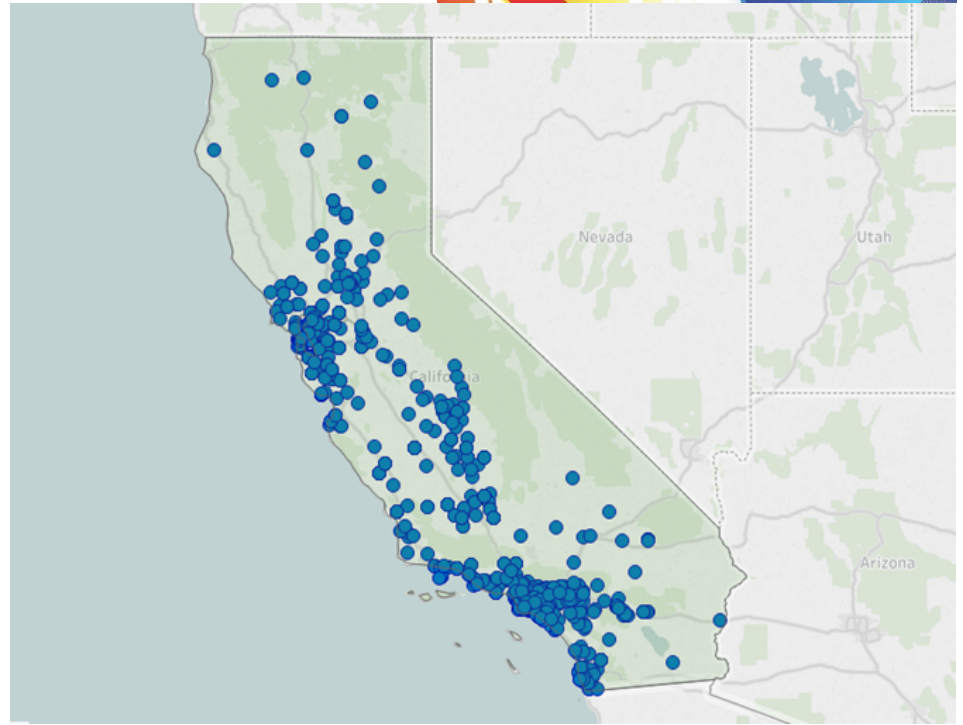


The State of CHP: California



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



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

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

CHP Project Profiles

The Western CHP TAP has compiled information on certain illustrative CHP projects in California. You can access these by visiting the Department of Energy’s CHP Project Profiles Database at <https://betterbuildingsolutioncenter.energy.gov/chp/chp-project-profiles-database>.

Western CHP Technical Assistance Partnership

For assistance with questions about specific CHP opportunities in California, please consult with the Western CHP TAP by visiting wchptap.org or contacting the CHP TAP director.

California Existing CHP

Sector	Sites	Capacity (MW)
Industrial	182	3,672
Commercial/Institutional	676	2,139
Other	356	3,141
Total	1,214	8,952

