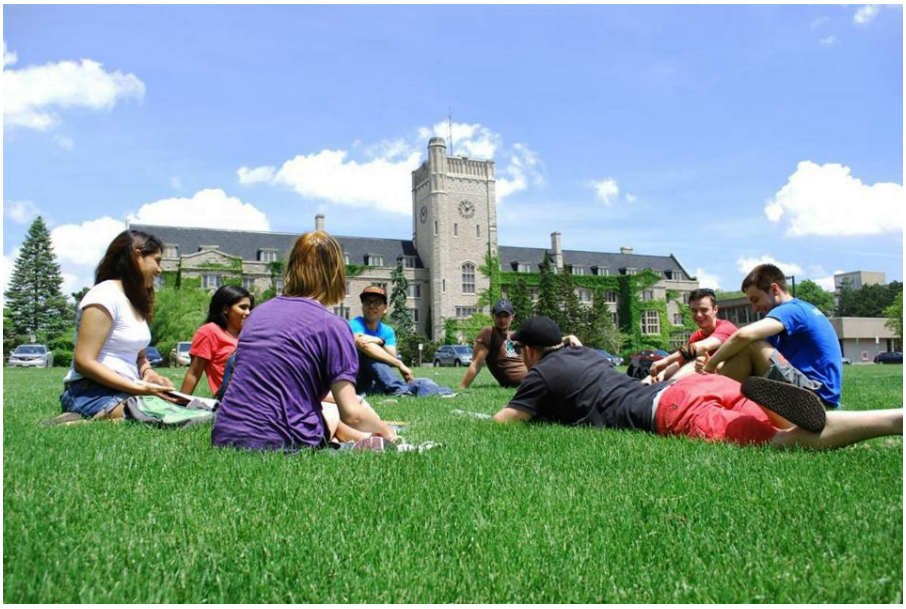
The University of Guelph
'The Green Gryphon Initiative' EPC

Address (Map): 50 Stone Rd E, Guelph, Ontario N1G 2W1 Canada
Sector: Educational
MCW Office: Toronto
Sub Categories: College & University
Delivery Type: Energy Performance Contract
Status: In Construction



Project Initiated In:
2011

Project Cost:
$26,200,000

Scope of Project:
62 Buildings - 6 Million Square Feet

Annual Energy Savings:
$2,600,000

Annual GHG Emissions Reductions:
4,700 Tonnes eCO2

Project Description

The University of Guelph is proud of its history of building, maintaining and operating the best possible campus for its community to live, learn and grow. This includes a focus on resource use in an effort to reduce expenditures, carbon emissions and water usage.
The University's current energy project – 'The Green Gryphon Initiative' – is a $26.2 million investment in sustainability and energy improvements. The project includes many innovative and challenging measures, including a campus chilled water Thermal Energy Storage System - one of the largest utilities projects ever undertaken at the University.
The Green Gryphon Initiative is delivered in partnership with MCW Custom Energy Solutions under an Energy Performance Contract (EPC), wherein MCW provides a guarantee on the total Project Cost and annual Savings over the entire term of the Project.

Featured Energy Management Solution: The Thermal Energy Storage System:

What is it?
The Thermal Energy Storage (TES) System is an energy performance and infrastructure improvement to the University's chilled water district cooling system. It's essentially a huge battery, anchored by a 22 million litre chilled water thermal storage tank that feeds water to the University's Central Utilities Plant and, from there, the campus' chilled water network.

How does it work?
The TES tank is charged at night by the chillers in the Central Utilities Plant, when Ontario's electricity price and the grid's carbon footprint are reduced. By early morning the next day, the chilled water is ready for discharge to meet up to 58,000 ton/hrs of Campus cooling loads.

Role in Ontario's Energy Market
In Ontario, the Independent Electricity Systems Operator's (IESO) 'Global Adjustment' (GA) mechanism incentivizes large Class A users to proactively manage their electrical demand through demand control strategies triggered by price signals and grid constraint forecasts.

The TES System allows the University to shift up to 5MW of electrical demand from daytime peak hours – during which grid and demand charges are highest – to nighttime off-peak hours. The IESO rewards this shift in demand profile as it enables Ontario to defer the need

for new distribution and generation infrastructure. At the University, the shift in demand results in a significantly lower electricity bill and an indirect reduction in its campus carbon footprint by using the offpeak electricity predominantly supplied by Ontario's cleaner baseload mix of nuclear and hydro-electric generation.

Performance Results & Business Case

The TES System was fully operational starting in 2016. So far, it has demonstrated significant over-performance, with first year performance of 5MWe in reduced demand during the five GA hours, resulting in a cost avoidance of $2.5M at current rates. In addition to strong cost avoidance performance, the business case for the system was further enabled by the IESO’s $5.1M funding contribution.

Project Highlights:

- A new Thermal Energy Storage system that will meet all of the campus' cooling requirements and reduce peak summertime load electricity demand by up to 5MW. The system uses a 22 million litre chilled water thermal energy storage tank connected to the Campus’ chilled water network. The TES system's tank is charged at night by the chillers, when electricity prices are at their lowest. The chilled water is then ready the next morning for discharge to meet the Campus cooling loads.
- Extensive LED lighting retrofits and lighting controls upgrades, particularly in the Gryphon Centre Athletic Building, where lighting loads were reduced by over 50% while simultaneously improving light level flexibility for indoor sporting activities.
- The project is part funded by University of Guelph's Student Energy Retrofit Fund of $10 per student, per term - a contribution matched by the University on a 1-to-1 basis.
- The student-driven Energy Awareness Campaign - The Green Gryphon Initiative - adds visibility to the project and helps build a culture of energy conservation on campus among students, faculty, and the broader campus community
- MCW also supports other Green Gryphon Initiative projects on campus such as the Raithby House rooftop Solar PV installation and a Bike Shelter complete with a green roof.