Capstone onSITE

# A Fargo Hotel Keeps the Hot Water Hot

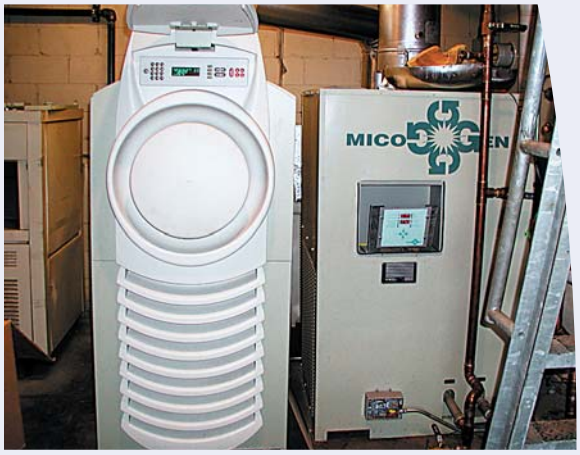
Using a Capstone CHP Solution, an Often Temperature-Challenged Holiday Inn Generates Hot Water with an Electricity Dividend

## THE ISSUE:

**Boost a hotel's hot water supply while producing more usable thermal and electrical energy from natural gas input.**

## THE SOLUTION:

**The Capstone MicroTurbine uses CHP to heat water while generating valuable onsite electricity.**



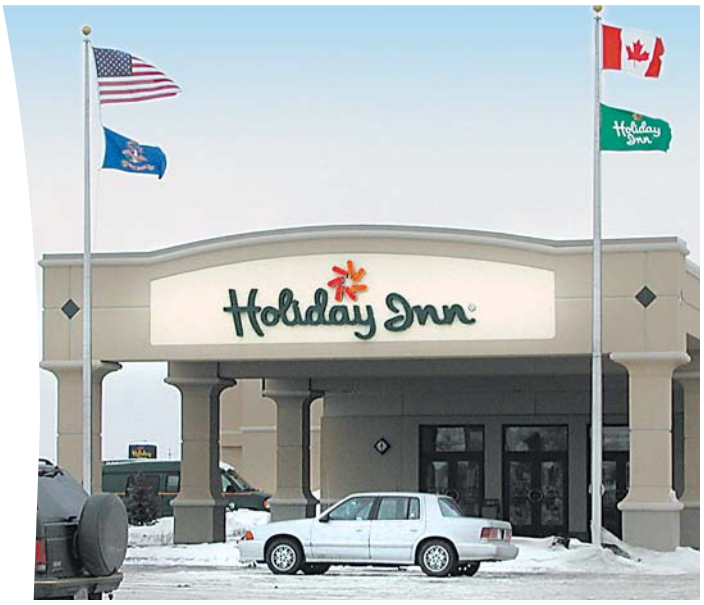
*Clean exhaust heat generated by the Capstone MicroTurbine loops into the Holiday Inn's commercial grade boiler via a heat exchanger.*

## SOLUTION SUCCESSES:

- High reliability and system compatibility proven for hotel operations
- Hot water availability boosted 20% via innovative Capstone CHP installation
- Electricity additionally produced from fuel stream is also used for heat production
- More than 13,000 hours of near-continuous operation
- Onsite electrical generation can ensure vital hotel operations remain up and running regardless of grid conditions (dual-mode controller option required)

## Getting into Hot Water

In buildings where people eat, sleep and bathe–hotels, retirement homes, health care centers–there is a perpetual need for heated water in the bathrooms, laundries, kitchens, pools and spas. Most facilities already use natural gas for the heating process, but there is a way to improve fuel efficiency and the bottom line, a way to turn incoming gas into more than just hot water. A 309-room Holiday Inn in Fargo, ND, found the way: the Capstone MicroTurbine™.




*The Holiday Inn in Fargo, ND, where Capstone solved a hot water shortfall while generating an electricity dividend.*

## Conventional Hot Water System Can Fall Short

Gas-fired boilers supplied hot water to 200 rooms in the Fargo Holiday Inn's two-story wing. This system was overtaxed during peak accommodation periods such as conventions and athletic meets. Beyond demands during occupancy spikes, the hotel had to address the customary hot water needs of the laundry and kitchen. Rural utility Cass County Electric Cooperative (www.kwh.com) went to work to find an effective solution for the Fargo Holiday Inn. Priority was placed on flexible technology that would augment existing heating systems and energy use patterns. Financial support of the capital costs from national power organizations guaranteed the deal.

