

The State of CHP: Oklahoma



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. For help with questions about specific CHP opportunities in Oklahoma, please consult with the [Southwest CHP Technical Assistance Partnership](#).

Installed CHP

CHP Technical Potential

CHP Economics

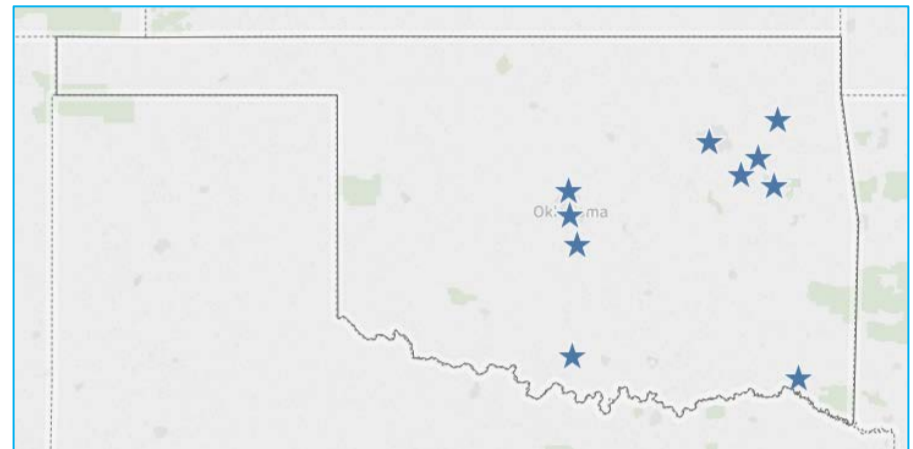
CHP Partners

Oklahoma Installed Base of CHP

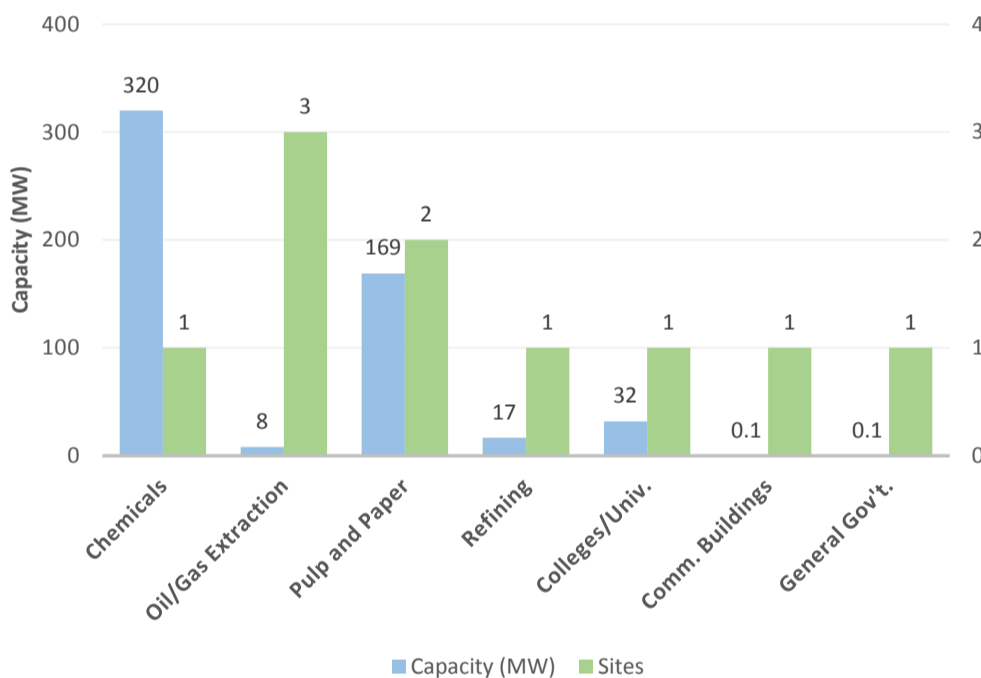
[U.S. DOE Combined Heat and Power Installation Database](#)

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

The Southwest CHP Technical Assistance Partnership 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](#).