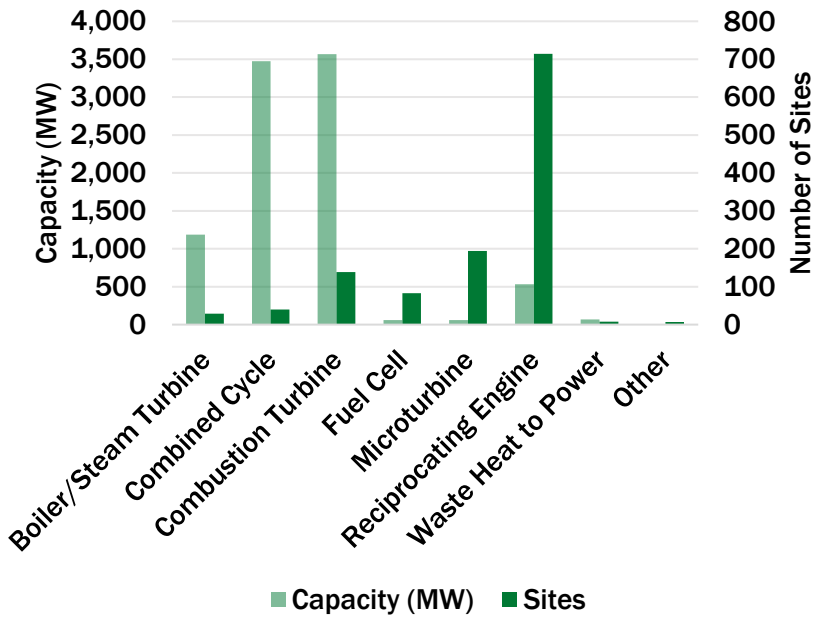
Western CHP TAP Director

Carol Denning

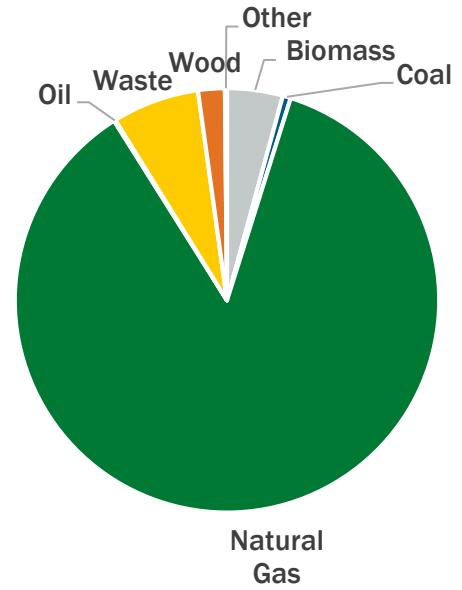
- Center for Sustainable Energy
- carol.denning@energycenter.org
- 530-513-2799



