



AIRSIDE / APPLIED / CONTROLS / SERVICE / SPECIAL SOLUTION / TOTAL SYSTEM / UNITARY

Case Study – University of Toronto

EDUCATION / HEALTH CARE / LODGING / MANUFACTURING / OFFICE BUILDING / RETAIL / SPECIAL



School “Goes Green” with PureComfort™ 240M Solution

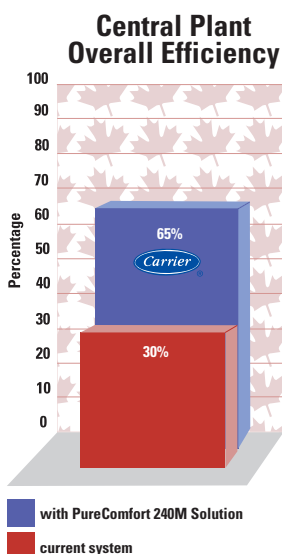
Project Objectives

Under the banner of “Grow Smart, Grow Green,” University of Toronto Mississauga’s Centre for Emerging Energy Technologies recognized a need for a cohesive Canadian approach to commercialization of green energy products. This effort dovetailed nicely with the ongoing drive to improve campus sustainability and ameliorate the overall environmental impact of campus development. As a microcosm reflecting the impact of urban growth, UTM will act as a living laboratory for the application and evaluation of a wide range of new energy technologies.

Solution

The PureComfort™ 240M Cooling, Heating and Power Solution is a high-efficiency, low-emissions supplement to central plant power. This innovative system features a 110-ton, double effect absorption chiller that provides space cooling in the summer and space heating in the winter. The chiller is powered by waste heat from four 60kW UTC gas microturbines, which provide up to 240kW of reliable power year-round. The result is year-round, efficient and reliable heating and cooling with a much lower demand off the electrical grid.

Utilization of the thermal output of the 240M unit to heat the Central Utility Plant and pre-chill for the campus’ main chiller will increase overall plant efficiency to about 65% — compared to the average 30% realized with the current system.





Case Study – University of Toronto *continued*



Microturbines (above) and the Absorption Chiller (below) are integrated to create the PureComfort™ 240M Solution



Project Synopsis

The University of Toronto (U of T), founded in 1827, is the largest university in Canada with a student population of over 63,000 throughout the three major campuses located within the Greater Toronto Area (GTA). U of T is the 16th largest employer in the GTA. The university is undergoing a one million sq. ft. expansion consisting of new classrooms, research facilities, libraries and residences. The university's Mississauga campus, or UTM, is located on 224 acres of greenbelt land.

Upon learning of the PureComfort 240M product offering, UTM — in partnership with Ontario Power Generation (OPG) — invited UTC Power* and Carrier to present their offering in greater detail. The combination of Carrier's proven cooling technology with cutting edge energy technology from UTC Power was compelling to U of T and OPG. Carrier Commercial Service's (CCS) ability to deliver the product as a turnkey job and serve as a single point of contact closed the deal.

The PureComfort 240M's four turbines, driven by high pressure natural gas, will produce up to 240kW and be tied into the university's electrical power grid. The Central Utility Plant's (CUP's) existing Carrier chiller plant will be supplemented with up to 110 tons of chilled water from the PureComfort's 16DN chiller/heater. The CUP will be equipped with two Carrier 39 series air handlers to heat the CUP, using available heat from the 16DN chiller/heater in the winter months. Carrier Comfort Network (CCN) controls will tie in the entire system, featuring a central front-end monitor with customized graphics. The system will use live metering to track realtime savings, both environmental and economic.

Localized generation of electrical energy represents an immediate efficiency gain of 10% through foregone transmission and distribution losses. Utilization of the thermal output of the unit to heat the Central Utility Plant and pre-chill water for the campus' main chiller will more than double overall system efficiency to about 65% — compared to the average 30% realized with the current system. Part of the project cost was paid for by OPG. But savings on energy that would otherwise be purchased from the main grid will provide a payback period for UTM's investment of less than two years, before inclusion of system efficiency savings.

By focusing on the role of high efficiency Combined Heat and Power systems in achieving sustainable campus growth, University of Toronto is adding environmental leader to its community and education leader roles. By using CHP technology to help save resources and money on its own campus, it is living by the dictum "think globally, act locally."

**UTC Power is a division of United Technologies Corporation.*

Project Summary

Location: Mississauga, Ontario

Project Type: Modernization

Building Age: 37 years

Building Type/Size: University

Building Usage: Lecture halls and administrative offices

Objectives: To demonstrate innovative and cost effective emerging energy technologies

Major Decision Drivers: Experience with Carrier engineering and Carrier Commercial Service turnkey execution

Design Considerations: Existing plant room constrains

Total Power: 240kW electricity, and 110-tons cooling or 900MBH heating

Equipment: PureComfort 240M consisting of four microturbines and one Carrier 16DN absorption chiller. Two Carrier 39 series AHU, CCN controls

Consulting Engineer: Mancini, Saldan and Assoc. Ltd.

Unique Features: Use of microturbine waste heat to drive facility heating and main chiller precooling

Project Cost Range: \$1 to 1.5 million CDN

Installation Date: Fall 2004