

The State of CHP: Arizona



The information in this document provides a general overview of the state of combined heat and power (CHP) in Arizona, with data on current installations, technical potential, and economics for CHP. For help with questions about specific CHP opportunities in Arizona, please consult with the [Southwest CHP Technical Assistance Partnership](#).

Installed CHP

CHP Technical Potential

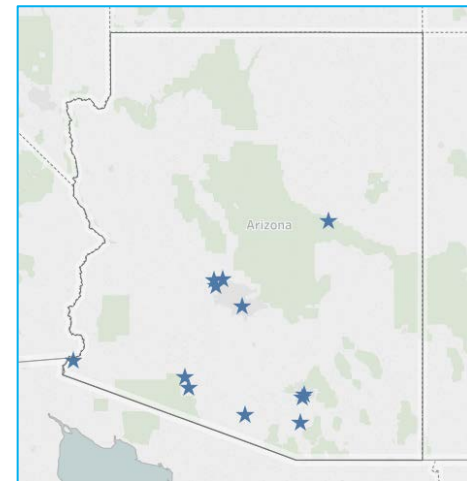
CHP Economics

CHP Partners

Arizona Installed Base of CHP

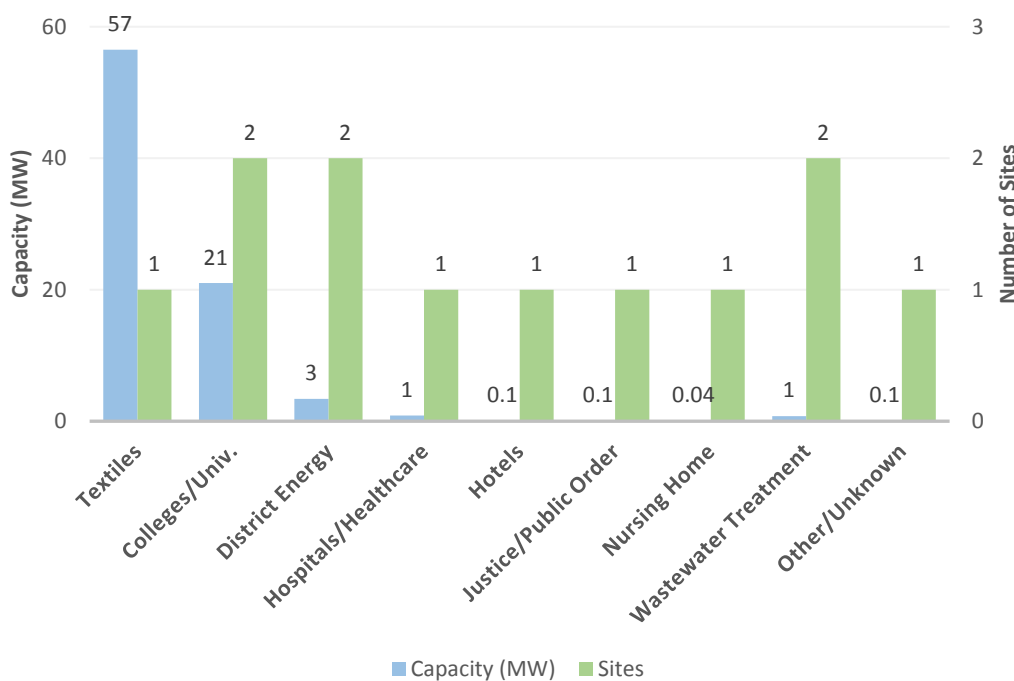
[U.S. DOE Combined Heat and Power Installation Database](#)

Sector	Installations	Capacity (MW)
Industrial	1	57
Commercial/Institutional	10	26
Other	1	0.1
Total	12	83