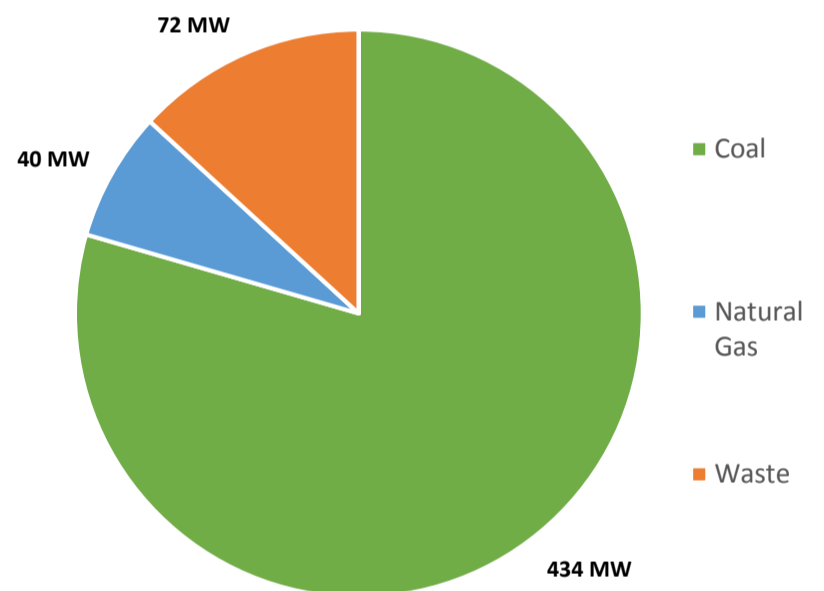


Oklahoma CHP by Application



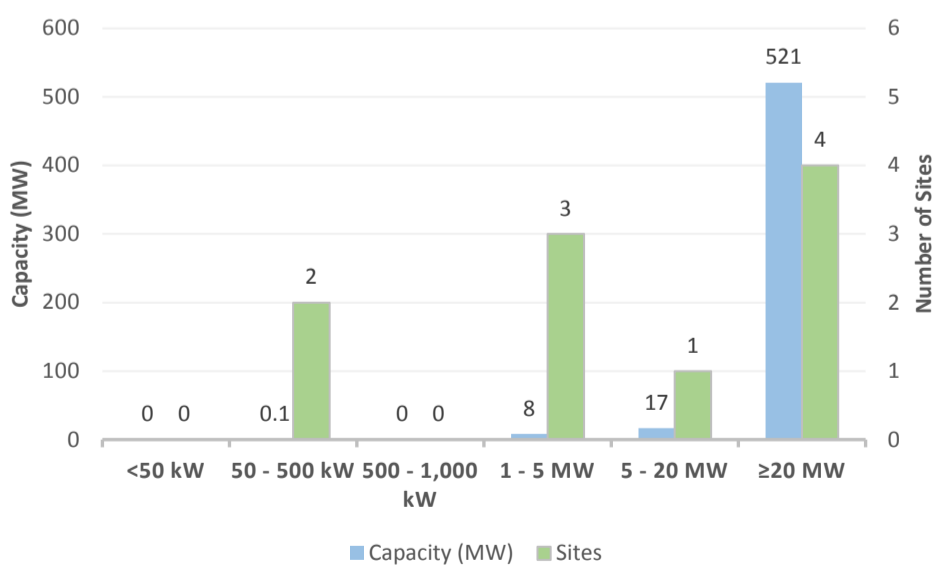
Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Oklahoma CHP Capacity (MW) by Fuel Type



