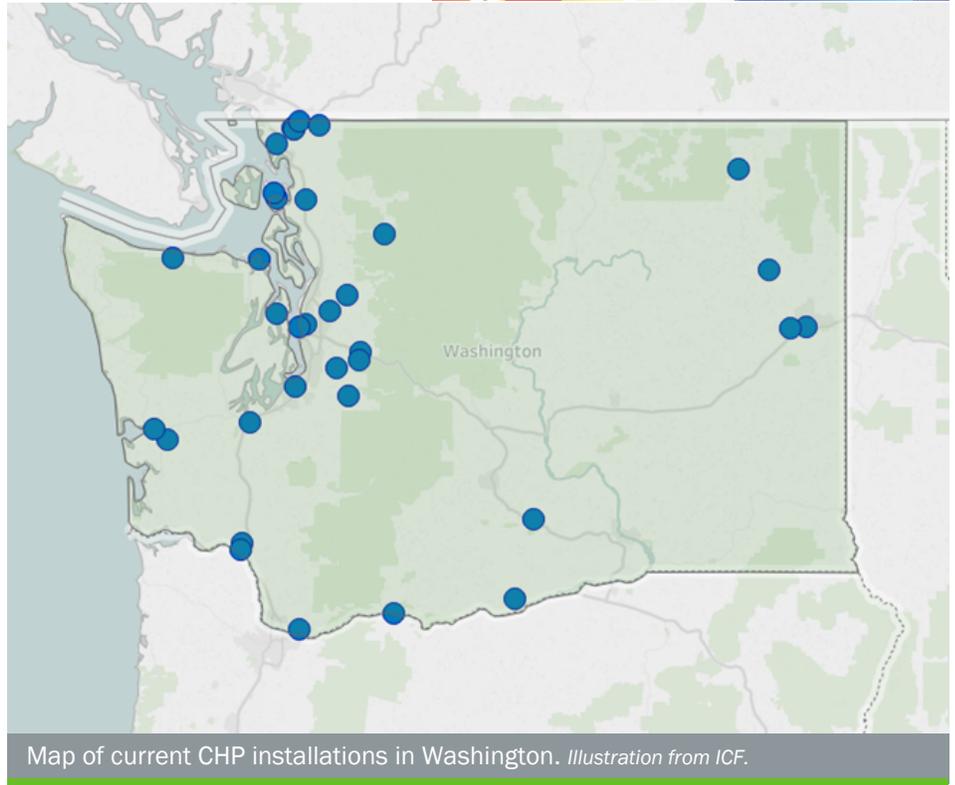




Combined heat and power (CHP) – also referred to as cogeneration – is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source. The information in this document provides a general overview of the state of CHP in Washington, with data on current installations, technical potential, and economics for CHP.



Washington: 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 Washington, and can be accessed by visiting energy.gov/chp-installs.

CHP Project Profiles

The Northwest CHP TAP has compiled information on certain illustrative CHP projects in Washington. You can access these by visiting the Department of Energy’s CHP Project Profiles Database at energy.gov/chp-projects.

Northwest CHP Technical Assistance Partnership

For assistance with questions about specific CHP opportunities in Washington, please consult with the Northwest CHP TAP by visiting nwchptap.org or contacting the CHP TAP director.

Washington Existing CHP

Sector	Sites	Capacity (MW)
Industrial	16	909
Commercial/Institutional	11	134
Other	8	6
Total	35	1,049

Northwest CHP TAP Director
David Van Holde, P.E.