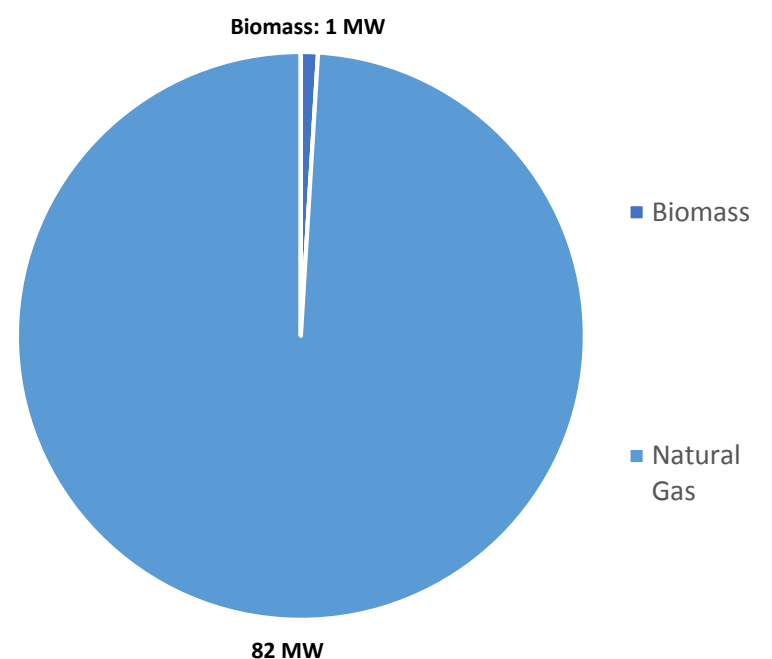
The Southwest CHP Technical Assistance Partnership has compiled information on certain illustrative CHP projects in Arizona. You can access these by visiting the Department of Energy's [CHP Project Profiles Database](#).

Arizona CHP by Application



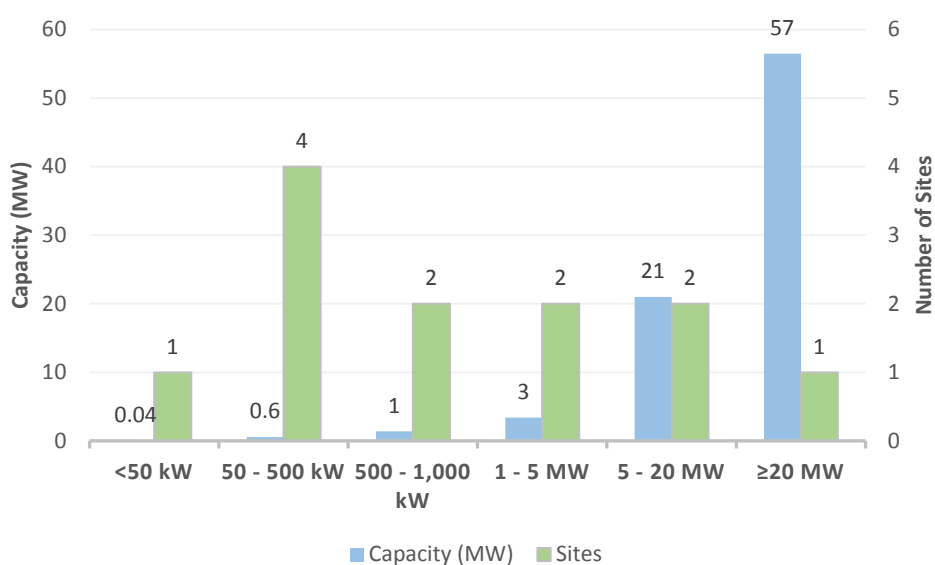
Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Arizona CHP Capacity (MW) by Fuel Type