## Choosing Capstone as the Solution

CCEC partnered with the National Rural Electric Cooperative Association's Cooperative Research Network (www.nreca.org) and the Electric Power Research Institute (www.epri.com) to identify and implement distributed generation technologies for energy users. Like many such organizations around the world, the group found immediate merit in the combined heat and power (CHP) solutions provided by the ultra-low-emission Capstone MicroTurbine. "Capstone was way ahead of any competition," determined CCEC Business Account Executive Mark Hanson.

## The Capstone MicroTurbine Integrates Seamlessly

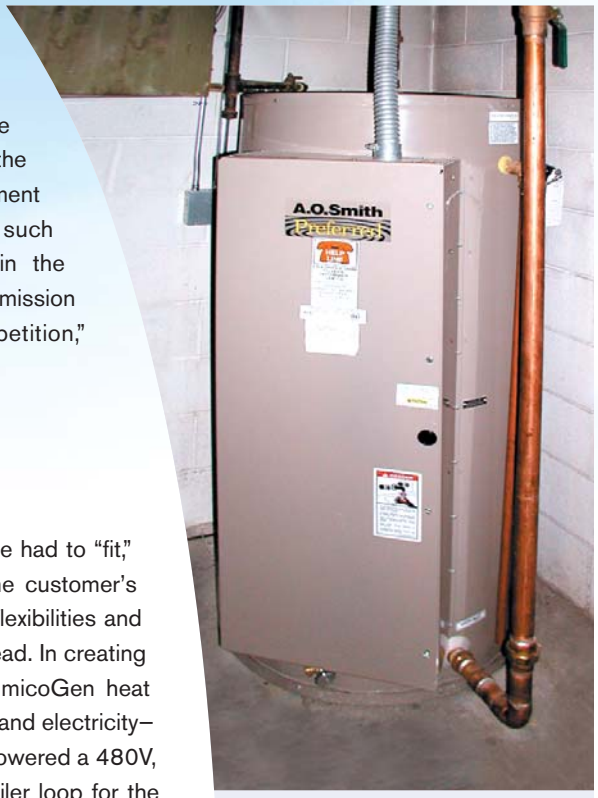
In introducing Capstone to Holiday Inn, CCEC knew that the microturbine had to "fit," both in terms of technical compatibility with existing systems and in the customer's operations comfort level. Impressed with the microturbine's capabilities, flexibilities and end-user "transparency," Holiday Inn management gave CCEC the go-ahead. In creating a CHP solution, the Capstone MicroTurbine was paired with a Unifin micoGen heat exchanger. It was determined that both microturbine energy outputs–heat and electricity–would be applied to hot water production. Capstone's electricity output powered a 480V, 22 kW AO Smith electric water heater, which was added to the gas boiler loop for the two-story wing.

The clean exhaust heat generated by the Capstone MicroTurbine was looped into the hotel's commercial grade boiler via the Unifin heat exchanger and applied to the 1,000 gallon hot water storage tank serving the laundry and kitchen. With simple site requirements, relatively low noise output, small footprint and zero vibration, the Capstone system was sited near the laundry/kitchen storage tank.

## Capstone: New Energy Benefits for the Hospitality Industry

Other than maintenance on the system's internal gas compressor, the system has run smoothly for more than 13,000 hours. In hotel installations that use the dual-mode controller option, the system's electrical output could be routed to key loads, such as the front desk and reservation systems, ensuring dependable power, particularly during winter months when power interruptions increase.

"The Capstone MicroTurbine lets the hospitality industry achieve better guest service while offering the potential to reduce energy costs," concluded Mark Hanson. "A Capstone cogeneration system like this that generates 1 kilowatt of power and 2 kilowatts of heat from six cents worth of gas is going to look very good in California, New York and a lot of places in between. And when you can even fire absorption chillers with the Capstone exhaust to deliver virtually load-free air conditioning, it's a pretty sweet deal."




*The Capstone MicroTurbine's electrical output drives this additional water heater.*

## Quick Facts:

**Equipment:**
Stand-Alone Capstone C30 low-pressure unit; Capstone Dual-Mode Controller; Unifin micoGen Heat Exchanger

**Electrical Output:** 22 kW (maximum load demand of electric water heater)

**Heat Recovery:**
42 kW, or 142,000 Btu/hr

**Installation Purpose:**
- To augment existing boilers with heat output to accommodate peak hot water demand
- To generate electricity for onsite use
- To provide data for EPRI/NRECA/DOE Distributed Resource Group

Capstone

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- Designed for Ultra-Low Maintenance
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- Air-Cooled
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