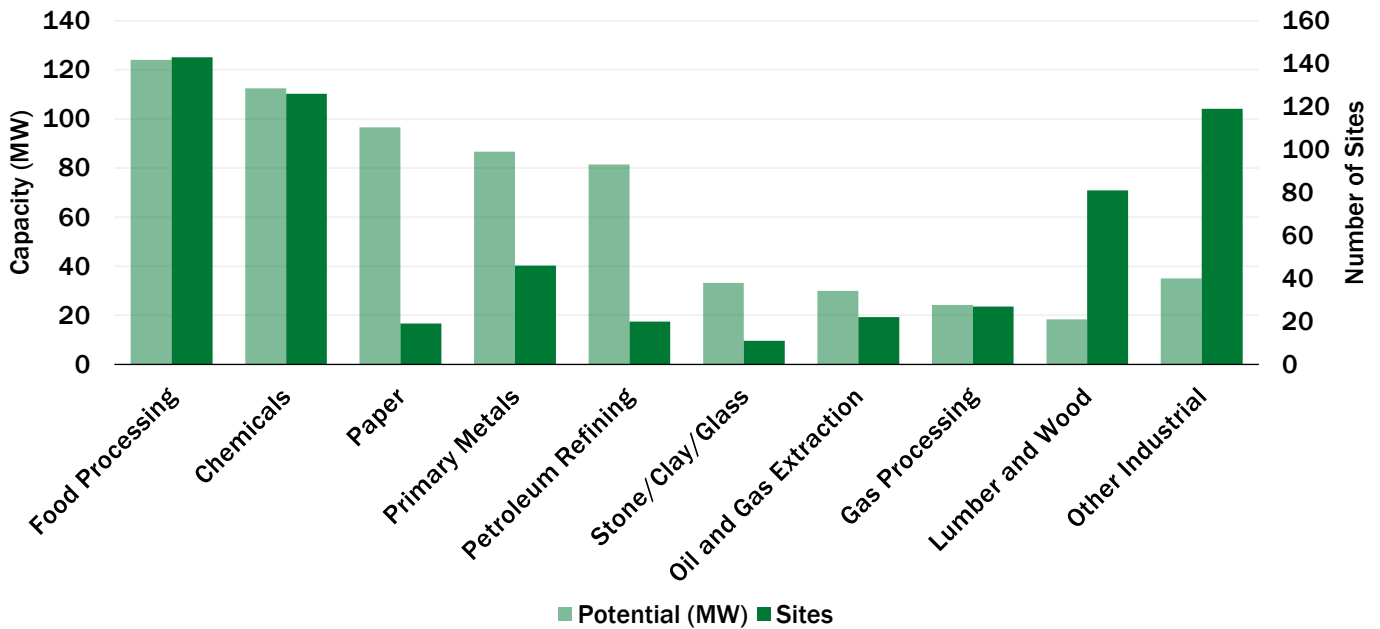
Colorado: Technical Potential for New CHP Installations

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](#).

Colorado CHP Technical Potential

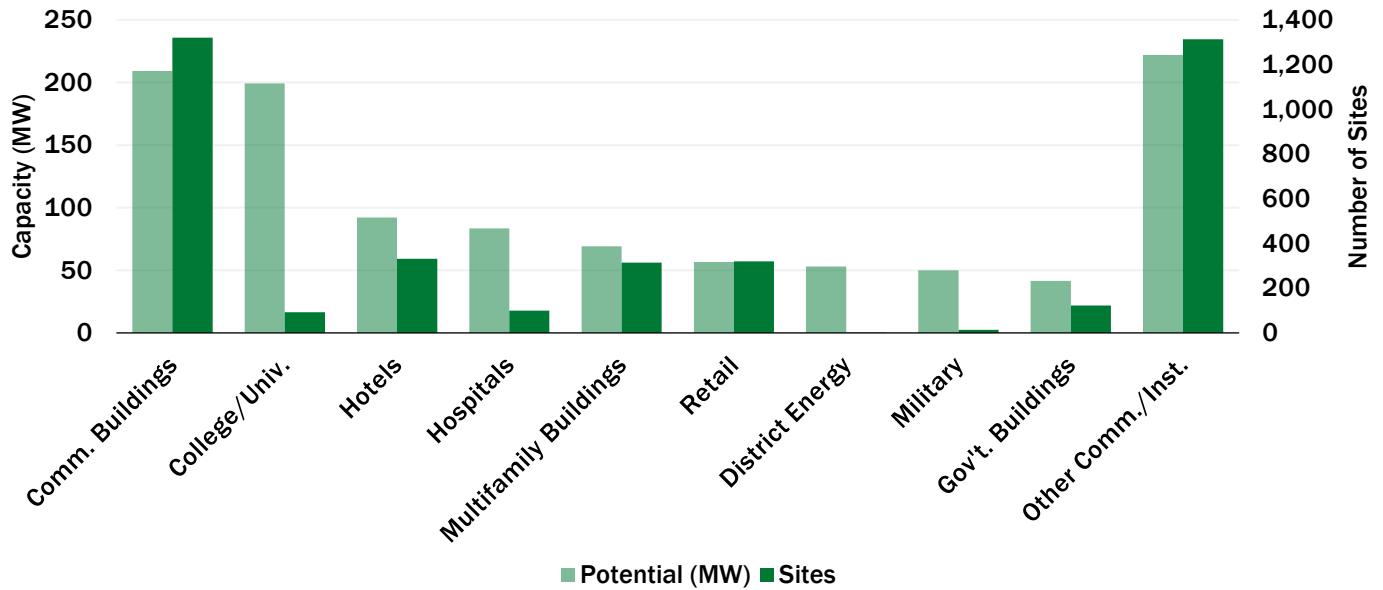
Sector	Potential Sites	Potential MW
Industrial	614	642
Commercial/Institutional	3,930	1,077
Total	4,544	1,718