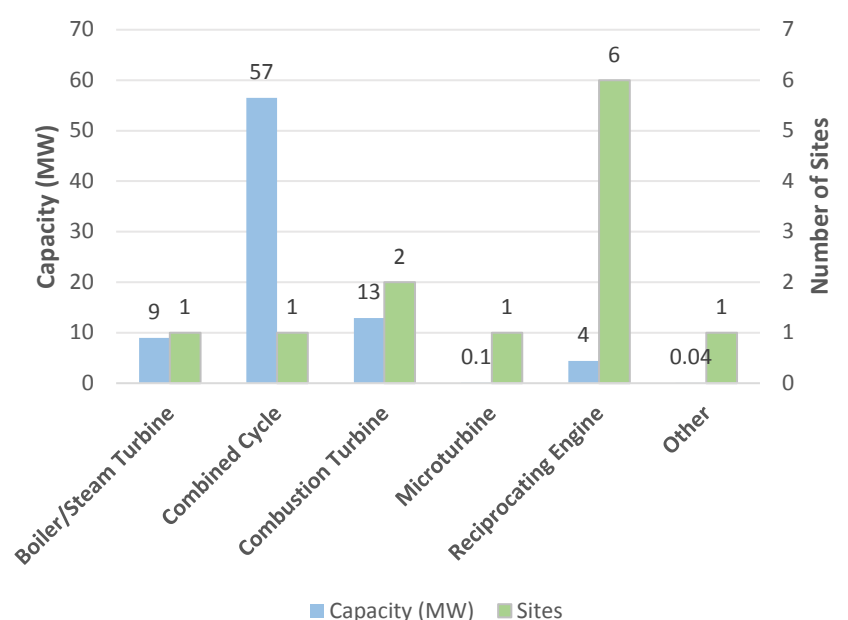
Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Arizona CHP by Size Range



Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Arizona CHP by Technology



Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Combined Heat and Power (CHP) – sometimes 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 State of CHP: Arizona



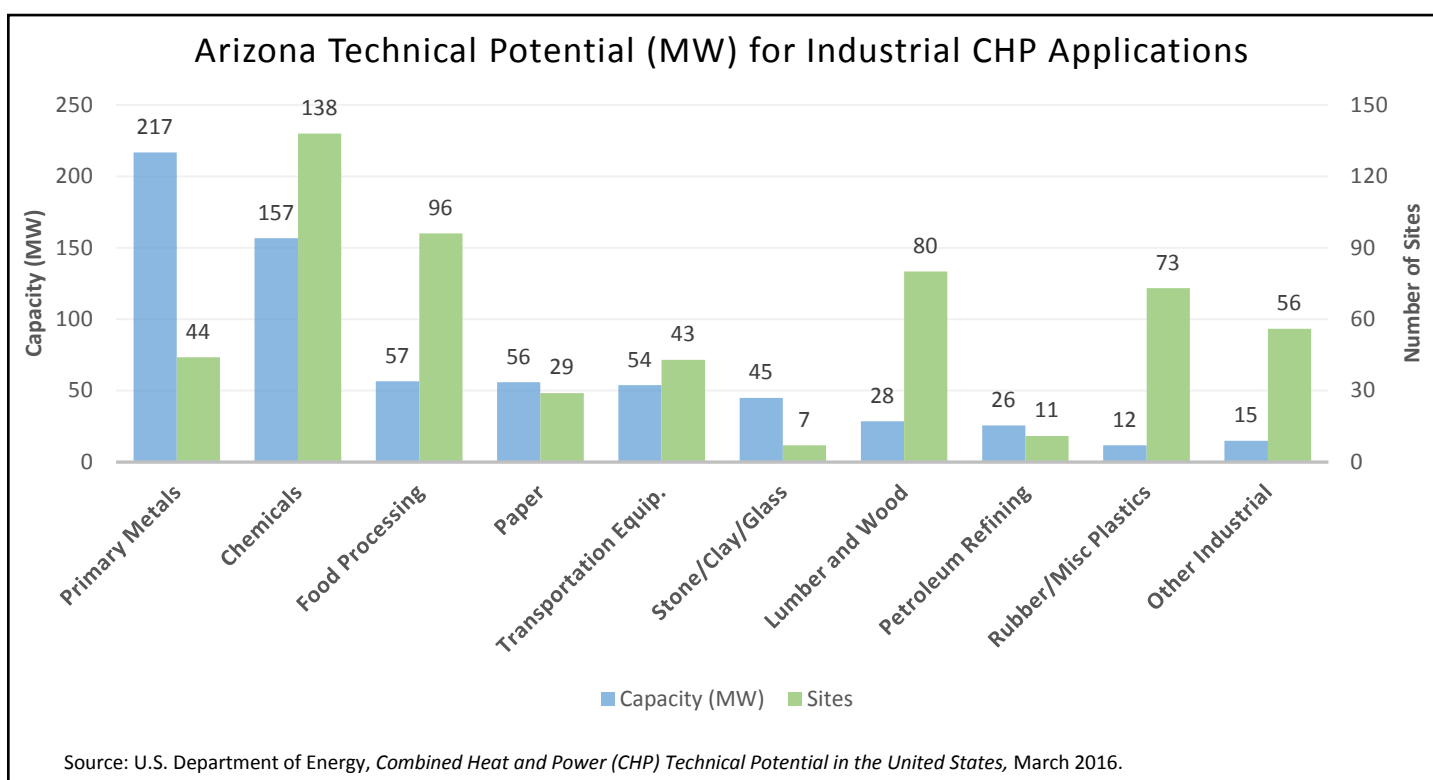
The information in this document provides a general overview of the state of combined heat and power (CHP) in Arizona, with data on current installations, technical potential, and economics for CHP. For help with questions about specific CHP opportunities in Arizona, please consult with the [Southwest CHP Technical Assistance Partnership](#).

