

Leaf California Cannabis Cultivator

Agricultural Manufacturing

The Challenge

Commercial growers in the burgeoning cannabis industry are increasingly finding that traditional, utility-provided electricity simply cannot meet their business and financial needs. Facilities are often remotely located and require enormous amounts of energy. Further, it can take several months or even years to secure the necessary electrical service upgrades.

So when Leaf California, one of the state's leading growers of premium, natural cannabis, sought to more than double capacity at their Sacramento cultivation facility, they looked for an alternative solution. Given the facility's high electricity and water requirements, it was an ideal candidate for a combined cooling, heat & power system (CCHP) with power supplied by Capstone natural gas microturbines.

The Solution

The CCHP system at the 8,600-square-foot Sacramento facility is the first of its kind in the industry. Along with energy efficiency upgrades that included replacing all lighting with LEDs, the company installed an array of highly efficient microturbine systems. The initial design in 2019 included five C65, natural gas-powered microturbines that generate 325kW of prime power, including electricity for over 380 grow lights. A sixth C65 ICHP CARB-certified system (California Air



By generating our own power and using exhaust heat to make air conditioning we have reduced our carbon footprint to one of the smallest in the industry nationwide. We save precious natural resources including water and save the company hundreds of thousands of dollars annually in energy bills and operational costs."

— Mike Mattioli, Managing Member
Leaf California

Power Profile

Customer

Leaf California

Location

Sacramento, California

Commissioned

June 2019

Fuel

Pipeline Natural Gas

Technologies

- Six Capstone C65 Microturbines
- Capstone Logic Control (CLC) System
- 120-ton Absorption Chiller

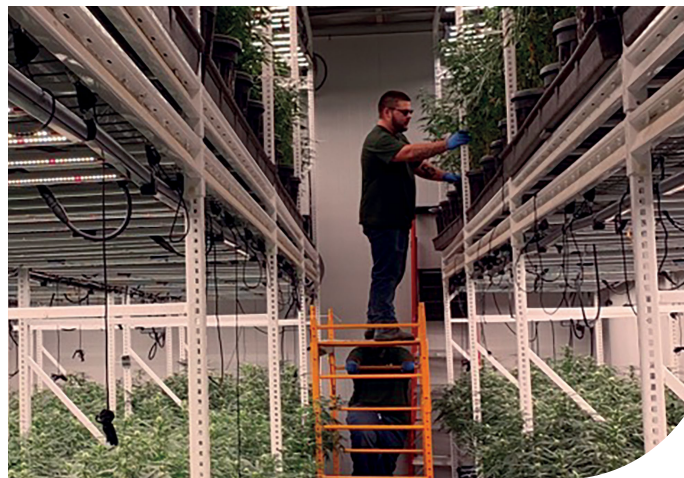
Capstone Green Energy

Distributor

Cal Microturbine

A close-up photograph of a cannabis plant with green serrated leaves and small buds, set against a blurred green background. The image is used as a decorative element for the bottom right section of the page.

**Smarter Energy
for a Cleaner Future**



Six Capstone C65 microturbines help Leaf California meet their sustainability goals on improved energy efficiency while reducing waste.

Resources Board) microturbine was added in April 2020.

Reliability is a critical component of the system since any interruptions in power can lead to lost product. So the on-site system provides essential redundancy for seamless power even when the utility has an outage.

In addition to the microturbines, the system includes six absorption chillers. The chillers capture the exhaust from the turbines and use it to produce 400kBTU/hr of hot water for the indoor greenhouse facility. They also provide 100gal/min of chilled water, which replaces conventional air conditioning and handles the facility's dehumidification needs. The process of dehumidification produces 100% of all the water needed to grow plants, thereby making it an entirely, closed-loop hydration system. Furthermore, the improved HVAC system is so efficient it requires almost no power.

The Results

The benefits of the on-site system are many. Energy costs have been reduced by roughly \$217,000 per year, in part because of the ability to lock in price-stable, long-term fuel contracts. And because the microturbines were able to provide on-site energy upon start-up, the savings rewards started right away.

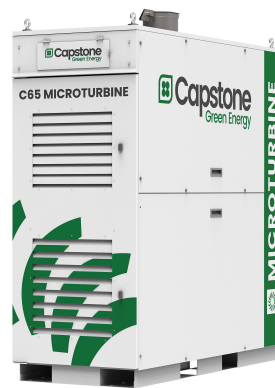
Beyond energy efficiency and cost savings, Leaf California's product has benefitted as well. The improved power reliability allows for stable, continuous cultivation. This leads to healthier plants, which in turn, produces greater cannabis yields.

The new system aligns, too, with the company's focus on sustainability. Though not carbon-neutral (natural gas is a fossil fuel), the system's high efficiency means the system produces less CO2 emissions per kWh than any California utility for a comparable amount of power generation. The combination

of on-site power generation, HVAC improvements, and the addition of LED lighting makes the Sacramento facility one of the most efficient indoor cultivation sites in the country.

Overall, the CCHP system allowed Leaf California to achieve multiple goals with regard to cost savings, sustainability, energy efficiency, product stability and waste reduction. "By generating our own power and using exhaust heat to make air conditioning we have reduced our carbon footprint to one of the smallest in the industry nationwide. We save precious natural resources including water and save the company hundreds of thousands of dollars annually in energy bills and operational costs." said Mike Mattioli, Managing Member for Leaf California.

Capstone C65 Microturbine



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