What is Combined Heat and Power?

Combined heat and power (CHP), also known as cogeneration, can help manufacturers lower operating costs and reduce carbon emissions while offering fuel flexibility, improved reliability, and improved energy resilience. CHP is an efficient technology that generates electricity and uses the thermal energy that is otherwise wasted as heat to provide steam or hot water, achieving overall efficiencies of up to 80%.

How can the CHP Technical Assistance Partnerships (CHP TAPs) support Better Plants Partners?

Better Plants partners have priority access to a range of no-cost CHP resources provided by ten regional partnerships that can:

- Identify CHP opportunities for your facilities, considering multiple fuel and technology options.
- Access engineering support for project planning throughout a project’s lifespan.
- Provide CHP portfolio screenings, including economic payback analyses.

Is my facility a good fit for CHP?

The CHP TAPs are well-equipped to work with Better Plants Partner sites. Answering yes to three or more of the questions below would indicate a potential fit for CHP:

1. Do you have energy reduction or efficiency targets that are causing you to look deeper for savings?
2. Are you concerned about resilience and power reliability? Is there a substantial financial impact to your business if the power goes out?
3. Do you have thermal loads throughout most of the year (including steam, hot water, chilled water, hot air, etc.)?
4. Does your facility have an existing central heating or cooling plant?
5. Do you anticipate a facility expansion or new construction project, or do you expect to replace, upgrade, or retrofit central plant equipment within the next 3-5 years?
6. Do you have access to on-site or nearby low-cost fuel resources (i.e., landfill gas, farm manure, food processing waste, etc.)?

Contact your CHP TAP by visiting the website listed on the map above, or via email at chp@ee.doe.gov.

Success Story: Shaw Industries

Better Plants Partner Shaw Industries—the world’s largest carpet manufacturer—completed the construction of a CHP plant at its Columbia, South Carolina, fiber production facility. The Southeast CHP TAP assisted with a CHP screening and feasibility analysis and facilitated training sessions and collaboration between engineers at Shaw and CHP TAP staff. The CHP system began operating in May 2018 and is a key component of Shaw’s sustainability strategy, providing a reduction in greenhouse gas emissions of approximately 26,000 metric tons per year.

Learn more at betterbuildingssolutioncenter.energy.gov/better-plants or energy.gov/chp
Combined Heat and Power (CHP) Technical Assistance Partnerships

DOE Technical Partnerships

CHP Installation Database and Project Profiles Database

The [DOE CHP Installation Database](https://doe.icfwebservices.com/chp) is a compilation of CHP installations throughout the country. The database is searchable by CHP system capacities, fuel types, technology types, and other information for systems in your geographic area or industry including by North American Industry Classification System (NAICS) and Standard Industrial Classification (SIC) codes. Case studies about selected CHP projects are available in the [DOE CHP Project Profiles Database](https://doe.icfwebservices.com/chp/chp-project-profiles-database).

Examples of CHP at Manufacturing Sites

- **Boston Scientific**, Marlborough, Massachusetts – In addition to electricity, this 555 kW CHP system provides space heating and domestic water in cold weather, and is coupled with an absorption chiller to provide space cooling in warm weather. The system’s overall efficiency is 70%.

- **Eastman Chemical**, Kingsport, Tennessee – This large chemical manufacturing site’s first CHP system was installed in 1930, and has been expanded over the years to its current 200 MW capacity. The system provides an average of 155 MW for on-site consumption and 3,600,000 pounds/hour of steam for thermal needs.

- **Frito Lay**, Killingly, Connecticut – This 4.6 MW CHP system provides 90% of the site’s electrical demand and 80% of the steam load at an overall efficiency of 70%. The system saves Frito Lay more than $1 million annually and provides resilience by being able to operate in “island mode” during utility grid outages.

- **General Mills**, Murfreesboro, Tennessee – Anaerobic digesters for this facility's wastewater treatment plant provide biogas as fuel for a 1.6 MW CHP system, which now meets about 20% of the facility’s electricity demand and provides hot water for dairy sanitation processes. The system reduces operating costs by more than $500,000 per year and lowers greenhouse gas emissions by more than 9,000 metric tons of CO₂e per year.

- **Harbec Plastics**, Ontario, New York – A 250 kW wind turbine and 500 kW in microturbines power this hybrid CHP system, which meets the facility’s electricity and space heating and cooling needs at an overall efficiency level of 70%.

- **Philadelphia Water Department**, Philadelphia, Pennsylvania – The Philadelphia Water Department installed a 5.6 MW CHP system at its Northeast Philadelphia Water Control Plant. Fueled by biogas from the plant’s anaerobic digester, the CHP system generates enough electricity to meet 85% of the plant’s electricity demand.

Above: Map of Installed CHP systems in the United States. Source: DOE CHP Installation Database, [https://doe.icfwebservices.com/chp](https://doe.icfwebservices.com/chp)

Other DOE CHP Resources

The [Packaged CHP eCatalog](https://doe.icfwebservices.com/chp) is a national web-based searchable online tool containing a growing database of packaged CHP systems ranging from 24 kW to 7.5 MW in electric capacity. Better Plants Partners can search for CHP system characteristics and get connected to packagers and installers. The [CHP eCatalog](https://doe.icfwebservices.com/chp) allows users to reliably compare technology options on a common basis. The eCatalog website also includes additional CHP resources such as screening tools, a financing primer, and CHP-related news and events.

The [Distributed Generation for Resilience Planning Guide](https://betterbuildingssolutioncenter.energy.gov/chp/chp-project-profiles-database) describes the value of CHP, microgrids, and solar + storage in creating resilient facilities, along with guidance on CHP for critical infrastructure. A [CHP for Resilience Screening Tool](https://betterbuildingssolutioncenter.energy.gov/chp/chp-project-profiles-database), case studies, and other resources are available.

**View the DOE CHP Project Profiles on the left at** [betterbuildingssolutioncenter.energy.gov/chp/chp-project-profiles-database](https://betterbuildingssolutioncenter.energy.gov/chp/chp-project-profiles-database)

Learn more at [betterbuildingssolutioncenter.energy.gov/better-plants](https://betterbuildingssolutioncenter.energy.gov/better-plants) or [energy.gov/chp](https://energy.gov/chp)