Installed CHP	CHP Technical Potential	CHP Economics	CHP Partners
---------------	--------------------------------	---------------	--------------

Arizona Technical Potential for New CHP Installations

[U.S. DOE Analysis: Combined Heat and Power \(CHP\) Technical Potential in the United States](#)

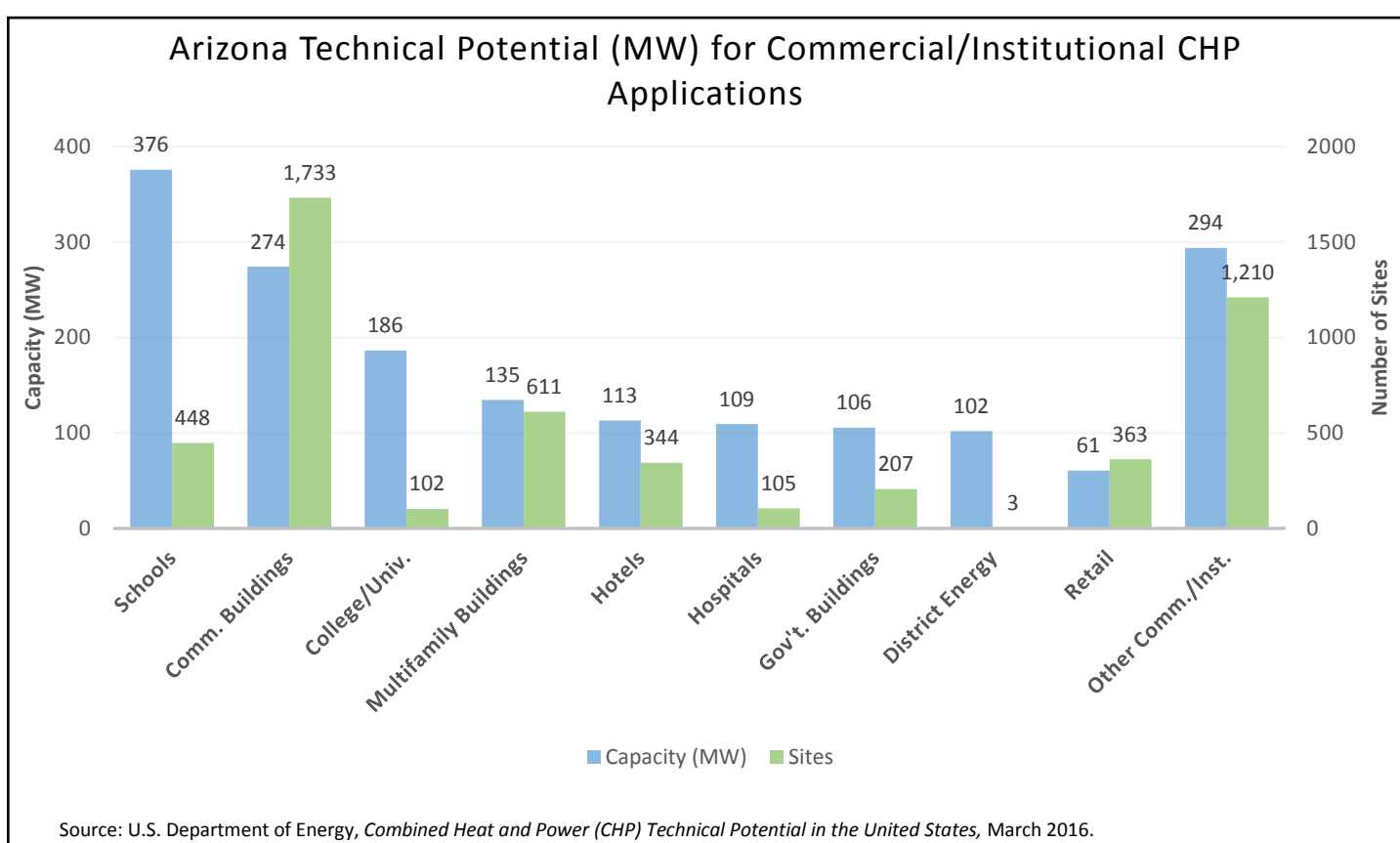
Sector	Potential Sites	Potential Capacity (MW)
Industrial	577	666
Commercial/Institutional	5,126	1,756
Total	5,703	2,422