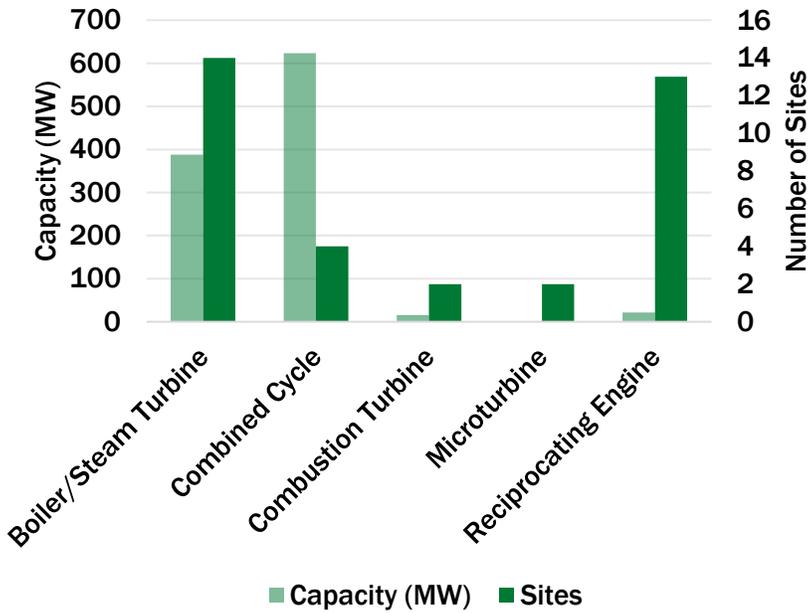
- Washington State University
- vanholded@energy.wsu.edu
- 360-956-2071

