Case study

Lakehead University

Thunder Bay, Ontario

Ontario's Lakehead University tackles sleeping giant of deferred maintenance

Lakehead University lies near the western end of Lake Superior under the watchful gaze of the Sleeping Giant, an ancient rock sentinel marking the entrance to the rugged Canadian Shield. The University offers a comprehensive range of graduate and undergraduate programs to over 7,600 students, 49% of whom come from Northwestern Ontario, and 51% from Southern Ontario and beyond. It also has one of the highest numbers of Aboriginal students of any university in Canada (approximately 13%). With eight Faculties including the Northern Ontario School of Medicine (west campus) and a new campus in Orillia, Ontario, Lakehead University has been ranked by Maclean's magazine as Canada's top university in the "Value Added" category five times, most recently in 2006.

Challenges

- Replace aging building systems that had been deteriorating and requiring too much energy to operate
- Fund these major infrastructure upgrades with very limited financial resources
- Improve indoor comfort conditions for students, faculty and visitors

Johnson Controls solutions

- Replace the campus heating system and central plant chillers, upgrade lighting systems, and perform asbestos abatement
- Finance $23.3 million worth of improvements via performance contracting, in which the capital investment is paid for through the energy savings they generate

Johnson Controls

Lakehead's Advanced Technology and Academic Center (ATAC): One of Canada's most advanced teaching and learning environments.

"Years of significant underfunding, combined with our location away from the large urban centres of the south, have compelled us to be more efficient, more effective, and more creative."

Dr. Frederick F. Gilbert
President, Lakehead University

- Provide on-site service support to maintain comfort throughout the campus and identify further energy savings opportunities

Results

- Guaranteed annual energy savings starting at $1.3 million and accruing to $30.9 million over the twenty-year contract term
- Actual energy savings **exceeded** the guarantee by 45% after the first year
- Provided long-overdue building system improvements without tapping into Lakehead University's capital budget
- Freed funds for a new university entrance via a new road designed to reduce traffic congestion
- N_2O and SO_2 emissions were reduced by 4,600 tonnes annually

As the 21st century approached, Lakehead University realized that the status quo would no longer be acceptable. Officials identified $44 million of infrastructure improvements that needed to be made, but the capital funds were not available. Dr. Frederick F. Gilbert, president of Lakehead University, admitted that Lakehead was "literally at risk, in terms of being able to maintain the work environment."

Lakehead's steam-powered central plant was outdated and very inefficient. Its 40-year old chillers were near the breaking point, full of CFC-emitting R-11 refrigerant. Lakehead's lighting systems were using original technology and configurations, demanding significantly more electricity than newer lighting systems. In an effort to renew this educational northern light, and to tackle its sleeping giant of deferred maintenance, Lakehead University enlisted the help of Johnson Controls to reinvigorate the 41-building campus environment.

Lakehead officials were impressed with the Johnson Controls method of collaboratively examining the University's needs and developing a long-term solution. Together, they established a partnership to tackle $12.3 million of the deferred maintenance backlog.

Eye-opening experience

James Podd, Lakehead's Physical Plant Director, said Johnson Controls' comprehensive approach enabled the University to "look at things we normally wouldn't do, or even consider," such as completely decommissioning the central plant, while switching from steam heating to a highly efficient hot water heating and distribution system. Standalone hot water plants were installed in remote buildings where it made sense. The Phase I project also included replacing the University's aging central plant chillers. In all, these improvements will generate annual savings of $830,000.

The initial phase was completed in less than one year, at which point the University Board immediately gave the go-ahead for another $11 million worth of improvements. In Phase II, Johnson Controls replaced and updated lighting systems, and directed long-avoided asbestos abatement programs across

the campus. When complete in June 2007, Phase II will produce an additional $640,000 in energy savings, which Lakehead earmarked for a new road designed to divert traffic away from the main entrance. This will increase accessibility to the growing campus. As Dr. Gilbert noted in 2005: "The savings generated from the second phase will allow us to generate sufficient fiscal resources right now to put a new entrance into the University to develop the ring road for traffic circulation."

Lakehead also has engaged Johnson Controls to provide full-time, on-site support through a long-term service agreement. The company maintains a local presence in Thunder Bay through an Authorized Building Services arrangement with a reputable local contractor that will keep the new equipment operating in peak condition.

Noticeable improvements

Around campus, people are beginning to see positive results. Geology Professor Graham Borradaile immediately noticed the improvements in the recently completed Centennial building. "Thank you for the vastly improved lighting in our laboratories," he said. "More importantly, the 'always-on' safety light is a necessary and welcome safety factor, for which we have waited many, many years."

With the "sleeping giant" of deferred maintenance well under control, Canada's Lakehead University is now better positioned than ever to provide the best in education and scholarly research for northwestern Ontario and beyond.

Dr. Gilbert is especially proud of the University's accomplishments: "Years of significant underfunding, combined with our location away from the large urban centres of the south, have compelled us to be more efficient, more effective, and more creative. Lakehead's motto, **Achievement Through Effort,** reflects the essence of this drive and visionary spirit."

Students are beginning to notice Lakehead's efforts.

FRP pipe dramatically reduced installation problems.

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