

Hacienda North Farms

Agricultural Manufacturing

The Challenge

Nestled in the Leamington area of Ontario, Canada, Hacienda North Farms proudly hosts an expansive greenhouse facility with an impressive 160 acres under glass. Renowned as one of the largest indoor greenhouse operations in North America, it underscores the scale and significance of its agricultural endeavors. Given the region's status as home to the highest concentration of greenhouses in North America, the local electrical utility faces challenges in meeting the power capacity demands essential for growers to effectively manage their operations.

So when Hacienda North Farms decided to expand the size of their operations by more than 90 acres, they knew they would need to augment their energy supply with on-site power generation. The company initially purchased solar PV panels to help add capacity but when it turned out they couldn't be connected to the grid, Hacienda partnered with Vergent Power, Capstone's exclusive distributor in the Midwest, New England and Eastern Canada, to find an alternative that could both meet their goals and incorporate the PV system.

The cogeneration microgrid solution Vergent designed not only provides a stable supply of energy, it also operates ultra-efficiently and delivers quantifiable environmental benefits.

Power Profile

Customer

Hacienda North Farms

Location

Leamington, Ontario, Canada

Commissioned

Fall 2022

Fuel

Pipeline Natural Gas

Technologies

- (1) C1000S Microturbine
- 500kw Solar PV
- (mTim) Microgrid Control System



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— Johnny Braun
Vice President Hacienda Farms North



**Smarter Energy
for a Cleaner Future**



Hacienda North Farms required on-site generation to support an expansion to their existing operations. Vergent provided an off-grid redundant microgrid solution that features a 1MW microturbine integrated with a 500kW solar PV that provides over 90% efficiency.

The Solution

The new microgrid system was built from the ground up in an empty field. At the heart of the microgrid is a Capstone C1000S, a modular unit composed of five 200kW microturbine engines able to operate together or independently. The system, which is also integrated with a 500kW solar PV array, is configured as a heat recovery system whereby the waste heat produced by the engines is captured and used to produce free hot water and carbon dioxide required for the growing process.

On a typical day, the microturbine serves as the baseload energy source, able to power the entire facility even when operating in standalone, off-grid mode. When the sun is shining, the power production is supplemented by the PVs utilizing as much of the solar energy as possible and reducing the microturbines output and natural gas fuel usage.

The system's modularity was an essential part of the design as it allows Hacienda to adjust power generation according to demand rather than continuously running a 1MW generator, a factor that helps save on operational costs. Additionally, though maintenance needs are minimal due to the turbines only having one moving part, any scheduled or unscheduled work that needs to be done on the equipment can be completed one microturbine at a time, so the system is never offline, and the farm never experiences downtime.

The Results

With this highly efficient cogeneration system, Hacienda North Farms was able to achieve their primary goal of energy independence. The system delivers 99% uptime and is over 90% efficient. That degree of efficiency, in combination

with renewable solar power, has allowed the farm to reduce greenhouse gas emissions by more than 30%.

As global energy costs continue to rise and reliability becomes an ongoing concern, businesses that make smart energy choices enjoy many benefits that include cost savings, power reliability, and emissions reductions. All those operational benefits can have a positive impact on the bottom line, which allows companies to compete in the marketplace more strongly.

"As a farming operation, we depend on sunlight, clean air, and clean water, so the environmental benefits of the system were important to us, said Johnny Braun, Vice President of Hacienda North Farms. "And it turns out, choosing microturbines over a reciprocating engine would save us roughly \$200,000 per year in operating, fuel, and maintenance costs."