



TUNDRA EDUCATION CENTRE



CASE STUDY: Mount Royal University

PROFILE
Reduce carbon footprint and bring boilers into compliance with local gas code

CHALLENGE
Make boiler upgrades without displacing any staff, students or programs

SOLUTION
Replace the burners and add advanced controls to two existing boilers

RESULTS
More than 10% increase in boiler efficiency and significant reduction in greenhouse gas emissions

Boiler Retrofit the Right Solution at Mount Royal University

By Cleaver Brooks | 

Mount Royal University (MRU) in Calgary, Alberta, Canada, has a full-time student population of more than 10,000. Founded in 1910, the university moved to its current 118 acre suburban campus in 1970.

Like many educational institutions, Mount Royal University is committed to reducing its carbon footprint and operating in an environmentally responsible way. One of the long term goals of the university's corporate energy management program is to reduce energy consumption on campus.

In 2015, Owen Zarazun, director of Facilities Operation at Mount Royal University, asked Calgary-based Tundra Process Solutions for recommendations about retrofitting the two 800 HP Cleaver-Brooks steam boilers that had been operating for 35 years.

"We already had a good investment in the Cleaver-Brooks steam boilers," said Zarazun. "They are quality boilers in great condition for their age. It did not make sense to demolish a good product. Rather, we wanted to modernize the plant along with auxiliary systems."

Aleksei Myroniuk, technical sales representative for Tundra, agreed that the two boiler pressure vessels at Mount Royal University were in good shape, which made retrofitting an option.

Tundra then presented a plan to MRU showing how retrofitting the plant's two boilers would help to increase efficiency and reliability while also bringing the units into compliance with the local gas code. In addition, the plan recommended modernizing the controls and integrating the equipment into the plant's building management system (BMS).

In addition to retrofitting the boilers, MRU wanted to upgrade its plant, so it consulted with Canadian consulting engineering firm Smith + Anderson. Regan Moffat, principal of the Smith + Anderson Calgary office, proposed a plan that included recommendations such as heat exchanger and pump replacements.

"Our project cost was less than what it would have been to do a boiler replacement with a similar end result. There was also a quicker turnaround, so we realized the savings sooner."

– Owen Zarazun, Mount Royal University

Construction began in the summer of 2016 and was completed in several phases throughout a six-month period. Final commissioning was in January 2017.

"As with any retrofit project, there are always challenges," commented Moffat. "At the end of the day, Tundra and Cleaver-Brooks worked with Mount Royal to overcome them, and the client is happy. They met their main goals of increasing plant efficiency, increasing reliability and having more control options."



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CSA B149.3 Compliance

- This is a government safety code for fired appliances in Alberta. **Check to see if your insurance company is happy with your existing infrastructure**
- Tundra boilers and packaged boiler upgrades are pre-approved for CSA B149.3 compliance
- Tundra will arrange for the inspection and regulatory compliance of your boiler room
- **Tundra clients have saved over \$400,000 in annual gas costs by upgrading their Burner Management System (BMS).**
- To learn more about Tundra's products and solutions, please visit <https://www.tundrasolutions.ca/>

Boiler Retrofit the Right Solution at Mount Royal University

During the retrofit process, the university did not have to displace or relocate any staff, students or programs.



"No one on campus had a clue that we were doing this project as there were zero service interruptions," said Zarazun. "This is key when working on any centralized system."

Facility personnel really like the functionality of the Hawk 4000 control, especially the fact that it ties into the plant's central BMS. The control provides plant management more information and better controllability.

Zarazun estimates that the retrofit has increased boiler efficiency by more than 10 percent, and upgrades to the central steam plant have increased its efficiency by as much as 30 percent. As a result, MRU's operating costs decreased by \$385,885 the first year of operation. At the same time, the upgrades renewed critical infrastructure at the university.

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The project also met Mount Royal University's goal of minimizing its impact on the environment. The plant and boiler upgrades reduced the university's greenhouse gas emissions by 1,895 tons of carbon dioxide equivalents. These reductions correspond to 406 cars not being driven for a year, 205 homes not using energy for a year, and 2,232 acres of forest preserved from deforestation.

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<https://tundrasolutions.ca/ac-catalog-item-tags/cleaver-brooks/>