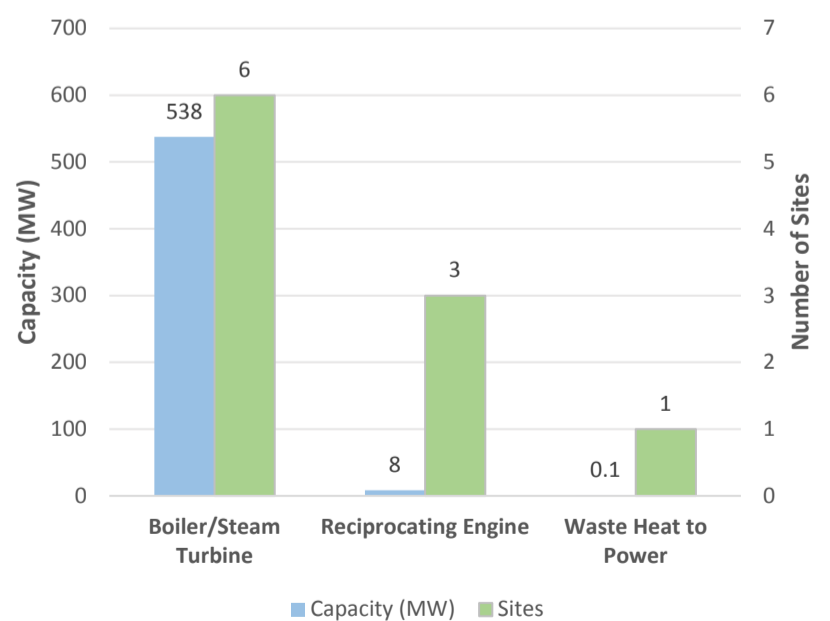
Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Oklahoma CHP by Size Range



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

Oklahoma 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.



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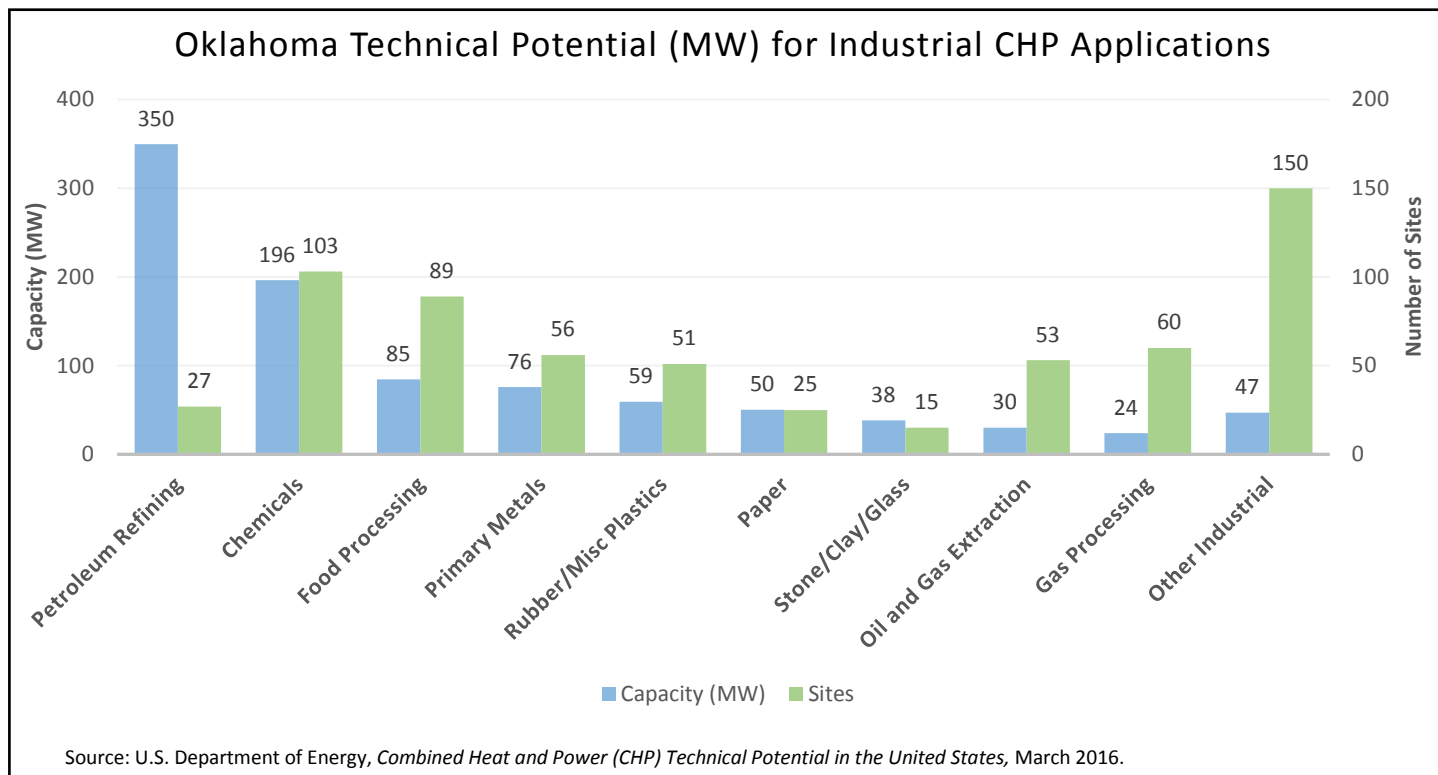
CHP Economics