NORTHWEST

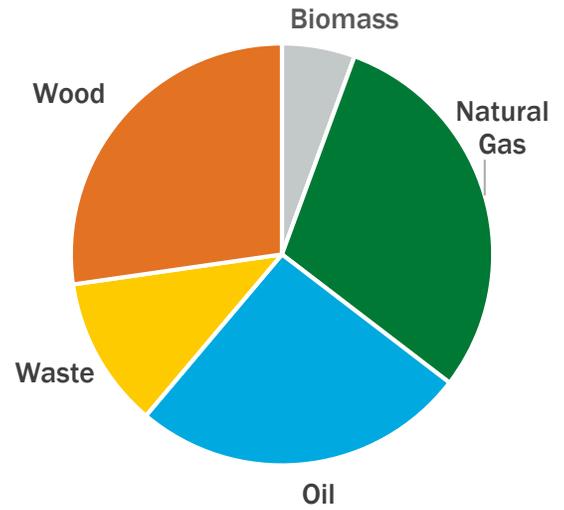


CHP
TECHNICAL ASSISTANCE
PARTNERSHIPS

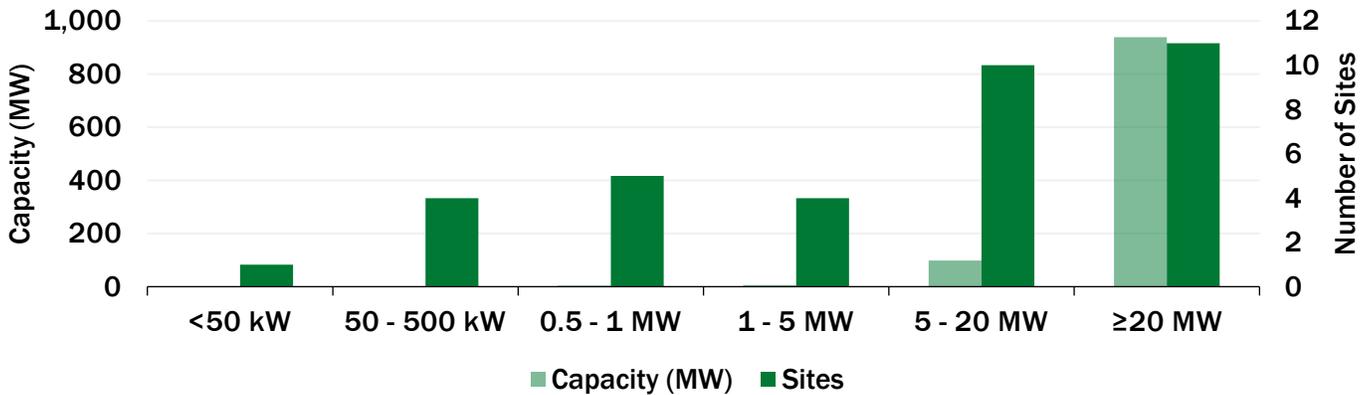
Washington CHP by Technology



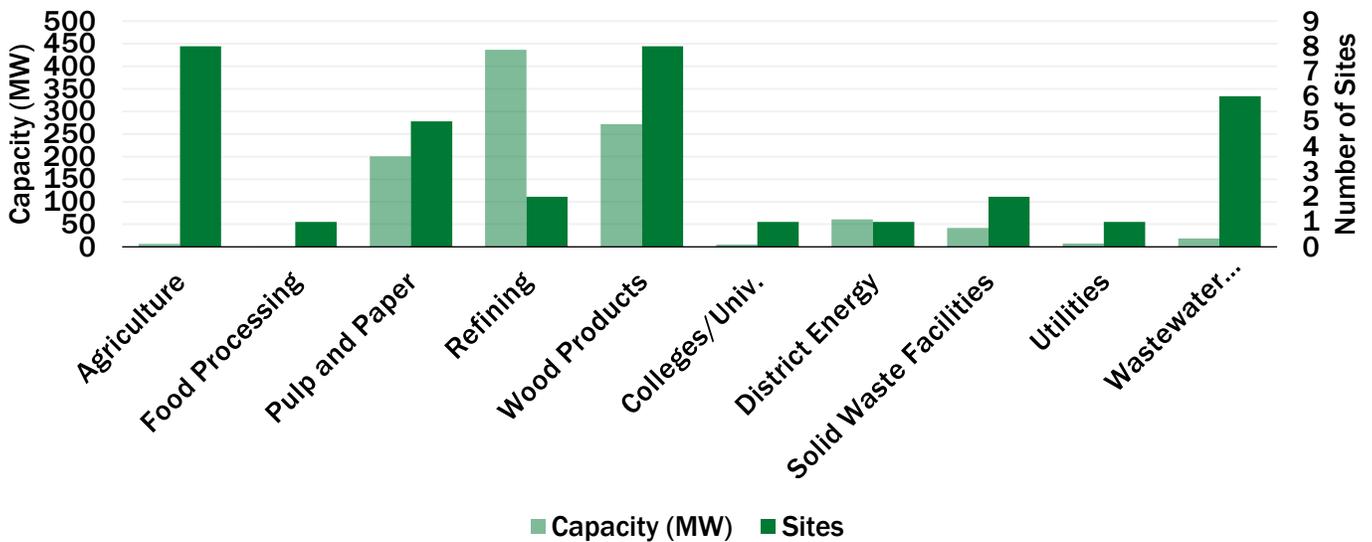
Washington CHP Capacity (MW) by Fuel



Washington CHP by Size Range



Washington CHP by Application



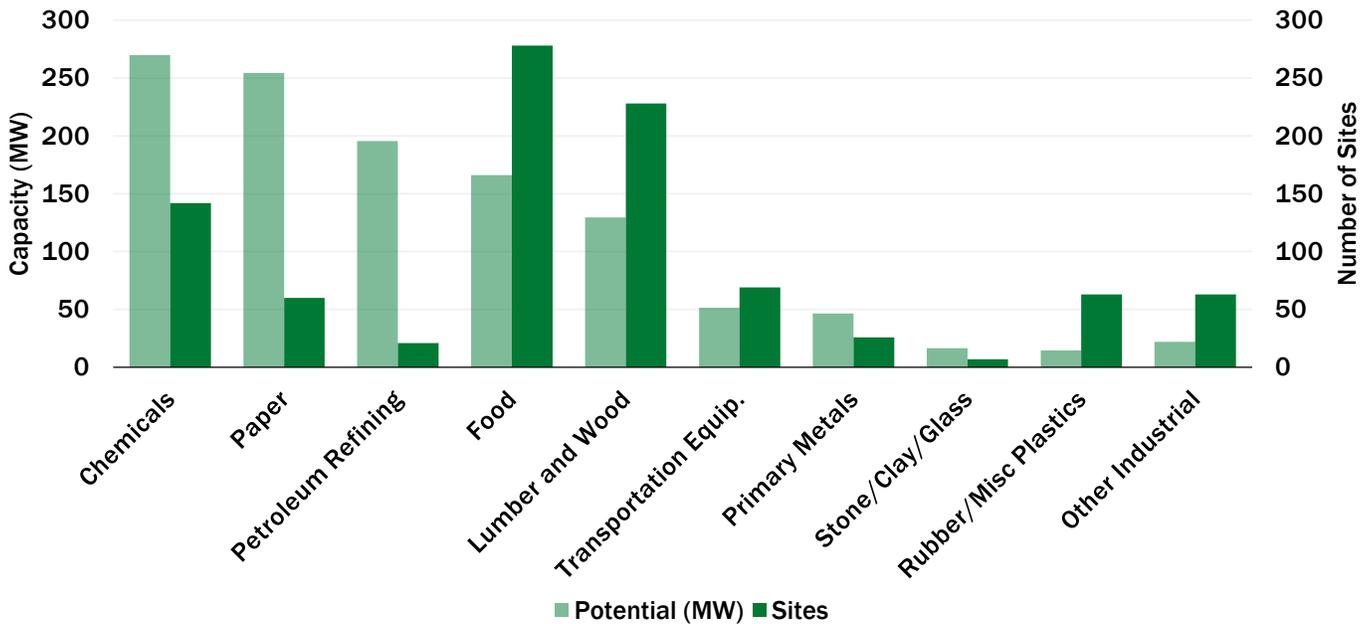
Washington: Technical Potential for New CHP Installations

