Does CHP Have a Place in Your Resilience Strategy?

The strength of a resilience strategy is best measured in one way: an organization's ability to adjust easily and efficiently when faced with extenuating circumstances that affect their energy supply or cost. To ensure that your organization is better equipped to withstand disruption or change, consider Combined Heat and Power (CHP) as a powerful component of a resilience strategy.

A CHP system is an onsite distributed energy solution that produces heat and power from a single fuel source, capturing heat typically wasted during electricity generation. CHP serves as both an energy resilience solution and an energy efficiency solution, and often at the same time. It operates as a standalone backup power source and a source of additional backup power when a separate backup system doesn't adequately meet needs, or another layer of backup is required should existing generators fail.

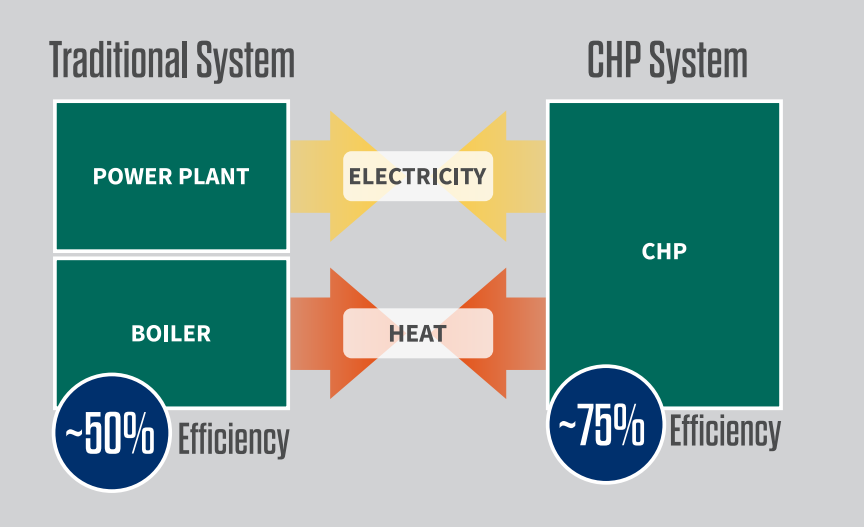
This was the case during the Northeast blackout in 2003 when half of New York City's 58 hospitals suffered emergency generator failures. Hurricane Sandy also caused a number of emergency generator failures at New York University's Langone Medical Center and Bellevue Hospital.

Meanwhile, 100% of CHP systems operating in the region provided continuous power to their facilities.

WHAT MAKES CHP THE OPTIMAL RESILIENCY SOLUTION?

When people typically think of resilience with respect to interruptions or issues to their power supply, they tend to think of liquid-fueled backup power systems for use during a grid outage. CHP serves well in this case, but can also play a cost-reduction role in standard day-to-day facility operations under normal utility grid conditions.

CHP systems typically run off natural gas which is rarely affected by weather events. Natural gas, unlike diesel or other liquid fuel sources, is not reliant upon external factors such as clear roadways.



HOW DO YOU KNOW WHEN YOUR BUSINESS IS A STRONG CHP CANDIDATE?

Generally speaking, CHP is best-suited for facilities that:

- Operate close to 24/7, 365 days-per-year;
- Use a sizeable amount of both electricity and thermal energy throughout the year—on average, the facility should consume at least 100,000 kWh and 600 MMBTU (million BTU) per month;
- Look to become more self-sufficient and less reliant on their utility or power supply.

Most companies and organizations that fit this description are often part of the healthcare, higher education and manufacturing industries. While CHP is viable for large facilities, an abundance of open space is not required for CHP. Many customers benefit from smaller, simpler and easier to integrate solutions. CHP systems are extremely compact and offered as a single package, eliminating footprint constraints. Among the most compact packaged CHP system options available are Capstone® gas-powered turbines ranging from 65 kW to 1 MW.

Many of these customers adopt CHP solutions after initially looking to become more energy efficient in their consumption. Then, they discover CHP as an energy efficiency solution with substantial resilience benefits.