CHP Partners

Oklahoma Technical Potential for New CHP Installations

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

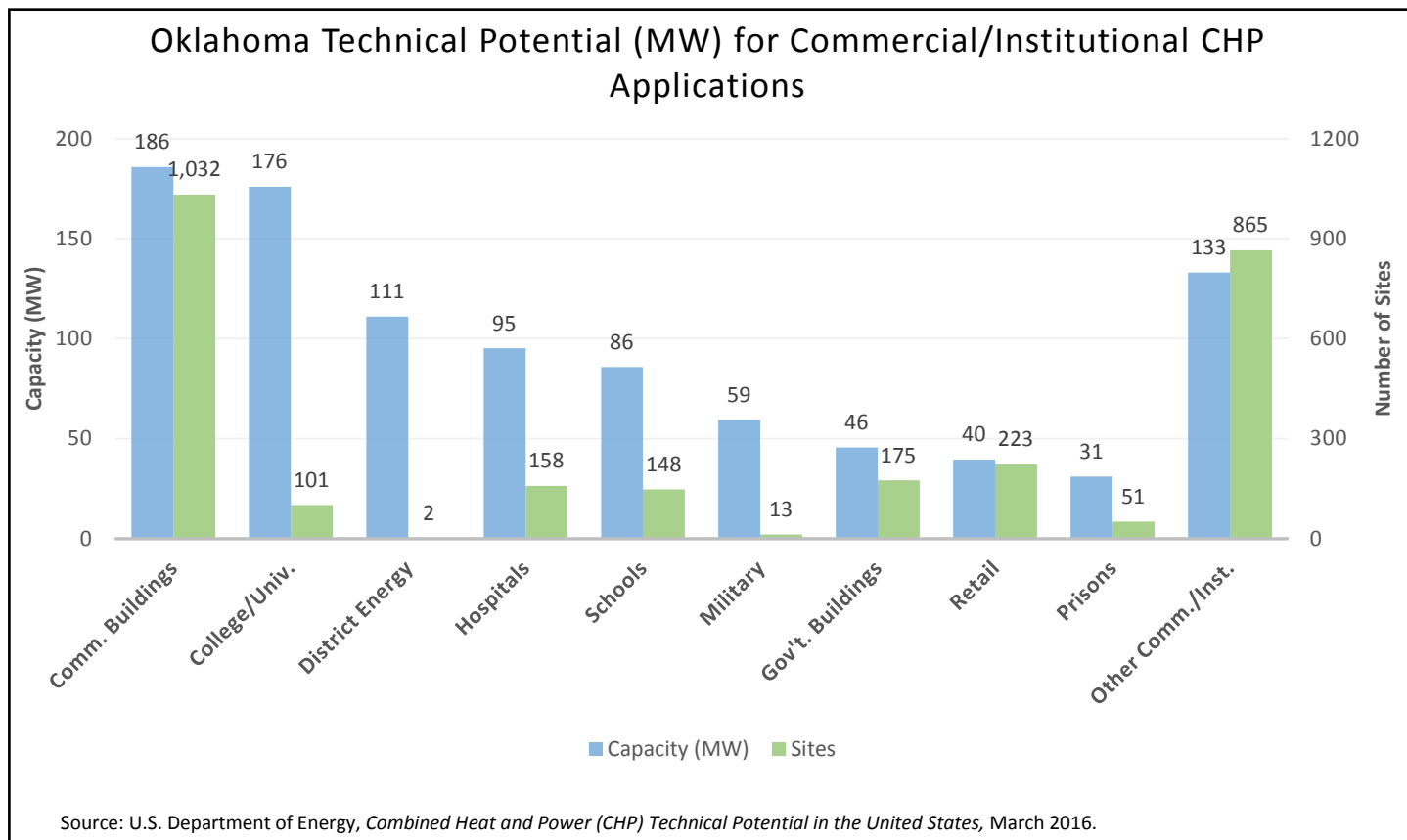
| Sector | Potential Sites | Potential Capacity (MW) |
|--------------------------|-----------------|-------------------------|
| Industrial | 629 | 955 |
| Commercial/Institutional | 2,768 | 962 |
| Total | 3,397 | 1,916 |