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. This report can be accessed at energy.gov/chp-potential.

Washington CHP Technical Potential

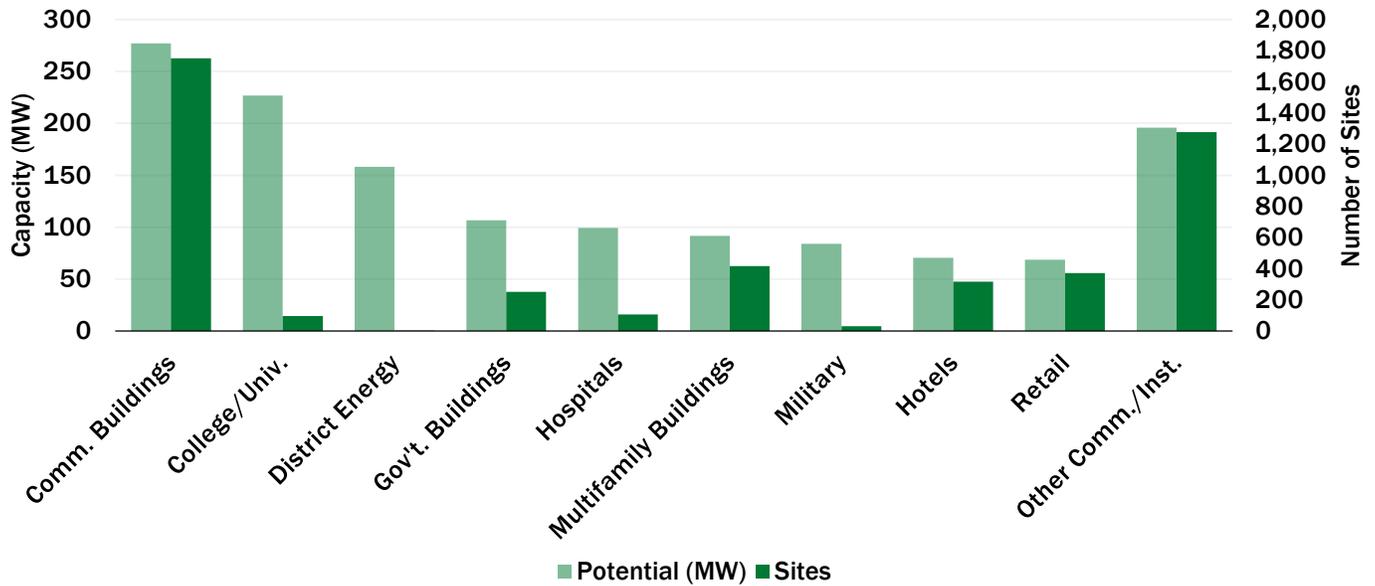
Sector	Potential Sites	Potential MW
Industrial	957	1,167
Commercial/Institutional	4,613	1,378
Total	5,570	2,545

Washington 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	95	17	14	10	21	47	8	65	4	131	142	270
Paper	32	9	11	7	7	12	6	67	4	159	60	254
Petroleum Refining	2	0	8	6	4	7	3	32	4	151	21	196
Food	214	44	25	17	34	62	5	43	0	0	278	166
Lumber and Wood	162	31	31	21	34	66	1	12	0	0	228	130
Other Industrial	184	32	24	16	16	36	2	12	2	55	228	151
Total	689	133	113	77	116	230	25	231	14	495	957	1,167

Washington 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	1,265	63	389	156	97	58	0	0	0	0	1,751	277
College/Univ.	40	7	3	2	45	117	6	74	0	26	94	227
Government Buildings	200	31	25	17	23	43	2	15	0	0	250	107
Hospitals	57	13	15	10	32	70	1	6	0	0	105	99
Multifamily Buildings	293	22	106	53	16	16	0	0	0	0	415	91
Other Comm./Inst.	1,904	242	43	27	44	79	4	31	2	198	1,997	577
Total	3,759	379	581	265	257	384	13	126	3	224	4,613	1,378

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

Washington: 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.

