

Logan Philadelphia Hotel

Hospitality



The Challenge

As a five-star luxury hotel in downtown Philadelphia, the Logan Philadelphia Hotel (formerly Four Seasons Hotel Philadelphia) uses a tremendous amount of energy each day. From cooking, heating, lighting, laundry, showers, swimming pools, and more, the demand on the city for steam and local electricity was high and costly.

Aiming to gain control of energy costs and reduce the hotel's greenhouse gas emissions, the management of this opulent, 391-room icon turned to E-Finity Distributed Generation to install a natural gas-fueled system that could generate electrical and thermal power, onsite, for the hotel's own use.

The Solution

Installed in 2009, the combined heat and power (CHP) system features three Capstone C65 ICHP natural-gas microturbines installed atop the eight-story hotel's roof. The system generates 195kW of electrical power, which covers 30 percent of the hotel's overall electricity needs.

During the generation process, exhaust heat from the microturbines is captured and used to heat water for laundry and other hotel operations. In fact, the energy-efficient CHP application provides 100 percent of the building's day-to-day domestic hot water and 15 percent of its heating needs.

Aesthetically, the system is quiet and takes up minimal space, a key reason the C65 microturbines were selected over reciprocating technology. With a noise output of only 65 decibels at 10 meters, the microturbines do not disturb guests in the Presidential Suite directly below—or in the nearby rooftop lounge that was installed in 2016. Further, reciprocating engines'

Power Profile

Customer

Logan Hotel, formerly the Four Seasons Hotel Philadelphia

Location

Philadelphia, PA

Commissioned

October 5, 2009

Fuel

Natural Gas

Technologies

- Three C65 ICHP Capstone Microturbines
- Heat Recovery Modules installed on each C65 capture the microturbines' waste heat as part of a CHP application

Capstone Turbine Distributor

E-Finity Distributed Generation



“This process with microturbines allows for more control over heat distribution and BTUs. In the first two months of operation we saw a cost avoidance of over US\$80,000.”

**— Marvin Dixon, Director of Engineering
Logan Hotel**



Commissioned in 2019, the rooftop-mounted C65 ICHP microturbines have logged more than 85,000 runtime hours, which amount to 99.8% uptime.

energy efficiency is often less than 30 percent compared to a Capstone C65 microturbine in a CHP application, which boasts energy efficiencies greater than 80 percent.

Once the system was commissioned, the hotel entered a 9-year service contract, which included a system overhaul. Over that period of time, all three units provided 85,000 hours of continuous runtime, which amounted to 99.8% uptime. At the end of the contract, a new 5-year service contract was put in place, which also includes a system overhaul.

Prior to system commissioning, the hotel entered a 9-year Factory Protection Plan (FPP) service contract with E-Finity, which included a system overhaul at 5 years. At the end of the initial 9-year term, E-Finity re-negotiated a 5-year renewal that included the second system overhaul.

The Results

To date, all three units have logged more than 85,000 hours of continuous run, representing 99.8% uptime.

The overall ROI for the system was 4.2 years⁽¹⁾ thanks to considerable cost savings and efficiency. Because the hotel buys natural gas from a third-party, it can shop around for the best rate. Doing so amounts to a 30 percent cost reduction over power purchased from the utility.

Since the units are small and modular, they easily fit in a 37-square-meter space on the hotel's roof. The rooftop microturbines, which sit amid prime metropolitan real estate, are also ultra-low in emissions (< 9 ppmv NO_x at 15% O₂), making this onsite power generation system a clean-and-green, environmentally friendly option. Thanks to the system, 425 metric tons of CO₂ emissions are avoided each year—the equivalent of removing 70 cars from the road.

The hotel has received recognition for its environmental achievements by being named one of TripAdvisor's Green Leaders Partners (bronze level award)

and in its ranking as #11 Green Hotel in Philadelphia, as well as being a featured case study in ASHRAE's Combined Heat and Power Design Guide.

"This process with microturbines allows for more control over heat distribution and BTUs," said Marvin Dixon, Director of Engineering. "With such a highly efficient process, the hotel is able to squeeze every dollar out of each BTU. Instead of dumping rejected heat into the atmosphere, we can reuse it." In the first two months of operation, the hotel saw a cost avoidance of over US\$80,000. ■

Capstone C65 ICHP Microturbine



A C65 Microturbine provides up to 65kW of electric power while the UL-Certified C65 ICHP provides up to an additional 150kW of thermal power for CHP applications.

(1) Based on 2008 energy rates