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 |
| 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 |

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 |
| 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 |

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

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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.

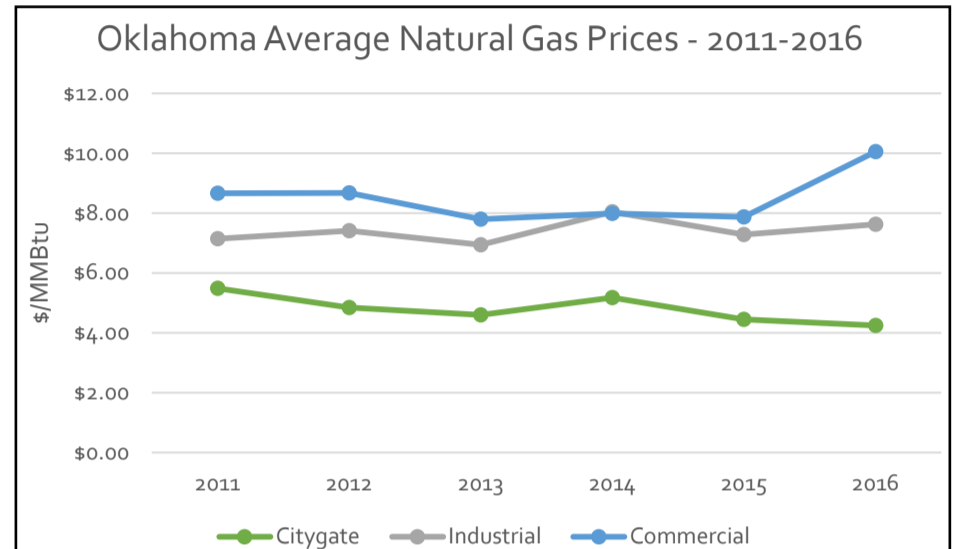
Oklahoma Natural Gas Prices

Oklahoma Average Gas Prices - 2016

| Sector | OK Price (\$/MMBtu) | U.S. Price (\$/MMBtu) |
|------------|---------------------|-----------------------|
| Citygate* | 4.24 | 3.75 |
| Industrial | 7.62 | 3.39 |
| Commercial | 10.05 | 7.22 |