Washington Natural Gas Prices

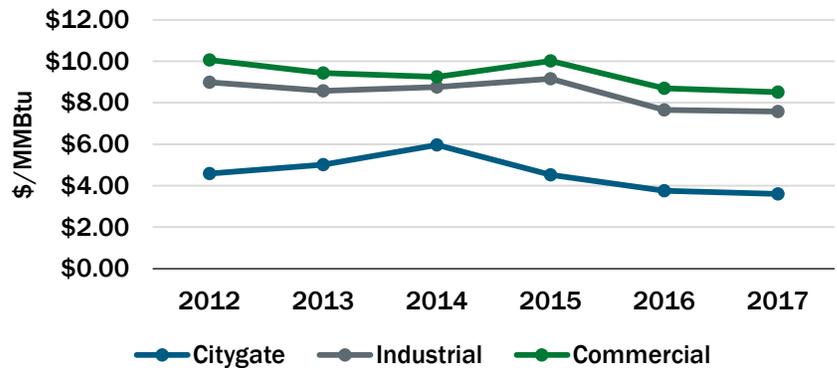
The EIA industrial natural gas price is a full tariff rate, and most large consumers are purchasing gas commodities from marketers at a lower rate.

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

Sector	WA Price	U.S. Price
Citygate*	3.60	4.26
Industrial	7.57	4.20
Commercial	8.51	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.

Washington Average Natural Gas Prices



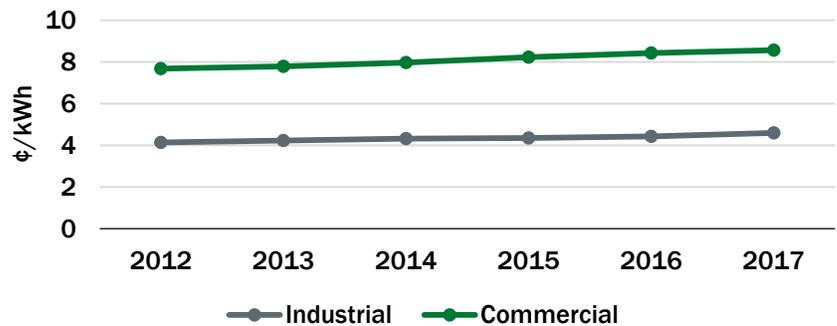
Washington Electricity Prices

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

Washington Average Electricity Prices (¢/kWh) - 2017

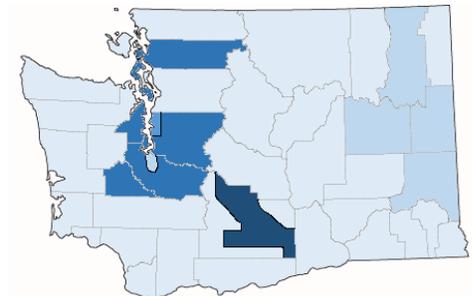
Sector	WA Price	U.S. Price
Industrial	4.60	6.88
Commercial	8.57	10.66

Washington Average Electricity Prices



Washington Average Delivered Electricity Prices by Utility

Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price (¢/kWh)
Pacific Power	13.49	14.97	14.23
Puget Sound Energy	9.29	9.94	9.62
City of Seattle	7.62	8.89	8.25
Avista Corp	5.72	9.13	7.42
City of Tacoma	5.80	8.53	7.17
Benton Rural Electric Assn.	6.32	6.78	6.55
Big Bend Electric Coop	5.71	7.24	6.47
Public Utility Districts (avg.)	5.43	7.44	6.43



- Benton Rural Elec / Big Bend Coop / PUDs
- Avista / City of Tacoma
- City of Seattle
- Puget Sound Energy
- Pacific Power