

POWER PROFILE

Customer: Enwave Energy Corp.

Location:

Toronto, Ontario

Customer Business Issue:

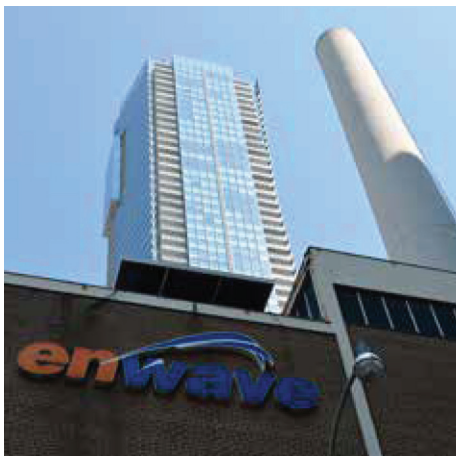
Demand Response

Solution:

Two Cat® G3516H gas generator sets
One ISO Switchgear

Cat® Dealer:

Toromont Power Systems



Enwave Energy Corp.

POWER NEED

Enwave Energy Corp. was originally established more than 20 years ago as a non-profit cooperative, known as the Toronto District Heating Corporation. Their mandate was to provide efficient, environmentally friendly heating to institutional and government buildings in downtown Toronto.

In 1998, the company's chairman initiated a restructuring plan that ultimately gave rise to the private, for-profit entity called Enwave. Privatization brought the financial discipline to make the company profitable and the capital resources to develop Deep Lake Water Cooling (DLWC)—an innovative method of air-conditioning buildings which recycles energy, using cold water drawn from Lake Ontario.

By the time DLWC was commissioned in 2004, Enwave had become a market leader in sustainable energy. With the financial support of its new shareholders, Enwave was no longer just a district heating company, but a fully integrated sustainable energy services provider.

On a local level, ever-increasing electrical loads within Toronto—resulting primarily from population growth and higher connected loads per person—continue to add strain to the existing transmission infrastructure within Canada's largest city.

SOLUTION

Established 50 years ago, Enwave's Pearl Street Energy Center was one of the first steam plants built before the larger district energy system was established in downtown Toronto. Following a C\$30 million modernization six years ago that added new, highly efficient boilers, the flagship plant in the heart of downtown Toronto supplies steam to all downtown hospitals, as well as downtown condominiums and office buildings.

Earlier this year, Enwave increased the efficiency of the Pearl Street plant by adding two Cat G3516H gas-powered generator sets. Electricity from the 4 MW power plant is exported to the grid based on the market electricity price as part of the Combined Heat and Power Standard Offer Program (CHPSOP 2.0), which provides government incentives to produce power at a lower cost than higher-priced grid power during times of greater energy demand.

At Pearl Street, heat from the gensets' exhaust is captured and used to generate low-pressure steam and hot water, thereby increasing efficiency by 33 percent as a result of not having to use a separate source of natural gas to warm up the water.

"A lot of these conventional power generating plants in the province produce electricity and give off a tremendous amount of heat, but they just let that heat escape into the atmosphere through a cooling tower or up the stack after the combustion process," says Kris Landon, Enwave's director of construction and project management.

"In our CHP system, we generate electricity first and then harvest the heat out of the exhaust gas so we're actually doing two things at the same time versus just running," Landon says. "We're doing the two processes together, so we're saving on natural gas and emissions because we're doubling up on a process."

"Because the Pearl Street steam plant runs continuously—hospitals and medical facilities in the northern part of the district energy system such as Toronto General Hospital use a tremendous amount of steam year-round—Enwave never has a problem with the generator sets not running enough to adequately use the waste heat," he continues.

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RESULTS

Under a 20-year contract with the Ontario Power Authority, the gensets at the Pearl Street plant are expected to run up to 2,000 hours a year, particularly during the hottest and coldest days of the year when demand on the grid increases.

“The government pays us to provide electricity when the cost to operate the generator sets is less than the cost of power from the grid—that’s when we run these engines,” Landon says. “And from what we’ve seen, that is usually during the summer peak days.”

The Ontario Power Authority places high value on the heat component of CHP plants, and views electricity as a byproduct. CHPSOP 2.0 participants must demonstrate that projects can achieve a useful heat output percentage of no less than 30 percent annually, starting after the third contract year.

Enwave Energy Corp. provides district heating and cooling to over 160 commercial customers in downtown Toronto via a 40-kilometer (25-mile) network of underground pipes that provide steam and chilled water. Using water drawn from Lake Ontario, a closed-loop DLWC system recycles energy from downtown buildings by pumping over 80,000 gallons of

water per minute at its peak to over 70 large customers and depositing that heat into the City of Toronto’s potable water system. Enwave currently has the capacity to air condition over 3.4 million square feet of office space, with ambitions to grow significantly.

“Toromont Cat, our local dealer, really stepped up and brought in all their expert personnel to get these pieces of equipment up and running and hit our aggressive project deadlines,” Landon continues. “Their technicians were very reliable, as they provided us with plenty of help right through our commissioning process to make sure that we had no problems or issues.”

The Cat dealer will provide regular preventive maintenance on the generator sets as part of a five-year Customer Support Agreement. Enwave is counting on the technical expertise of Toromont technicians to provide timely service when needed.

“We’ve had no complaints or problems at all,” he says. “It’s the dependability that we’ve come to expect from Caterpillar and our Cat dealer.”

For more information, please visit cat.com/powergeneration



G3516H gas generator sets