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



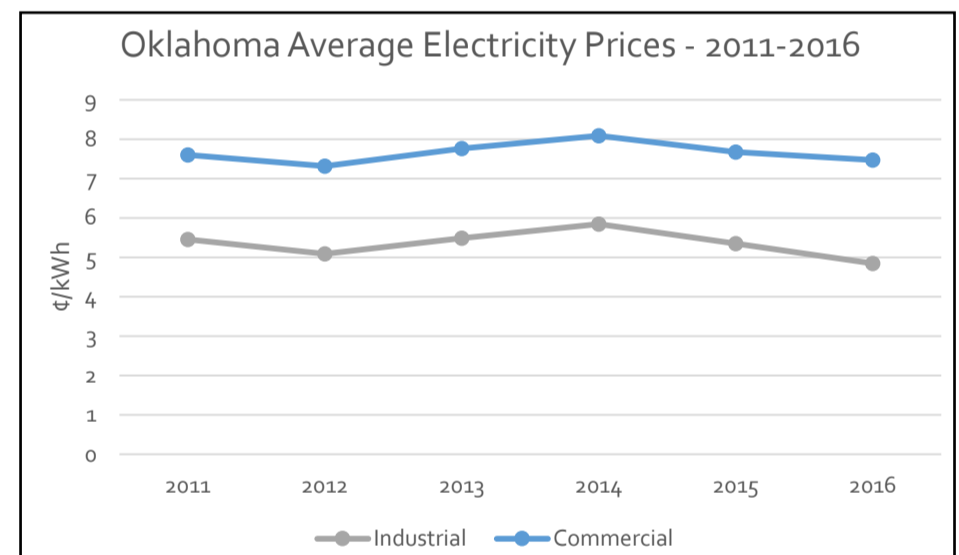
Oklahoma Electricity Prices

Oklahoma Average Electricity Prices - 2016

| Sector | OK Price (¢/kWh) | U.S. Price (¢/kWh) |
|------------|------------------|--------------------|
| Industrial | 4.85 | 6.75 |
| Commercial | 7.47 | 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.



Oklahoma Average Delivered Electricity Prices by Utility

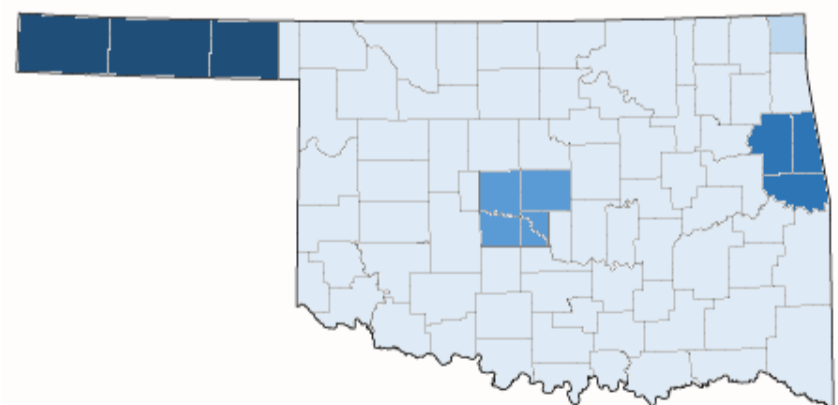
| Utility | Industrial Price (¢/kWh) | Commercial Price (¢/kWh) | Average Price** (¢/kWh) |
|---------------------------|--------------------------|--------------------------|-------------------------|
| Tri-County Electric Coop | 9.13 | 11.24 | 10.19 |
| East Central OK Elec Coop | - | 9.48 | 9.48 |
| Oklahoma Electric Coop | 6.73 | 11.08 | 8.91 |
| Grand River Dam Auth | 5.29 | 8.49 | 6.89 |
| Oklahoma Gas & Electric | 5.16 | 6.96 | 6.06 |
| Public Service Co of OK | 4.86 | 7.04 | 5.95 |

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.

Oklahoma Electricity Prices – Heat Map



- Oklahoma Gas & Electric / Public Service Co of Oklahoma
- Grand River Dam Authority
- Oklahoma Electric Coop
- East Central Oklahoma Electric Coop
- Tri-County Electric Coop

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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

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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 Oklahoma.

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