Technical Potential by CHP Size Range for Top Five Industrial Sectors

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
Primary Metals	23	5	11	9	5	10	1	18	4	174	44	217
Chemicals	94	16	13	10	21	41	10	91	0	0	138	157
Food	73	15	8	6	13	24	2	11	0	0	96	57
Paper	18	5	5	4	4	13	1	10	1	24	29	56
Transportation Equip.	35	5	2	1	4	11	1	12	1	24	43	54
Other Industrial	184	27	18	13	20	45	5	40	0	0	227	126
Total	427	73	57	43	67	145	20	182	6	222	577	666

Source: U.S. Department of Energy, *Combined Heat and Power (CHP) Technical Potential in the United States*, March 2016.



Technical Potential by CHP Size Range for Top Five Commercial/Institutional Sectors

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
Schools	92	44	239	157	117	175	0	0	0	0	448	376
Commercial Buildings	1,252	63	385	154	96	58	0	0	0	0	1,733	274
College/Univ.	61	11	8	5	24	71	8	70	1	29	102	186
Multifamily Buildings	431	32	156	78	24	24	0	0	0	0	611	135
Hotels	292	37	22	14	29	57	1	5	0	0	344	113
Other Comm./Inst.	1,705	230	84	57	86	190	8	57	2	138	1,888	672
Total	3,833	417	894	465	376	575	17	132	3	167	5,126	1,756

Source: U.S. Department of Energy, *Combined Heat and Power (CHP) Technical Potential in the United States*, March 2016.

Combined Heat and Power (CHP) – sometimes 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 State of CHP: Arizona



The information in this document provides a general overview of the state of combined heat and power (CHP) in Arizona, with data on current installations, technical potential, and economics for CHP. For help with questions about specific CHP opportunities in Arizona, please consult with the [Southwest CHP Technical Assistance Partnership](#).

Installed CHP

CHP Technical Potential

CHP Economics

CHP Partners

Arizona 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.