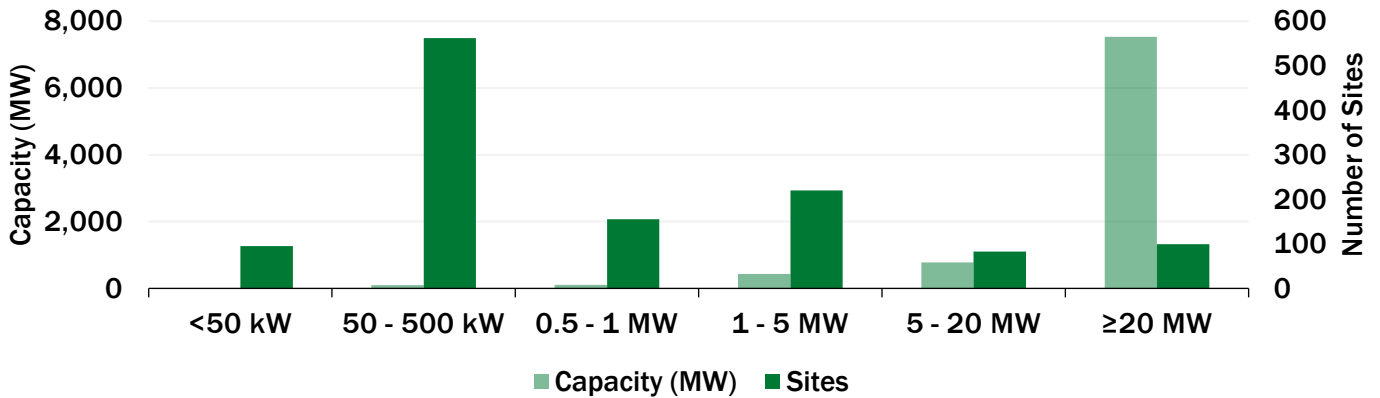
California CHP by Technology



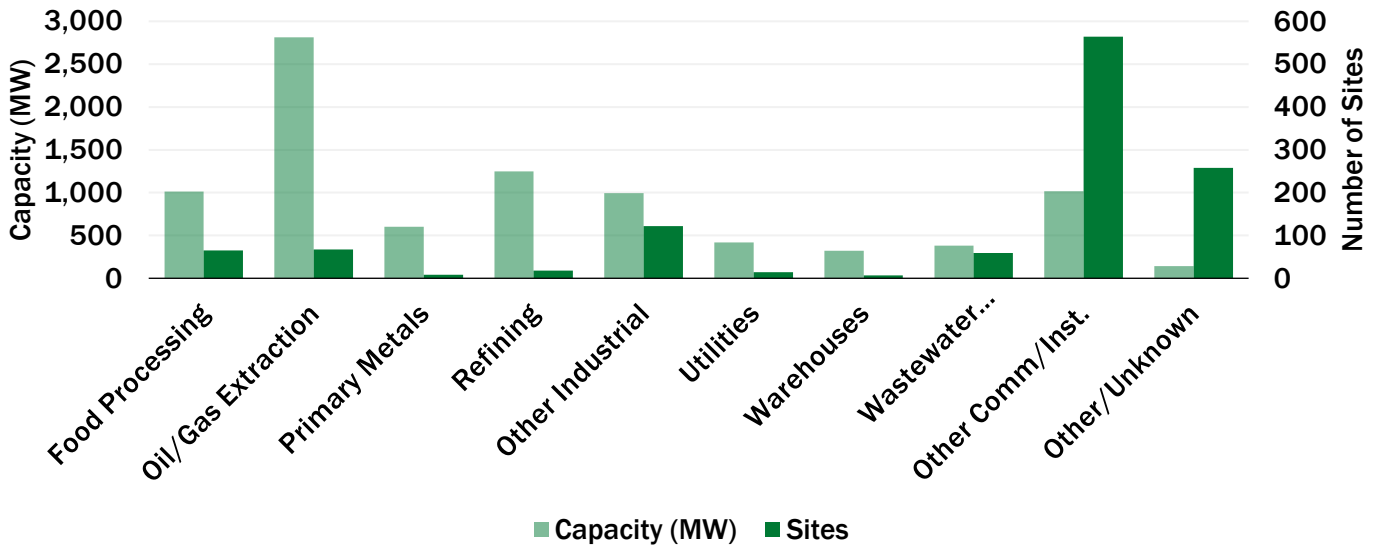
California CHP Capacity (MW) by Fuel



California CHP by Size Range



California CHP by Application



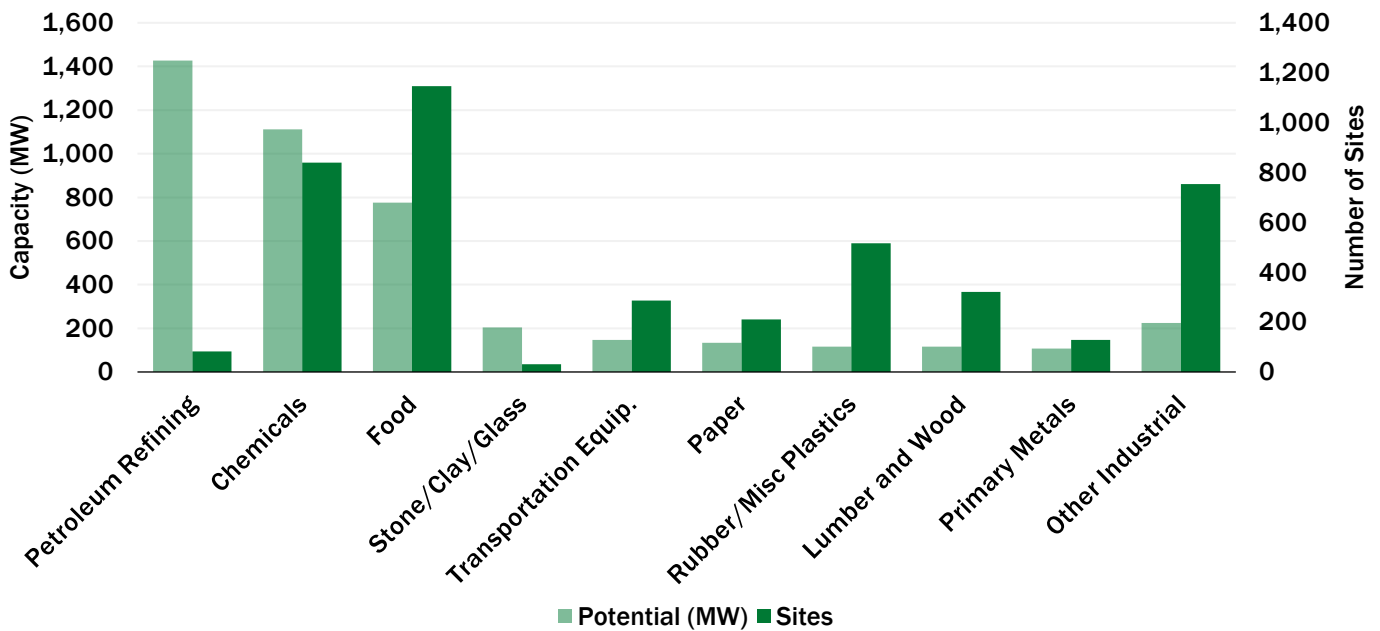
California: Technical Potential for New CHP Installations