Colorado 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
Food Processing	98	22	20	14	21	42	4	47	0	0	143	124
Chemicals	82	15	23	16	14	28	7	53	0	0	126	113
Paper	13	4	2	1	3	8	0	0	1	84	19	97
Primary Metals	25	6	13	10	6	16	0	0	2	54	46	87
Petroleum Refining	1	0	1	1	15	37	2	16	1	28	20	81
Other Industrial	218	36	17	11	19	42	6	52	0	0	260	141
Total	437	83	76	54	78	171	19	167	4	166	614	642

Colorado 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
Commercial Buildings	954	48	294	118	73	44	0	0	0	0	1,321	209
College/Univ.	51	9	8	5	25	68	8	84	1	33	93	199
Hotels	287	37	22	14	23	41	0	0	0	0	332	92
Hospitals	60	15	12	9	28	60	0	0	0	0	100	83
Multifamily Buildings	221	17	80	40	12	12	0	0	0	0	314	69
Other Comm./Inst.	1,682	212	54	36	28	49	3	22	3	106	1,770	423
Total	3,255	337	470	221	189	274	11	106	4	139	3,930	1,077

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>

Colorado: 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.

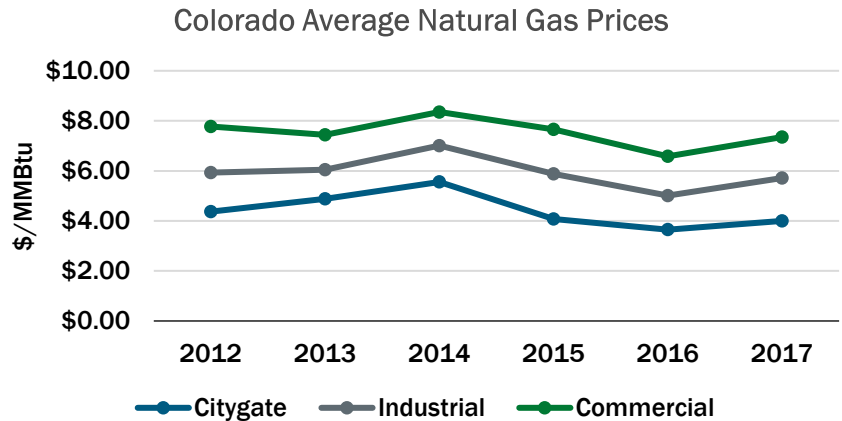
Colorado Natural Gas Prices

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.

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

Sector	CO Price	U.S. Price
Citygate*	4.00	4.26
Industrial	5.72	4.20
Commercial	7.35	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.

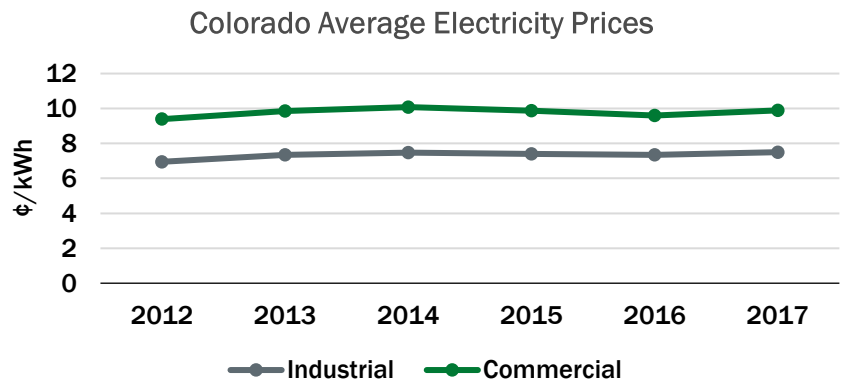


Colorado Electricity Prices

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

Colorado Average Electricity Prices (¢/kWh) - 2017

Sector	CO Price	U.S. Price
Industrial	7.50	6.88
Commercial	9.89	10.66



Colorado Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
Black Hills/CO Elec Utility	8.92	12.76	10.84
Intermountain Rural Elec	8.70	11.46	10.08
United Power	8.07	11.07	9.57
City of Colorado Spring	7.61	8.40	8.01
Xcel Energy	6.53	9.47	8.00