Self-generating a portion of a facility's energy consumption is an effective way to control energy cost. CHP enables users to offset a portion of electricity purchased from the grid and reduce costs by using fuel more efficiently than traditional systems. This also diversifies where power is coming from, making it easier to withstand impact from changing rates.

While customers can expect an unlimited supply capacity from utilities, expansion may be prohibited by a lack of distribution capacity. Distribution lines potentially need to be upgraded, with a cost component and a time component. For facilities anticipating growth in the near future, additional onsite power capacity available through CHP allows expansion of operations with less dependence on grid capacity. If a customer adds CHP onsite to an existing distributed energy source, current and future footprint expansion may be accommodated without added cost.

A manufacturing industry customer in New York found itself in this situation and looked to CHP as a solution. The R&D facility needed to expand within months requiring three times as much electric power, but was limited by its utility company's capacity. To overcome this obstacle, the company turned to GEM Energy, a Rudolph Libbe Group company, to design and install a Capstone 1000 kW CHP system. In addition to the electric power output, this system provides 5 million BTUs of hot water every hour, more than enough to satisfy the process needs of the expansion.

This manufacturing industry customer took advantage of a state incentive program which improved the economics of the project. While they vary by state, incentives have been strong in some states for CHP for decades now, and at times, paying anywhere from 30-50 percent of the project. For New York facilities in particular, New York State Energy Research and Development Authority (NYSERDA) supports CHP projects through a grant program for CHP systems that supply both efficiency and resilience benefits through the end of 2019. In Ohio, three utility companies currently offer lucrative incentives for CHP systems and are allocated on a first-come, first-serve application basis.

While commercial office buildings are not always obvious CHP candidates, there is still potential for cost savings. Since these facilities are not typically running at a continuous level, the economics may be challenging and the payback more complicated—but the opportunity still exists.

CHP customers who recognize the greatest benefits have both adequate electricity and thermal energy usage. If a facility requires a lot of electricity but little need for thermal energy, it might mean that CHP isn't the best resiliency solution. Another behind-the-meter solution, such as renewable power combined with battery storage, may be more suitable.

INTEGRATION WITH DISTRIBUTED SYSTEMS

Customers are increasingly interested in having multiple distributed energy systems on site. In fact, CHP systems are especially beneficial for customers who integrate with other distributed energy systems such as solar and battery storage. When these systems integrate with one another at the control level and establish a microgrid structure, customers experience greater control over their own power generation and energy costs.

For example, CHP can provide electricity and thermal energy designed to support a portion of the load year-round. This reduces the baseline of usage while a solar array simultaneously offsets peak daytime usage. Adding battery energy storage to these resources can enable predictable and controllable energy cost reduction.

SELECTING A PROVIDER

The most consistent challenge when integrating CHP is the utility interconnection process. It is an industry wide obstacle and the extent to which this obstacle is experienced varies based on technology and location. The easiest way, however, to alleviate the challenge is to start the process early and, if possible, work with a provider that has a familiarity with local utilities.

Delivering solutions via a turnkey approach is key to simplifying and streamlining the project. A provider with a comprehensive set of in-house services should be able to guide projects from the beginning through completion, including implementation of a full-service maintenance plan to solidify costs at the outset. GEM Energy has partnered with its customers on CHP integration since the early 2000's, managing projects from initial design to financing to self-perform construction through long-term maintenance, as an authorized service provider. For example, the VA Ann Arbor Healthcare System has relied on its 1 MW Capstone micro-turbine powered CHP system for five years, saving $370,000 annually for the 1.1 million square-foot campus.

ASKING THE RIGHT QUESTIONS

Today, no organization is safe without a resilience strategy. Unpredictable weather and natural disasters are no longer restricted to specific seasons or regions, as a community near Seattle that experienced an F2 tornado in December 2018 can attest. The question isn't about the necessity of a resilience strategy; it is about ensuring that you are equipped with the essential components of the resilience strategy.