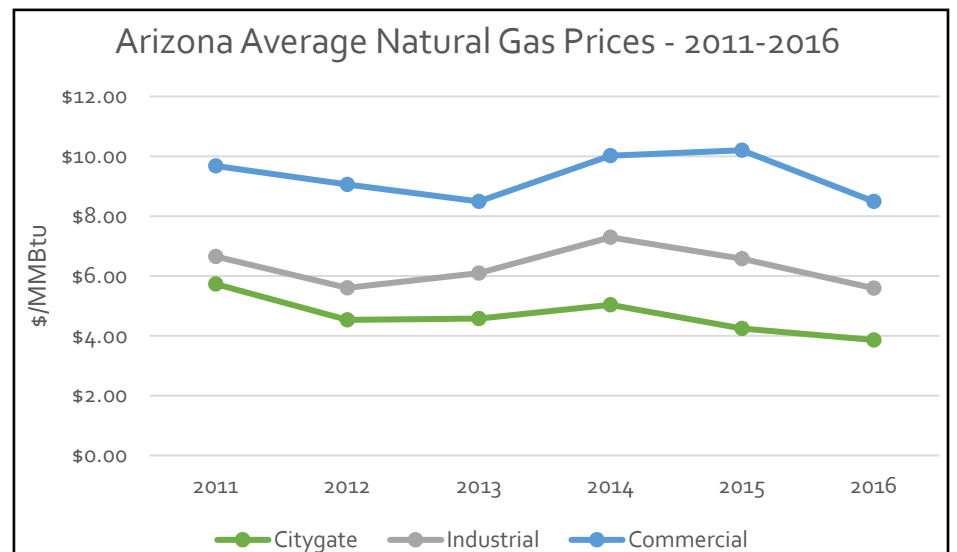
Arizona Natural Gas Prices

Arizona Average Gas Prices - 2016

Sector	AZ Price (\$/MMBtu)	U.S. Price (\$/MMBtu)
Citygate*	3.86	3.75
Industrial	5.59	3.39
Commercial	8.49	7.22

Source: U.S. Energy Information Administration, "Natural Gas Prices", https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SAZ_a.htm

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.



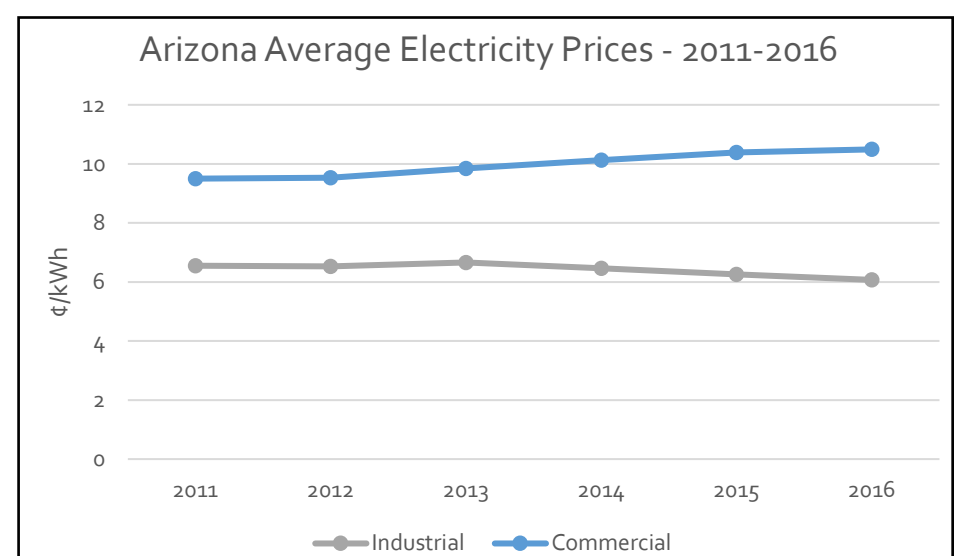
Arizona Electricity Prices

Arizona Average Electricity Prices - 2016

Sector	AZ Price (¢/kWh)	U.S. Price (¢/kWh)
Industrial	6.07	6.75
Commercial	10.49	10.37

