

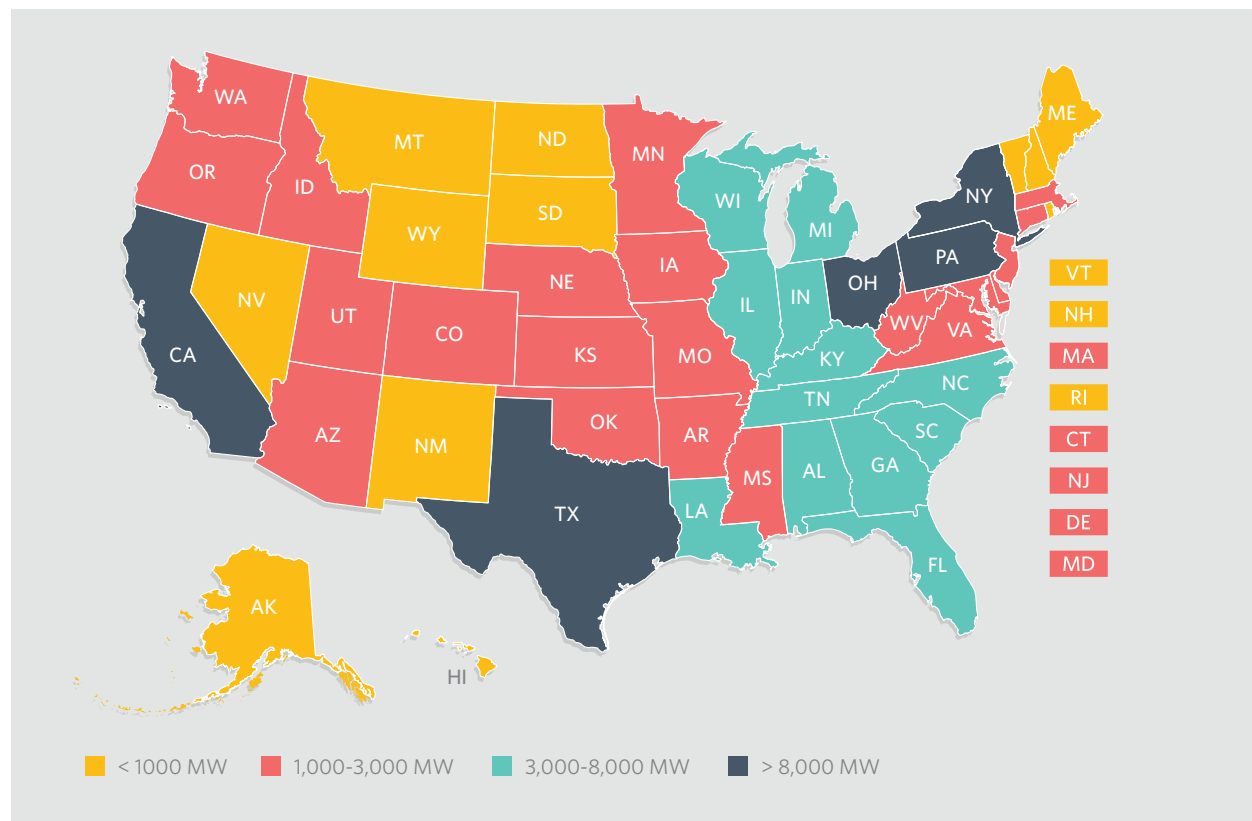


Industrial Energy Efficiency in Colorado

Overview

Combined heat and power, or CHP, technologies provide reliable electricity, mechanical power, or thermal energy by capturing heat that is wasted during electricity generation. District energy takes heat from a CHP system to heat or cool entire complexes such as a university campus, office park, or downtown area. Waste heat to power, or WHP, has been used to capture heat released during industrial processes and turn it into electricity. These on-site technologies allow businesses to achieve energy efficiencies of up to 80 percent. Technologies such as CHP and WHP represent tremendous potential to reduce energy consumption in Colorado's industrial sector, saving manufacturers money and creating energy businesses and jobs.

CHP Technical Potential



Source: U.S. Department of Energy

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State and regional statistics

Colorado currently has 25 CHP sites across the state with a total generating capacity of 641 megawatts (MW).

Source: U.S. Department of Energy

Manufacturing accounts for 7.3 percent—\$21.6 billion in 2013—of the total gross state product and employs 5.7 percent of the workforce.

Source: National Association of Manufacturers

Colorado's industrial sector consumed 28.3 percent, or 417 trillion British thermal units, of the total energy used statewide in 2013.

Source: U.S. Energy Information Administration

State policies support industrial energy efficiency

Colorado's renewable energy portfolio standard requires electricity suppliers to use clean energy resources to generate 10 percent of their retail sales by 2020. CHP and WHP systems of less than 15 MW are considered eligible resources.

Source: American Council for an Energy-Efficient Economy

Colorado's net metering rules require municipal utilities and cooperatives to allow recycled energy—power produced from thermal resources that would otherwise be lost as heat from exhaust stacks or pipes and does not combust additional fossil fuels—to qualify for systems up to 25 kilowatts.

Source: U.S. Department of Energy's Oak Ridge National Laboratory

The Colorado Public Utilities Commission established interconnection standards that include CHP. Additionally, the commission approved a program allowing Xcel Energy to provide financial incentives to facilities that convert waste heat into electricity.

Source: U.S. Environmental Protection Agency

Benefits for the oil and gas industry

CHP and WHP can be used in a variety of industrial applications with significant and coincident power and thermal loads. Processes such as oil recovery, petroleum refining, natural gas distillation, and pipeline compressor stations use large amounts of energy, but many facilities that conduct these operations release waste heat into the atmosphere rather than harness it for power production. CHP and WHP can also be practical solutions at sites with hot water, steam, or other thermal loads.

Source: Heat is Power Association

In the United States, CHP provides 18 percent of power and steam to oil and gas industries, and almost 25 percent of installed WHP projects are in the pipeline transmission and refining sectors. An additional 3.5 gigawatts of potential exist for WHP adoption in the petroleum refining sector.

Sources: U.S. Department of Energy and U.S. Environmental Protection Agency and U.S. Department of Energy's Oak Ridge National Library

CHP installations are already delivering efficiency and cost savings to the oil and gas industry nationwide. The Trailblazer Pipeline runs 436 miles across Wyoming, Colorado, and Nebraska and is outfitted with compressor stations along its route. Heat is produced as a byproduct of the pressurized systems that push the fuel from

station to station. One location in northeastern Colorado recycles waste heat through a 3.5-MW WHP installation that provides power to the electrical grid. Over the 20-year agreement, system operators expect to save more than \$10 million.

Source: U.S. Department of Energy's CHP Technical Assistance Partnerships: Southwest

CHP improves energy security

Reducing strain on the electrical grid with energy-efficient technologies increases power reliability during electrical outages due to extreme weather and other causes.

Colorado experienced 1,355 minutes—nearly 23 hours—of power outages in 2014. Almost 168,000 residents were affected by the 48 blackouts.

Source: Eaton Corp.

Examples of CHP Facilities in Colorado

City	Facility	Application	Year operational	Capacity (kW)	Fuel type
Aurora	Wattenberg Gas Processing Plant	Oil/gas extraction	1988	654	Natural gas/propane
Eagle	Eagle Gypsum Products	Stone/clay/glass	1990	9,600	Natural gas/propane
Fort Collins	New Belgium Brewing Co.	Food processing	2003	290	Biomass
Yuma	Yuma Ethanol	Chemicals	2007	2,000	Waste

Source: U.S. Department of Energy

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For further information, please visit:

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