Pharmaceutical Manufacturing

Microgrid

The Challenge

With the growing cost of electricity, and the new carbon tax laws on the books in California, this California-based biotechnology company was looking for on-site power generation system for their pharmaceutical manufacturing expansion.

The pharmaceutical manufacturing processes require 30 to 90 days to complete, depending on the specific drug being manufactured. Any deviation in power quality or electrical service interruption during this critical process would disrupt entire production lines at significant cost and impact delivery schedules.

The customer considered mitigating their cost of electricity provided by the local utility service, reducing their carbon footprint, and minimizing the associated tax penalties introduced by the California Global Warming Solutions Act of 2006 (AB32).

The Solution

The customer chose to develop an on-site combined heat and power (CHP) plant utilizing two Capstone C1000 microturbines operating on natural gas, producing up to 2 MW of electrical power. Clean exhaust from the microturbines is directed to steam heat recovery systems, providing heat output used in the manufacturing process. The microturbines feature Capstone's patented oil free air bearing technology, which

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— Ryan Brown, Managing Partner
Cal Microturbine.

Power Profile

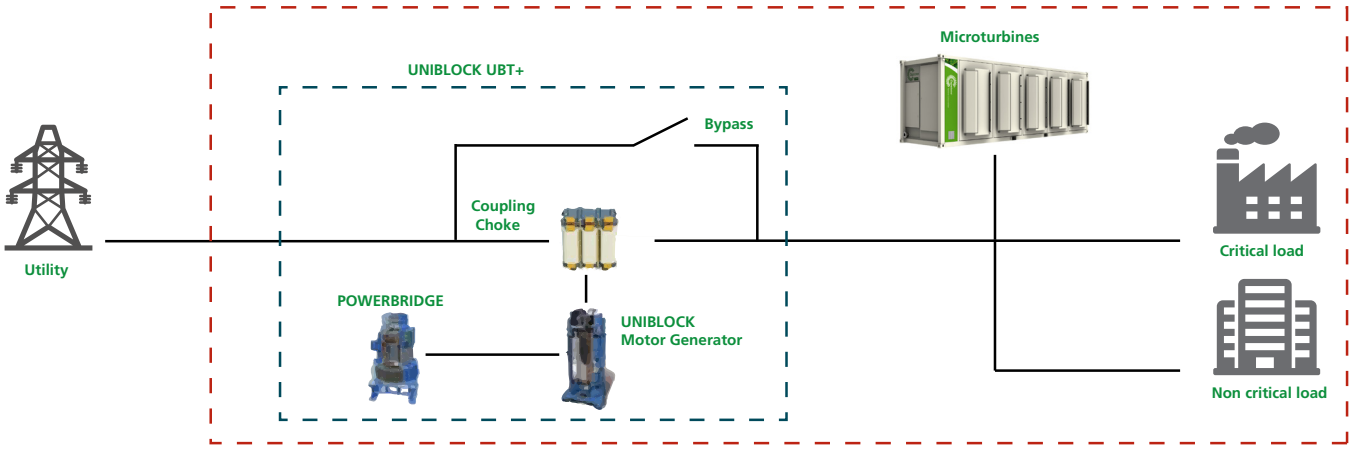
Customer
Biotechnology Firm

Location
Novato, California

Commissioned
July 2014

Fuel
Natural Gas

Technologies
- Two Capstone C1000 Microturbines
- Piller Rotating Uninterruptable Power System (UPS)



Two Capstone C1000 microturbines operate in concert with a Piller rotating UPS to provide a seamless transition from grid connect operation to island operation.

provides for low maintenance and high system availability.

The two Capstone C1000 microturbines operate in concert with a Piller rotating UPS to provide a seamless transition from grid connect operation to island operation. The Piller rotating UPS consists of a flywheel energy storage module, a synchronous motor/generator, and redundant control system. The Piller rotating UPS provides a stable voltage and frequency reference for the Capstone microturbines. This allows the microturbines to always operate in a grid connected mode – even when the utility source is disconnected. The Piller rotating UPS provides control signals to the Capstone microturbines to maintain energy storage in the flywheel while simultaneously serving the connected load.

The Results

With help from the microturbines, the mission critical cogeneration system enables the facility to generate 100% of their own power in island mode or derive power directly from the grid, replace standard diesel generation with natural gas fuel source, deliver necessary steam for production processes and increase both efficiency and reliability.

“Pharmaceutical manufacturing requires critical power with the highest levels of reliability. Capstone’s unique multiple prime mover architecture provides the best redundant power solution for any size project. The combination of ten Capstone 200 kW power modules and a rotating UPS at this site provides unprecedented critical power availability and is an application other pharmaceutical customers are currently adopting,” said Ryan Brown, Managing Partner at Cal Microturbine.

The system was put to the test during an unexpected outage that lasted two weeks. A fault in the local electrical feeder disrupted incoming power, causing the Capstone/Piller system to immediately transition into island operation. Facility power and heat output continued during this transition, and was maintained in this island operating mode until the feeder was restored and utility power became available again. Once the utility was back, the Capstone/Piller system automatically reconnected to the grid and continued operation without interruption. The result was no power disruption, no need to operate a backup diesel generator, and no lost production.

Furthermore, the steam byproduct of the microturbines can be utilized in production processes, while the electrical generation will supply critical manufacturing loads. Generating power on-site reduces their electrical charges from their local utility from $0.13/kWh to $0.08/kWh. From a financial perspective, the facility has been able to decrease operating costs by close to 50% and qualify for $5.4 million in tax credits, and incentives. The cost savings from avoided production loss further increases the financial benefit of this unique microgrid solution.

Capstone C1000 Microturbine

A C1000 Microturbine provides up to 1 MW of electrical power and contains five microturbine engines.

Capstone Green Energy