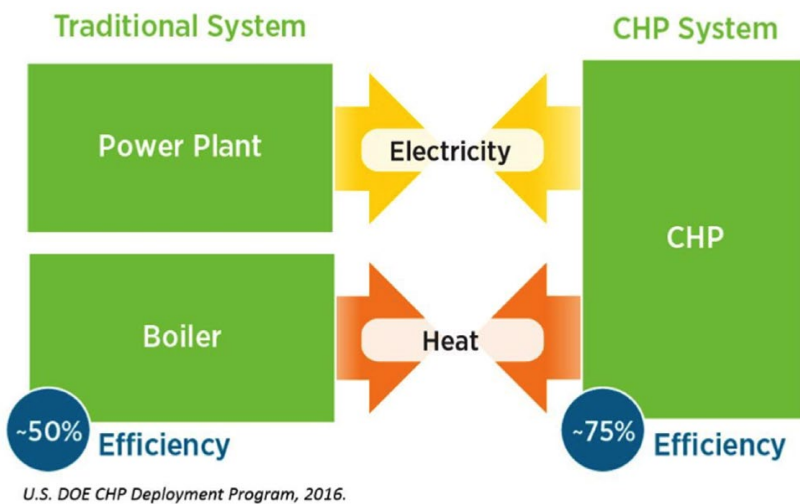




Combined Heat & Power (CHP): Efficient Generation of Electric Power & Thermal Energy

Combined heat and power systems use one fuel source to generate two products: thermal energy and electricity. This process is far more efficient than conventional, separate generation of heat and power. Also known as cogeneration, CHP systems are widely deployed in industrial, institutional, and commercial settings. Because electricity is generated near the point of consumption in a CHP system, heat that would be lost in a typical utility power generation process can be recovered to provide space heating, cooling, or any number of process steam or heat applications. Generating heat and power on site where it is needed improves energy reliability, resiliency, and site economics while lowering overall criteria air pollutants and greenhouse gas (GHG) emissions.



CHP Systems can Power:

- Manufacturing
- Refining
- Chemicals
- Food and Beverage Processing
- Metal Production and Fabrication
- Commercial Buildings
- Hotels and Resorts
- Hospitals and Healthcare Facilities
- College and University Campuses
- and more



CHP might be a good fit for your facility if:

- **Electricity Costs:** Your facility has high electricity costs.
- **Avoided Costs:** The cost of purchasing electricity from the utility is greater than the capital and operating costs involved in utilizing a CHP system.
- **Reliability:** There would be substantial business, safety, or health impacts if your electricity supply were interrupted.
- **Resiliency:** Your facility must run in all circumstances, including during and after storms and natural disasters.
- **Operation:** Your facility operates more than 3,000 hours per year and/or has thermal loads throughout the year.
- **Growth:** Your facility plans expansion, new construction or equipment replacement within the next 3–5 years.
- **Environmental Interests:** Your company is interested in reducing its emissions.



CHP Technologies and Fuels

The most common technologies for generating electricity on site are the steam turbine, reciprocating engine, combustion turbine, microturbine and fuel cell. Almost any fuel can be used in a CHP system, including natural gas, propane, biogas, landfill gas, biomass, digester gas, synthetic gas, coal, waste heat, and industrial byproducts. CHP systems in Colorado that are powered by a renewable energy resource listed in the renewable energy standard (RES) may qualify to generate renewable energy credits (RECs) they can bank or sell to their utility.



Key Benefits of CHP

Energy Efficiency

- Nearly 50% more efficient than separate generation of heat and power, producing more energy with less fuel.
- Generate power onsite where it is used, avoiding transmission and distribution losses which account for nearly 7% of electricity distributed by Colorado investor owned utilities.

Financial Savings

- Reduce costs associated with fuel and electricity purchases, providing lower, more predictable energy bills.
- Can provide a revenue stream.
- Reduce monthly utility electric demand charges.
- Reduce the need for investment in emergency generators.

Resiliency and Reliability

- Generate power on site with option to run disconnected from the electric grid (in island mode) and come online independent of the grid (black start) to reduce the likelihood of losing power.
- Can power critical processes during utility power outages, reducing the likelihood of business interruption and risks to safety and health.

Emissions Reduction

- Produce 50% fewer greenhouse gas and other air emissions than separate power and thermal energy generation (for comparable amount of thermal energy and electricity produced).
- Can contribute to a company's energy efficiency and sustainability goals.

Tailored to a Site's Operational Needs

- Can be sized to fit a facility's specific steam or heat needs.
- Can be fueled by a variety of energy sources including natural gas, landfill gas, biogas, biomass, and waste heat.
- Can be operated and maintained by facility engineering staff or outsourced to a third party.



Pursuing a CHP Project

If your company has a need for space heating, process steam, or space or process cooling; wants to save money on utilities; would suffer significant business, safety or health impacts if power supply were interrupted; or wants to reduce emissions, then CHP may be the right solution for you. Free technical assistance is available through the Upper West CHP Technical Assistance Partnership (TAP) (see contact information below). Their experts can help you decide whether your potential CHP application is promising and warrants a more detailed feasibility study.



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