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](#).

California CHP Technical Potential

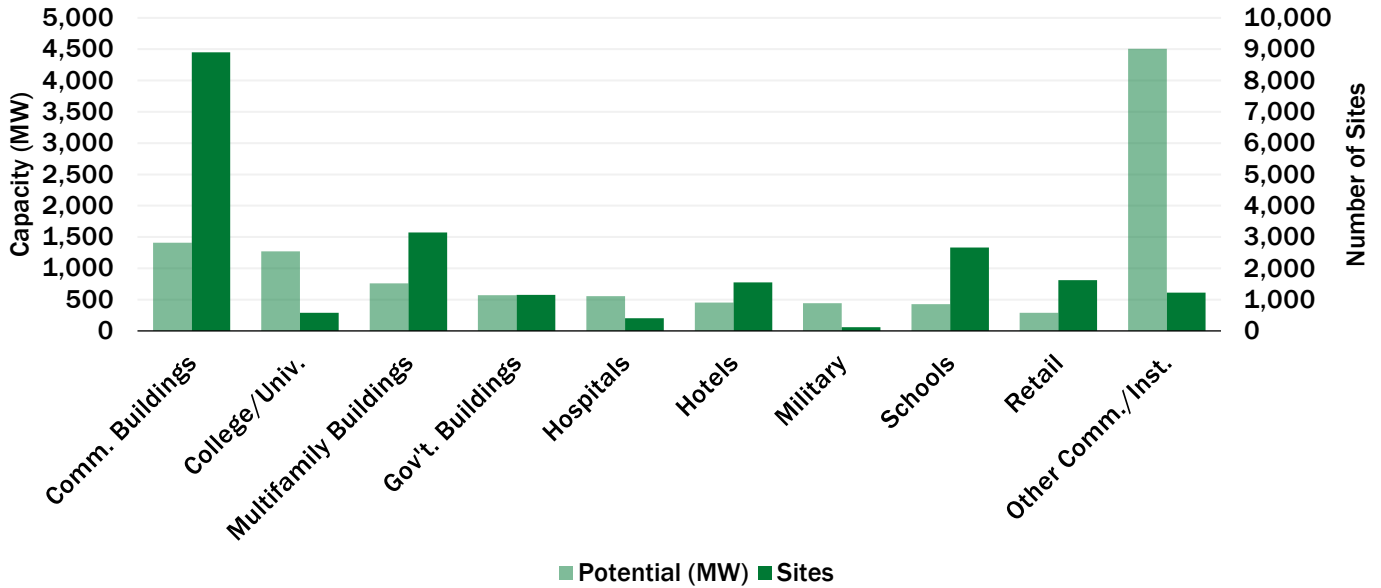
Sector	Potential Sites	Potential MW
Industrial	4,315	4,362
Commercial/Institutional	24,646	7,179
Total	28,961	11,542

California 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
Petroleum Refining	3	1	10	8	42	102	6	48	21	1,268	82	1,427
Chemicals	492	94	123	91	181	430	39	331	5	165	840	1,111
Food	852	155	131	97	132	263	30	240	1	21	1,146	776
Stone/Clay/Glass	2	0.5	1	1	13	48	14	122	1	33	31	204
Transportation Equip.	242	35	21	14	18	45	6	53	0	0	287	147
Other Industrial	1,602	267	178	127	145	267	4	35	0	0	1,929	697
Total	3,193	553	464	338	531	1,155	99	831	28	1,486	4,315	4,362