Source: U.S. Energy Information Administration, "Electricity Data Browser", <https://www.eia.gov/electricity/data.cfm>

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



Arizona Average Delivered Electricity Prices by Utility

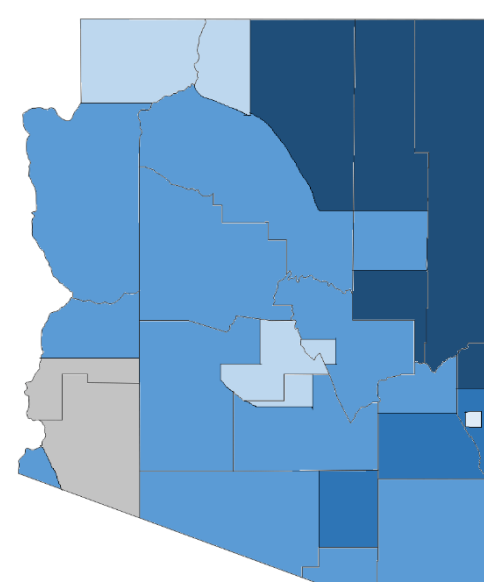
Utility	Industrial Price (¢/kWh)	Commercial Price (¢/kWh)	Average Price** (¢/kWh)
Navopache Electric Coop	11.75	12.66	12.20
Navajo Tribal Utility	9.55	13.07	11.31
Graham County Elec Coop	10.21	11.02	10.61
Tucson Electric Power Co	7.96	12.57	10.27
Arizona Public Service Co	8.19	11.17	9.68
Sulphur Springs Valley	8.58	10.63	9.61
UNS Electric Inc.	8.39	10.54	9.46
Trico Electric Coop	7.23	11.59	9.41
Electric Dist Pinal County	6.82	11.18	9.00
Garkane Energy Coop	6.82	9.62	8.22
Salt River Project	6.41	9.30	7.85
Morenci Water and Elec	3.36	7.85	5.61

Source: U.S. Energy Information Administration, "Annual retail price of electricity by utility", <https://www.eia.gov/electricity/data.cfm>

*Citygate is a point or measuring station at which a distributing gas utility receives gas from a NG pipeline company or transmission system.

**Average of commercial and industrial electricity prices as reported by EIA.

Arizona Electricity Prices – Heat Map



- Morenci Water and Elec
- Garkane Energy Coop / Salt River Project
- AZ Public Service / Sulphur Springs / UNS / Trico Elec / Pinal County
- Graham County Elec Coop / Tucson Electric Power Co
- Navopache Electric Coop / Navajo Tribal Utility
- No utility information

Combined Heat and Power (CHP) – sometimes 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 State of CHP: Arizona



The information in this document provides a general overview of the state of combined heat and power (CHP) in Arizona, with data on current installations, technical potential, and economics for CHP. For help with questions about specific CHP opportunities in Arizona, please consult with the [Southwest CHP Technical Assistance Partnership](#).

Installed CHP

CHP Technical
Potential

CHP Economics

CHP Partners

Department of Energy CHP Partnerships

Southwest CHP Technical Assistance Partnership



U.S. DEPARTMENT OF ENERGY
CHP Technical Assistance Partnerships
SOUTHWEST

Southwest CHP TAP Director: Gavin Dillingham
Phone: 281-216-7147
Email: gdillingham@harcresearch.org

CHP for Resiliency Accelerator

The U.S. DOE is collaborating with a group of cities, states, and utilities who are actively pursuing CHP as a consideration in resiliency planning for critical infrastructure in their jurisdictions. This has included defining resiliency, identifying critical infrastructure, and assessing CHP opportunities. This process is being documented in a Resiliency Planning Tool. For more information: [CHP for Resiliency Accelerator Website](#).

- Currently, there are no CHP for Resiliency Accelerator partners in Arizona.

Combined Heat and Power (CHP) – sometimes 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.



U.S. DEPARTMENT OF ENERGY
CHP Technical Assistance Partnerships