California 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	6,430	322	1,979	792	495	297	0	0	0	0	8,904	1,410
College/Univ.	336	55	33	20	141	423	63	538	8	236	581	1,273
Multifamily Buildings	2,130	160	825	413	185	185	0	0	0	0	3,140	757
Government Buildings	948	131	85	58	97	189	19	148	2	45	1,151	571
Hospitals	114	32	93	67	192	390	9	66	0	0	408	555
Other Comm./Inst.	9,856	1,356	349	222	199	399	58	448	4	418	10,469	2,842
Total	19,814	2,055	3,364	1,571	1,309	1,883	149	1,201	14	699	24,653	7,409

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>

California: 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.

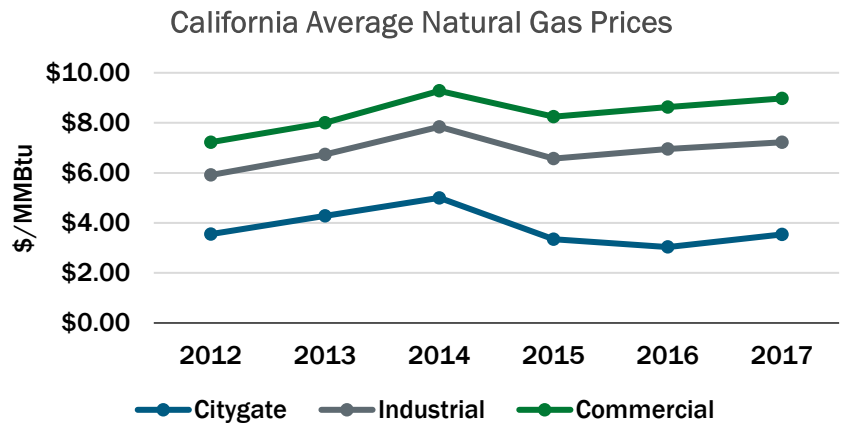
California Natural Gas Prices

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.

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

Sector	CA Price	U.S. Price
Citygate*	3.54	4.26
Industrial	7.23	4.20
Commercial	8.98	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.

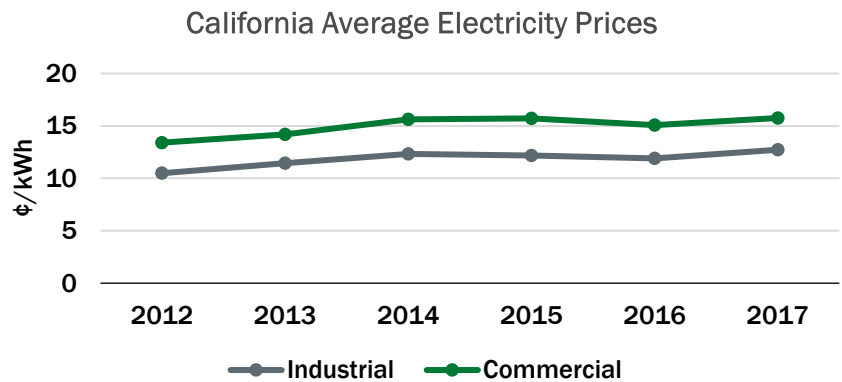


California Electricity Prices

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

California Average Electricity Prices (¢/kWh) - 2017

Sector	CA Price	U.S. Price
Industrial	12.73	6.88
Commercial	15.76	10.66



California Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
San Diego Gas & Electric	17.28	21.22	19.25
Pacific Gas & Electric	17.31	20.50	18.90
LA Dept. of Water & Power	14.30	15.48	14.89
Pacific Power	13.49	14.97	14.23
Imperial Irrigation District	14.81	12.31	13.56
Turlock Irrigation District	12.53	13.47	13.00
Southern California Edison	10.97	14.21	12.59
Sacramento Municipal District	10.57	13.75	12.16
Modesto Irrigation District	10.08	14.02	12.05

