



TD CANADA TRUST- CREDIT VALLEY TOWN PLAZA

6051 CREDITVIEW RD, MISSISSAUGA, ON

2016 CANADIAN CONSULTING ENGINEERING AWARD SUBMISSION

Submitted by: Integral Group



PROJECT INFORMATION

Project Name: TD Canada Trust-Credit Valley Town Plaza

Location: 6051 Creditview Rd, Mississauga, ON

Completion Date: October, 2013

Area: 485 m²

Construction Cost: ~ \$3 Million

Sustainability: LEED Gold Certified (USGBC NC for Retail)

Entering Firm's Role: Integral Group provided Mechanical, Electrical and Energy Modeling services

Contact Name: Mike Godawa, P. Eng. - Managing Principal, Integral Group

Architect: Perkins + Will

General Contractor: Turner Construction

PROJECT SUMMARY

TD Canada Trust has opened its first Sustainable Energy Efficiency Design (S.E.E.D.) branch that has achieved LEED Gold through an aggressive strategy of sustainable design and construction practices. The bank branch is ready to operate as a Net Zero building and the project was delivered through an Integrated Project Delivery process. Integral Group played a key role in ensuring mechanical and electrical systems were part of the 51% energy savings modeled over the reference building.

PROJECT HIGHLIGHTS

INNOVATION:

The goal of this project was to create a prototypical bank branch that would be ready to operate as a Net Zero Energy building. Meaning that the total amount of energy used annually by the building would be equal to the total amount of renewable energy created on the site. (There is also no natural gas service brought to the site making it a zero emissions building). The building currently has bifacial solar photo voltaic (PV) panels on the south facing entrance canopy and on the TD sign tower. Bifacial panels allow the energy from the sun to be absorbed on both sides of the panel. The roof has been designed to accept a complete array of PV panels once the budget is available.

Integral Group worked closely with the entire integrated design team and used modeling software to calculate the scenarios that would produce the most sustainable and energy efficient building within the budget constraints. The final built solution includes the following features:

- A geo-exchange system consisting of 4 - 150m deep boreholes connected to water-to-air geothermal heat pumps was designed to provide heating and cooling to the branch.
- The main banking hall also has a raised access floor allowing for supply air as well as wire management for power and data to desks and teller stations.
- Fresh air is provided by a heat recovery ventilator that transfers heat from outgoing air to incoming fresh untreated air that is 95% efficient.
- Domestic hot water is generated using instantaneous tankless electric heaters which eliminate standby losses that occur with tank heaters.
- Low flow plumbing fixtures were used throughout to reduce water and energy consumption
- A lighting control system was designed to promote daylighting. Artificial lighting is provided when required through the LED fixtures.
- Daylighting and occupancy sensors were used to control the lights
- A high performance building envelope was designed by the architect with RSI 8.8 roof and RSI 7.0 walls. The glazing was designed with a low 'e' argon filled double glazed panel. The glazing is RSI 0.53 and the overall glazing to wall ratio was 34%.

The main difference between this building and other typical bank branches is that it uses much less energy resulting in less equipment and it does not use natural gas as its energy source leading to an prototype of how future commercial buildings should be designed to reduce their impact on the environment.







COMPLEXITY:

The building although small in size had many complex problems to be solved in order to achieve a Net Zero Energy Ready Building. There were 16 energy models created with various options studied including double facades, off-site “cloud” server farm, radiant slabs, air source heat pumps and multiple envelope performance options.

Once the envelope, mechanical and electrical systems were optimized and rationalized with the project budget, the plug loads from the banks equipment became the dominating load. Integral group conducted a detailed plug load study using the list of equipment from the bank and had to research and verify the heat output from the equipment to determine where the opportunities for load reduction were possible. Options were provided to the bank to see if equipment could be reduced or eliminated to help assist the building achieve Net Zero Energy Ready status without affecting their customer service or corporate security.

The TD Canada Trust branch was also Canada’s first multi-party Integrated Project Delivery (IPD) contract in the corporate and commercial market sector. The IPD team, comprised of TD Bank Group, Perkins + Will Architects/Integral Group and Turner Construction came together to optimize project results; increase

value to the owner; reduce waste; and maximize efficiency through all phases of design, fabrication, and construction.

Together, the IPD team delivered a high-quality project with significantly reduced costs, a compressed schedule, and record customer satisfaction ratings when compared to the benchmark from similar corporate workplace projects for this client.

SOCIAL AND ECONOMIC BENEFITS:

The project provided many social and economic benefits to society including educating the public on the innovative use of technology to reduce the environment impact of new buildings.

"Educating our customers on what makes this branch unique is very important and we achieve this in a number of ways," says Scott Hite, head of architecture and design with TD Bank Group. "Employees working in the new branch have all gone through training to not only learn about their new environment, but to enable them to share the story with our customers."

Customers, Hite says, can learn about the sustainable elements in many ways. Employees, while helping with their banking needs, can have conversations, or conduct tours. There is educational material located throughout the branch known as "green leaves" containing sustainable facts. There are digital displays, including an interactive station providing details about all the green features.

From the raised floor system, to the geo-exchange heating and cooling, to solar panels to responsibly-sourced materials, attention to sustainable detail is everywhere. The Integral Group team provided innovative mechanical and electrical system designs which champion TD's sustainability goals for the project. To that end, striving to reach a net-zero energy facility standing, the integration of architecture, engineering and operations is a study of aligning art, science and human factors.

The energy model predicts that the energy saved compared to a reference building is about 51%. If this was compared to a traditional branch it would be even greater.

ENVIRONMENTAL BENEFITS:

The TD Canada Trust Net Energy Ready branch will reduce the environmental footprint in comparison to a typical bank branch. As the building was designed using an integrated design process it was possible to improve the building performance by transferring between typical disciplines budgets to achieve the project goals. For instance the cost of the high performance envelope was partially offset by the reduction in building loads resulting in smaller mechanical systems and in turn smaller electrical power needed for the mechanical systems.

The building relies on natural lighting whenever possible and uses solar power to generate electricity. Geothermal systems help heat and cool the branch, while energy efficient LED bulbs and daylighting & occupancy sensors reduce lighting energy. Regional and recyclable materials have been used in the construction process wherever possible. The wood in the branch has been sourced responsibly. Throughout the building low flow fixtures have reduced water use, and low-energy technology has reduced plug loads. The branch will also rely on rainwater as much as possible to irrigate the community garden.

This TD branch is has achieved the LEED (Leadership in Energy and Environmental Design) Gold certification standard for Retail New Construction (NC) from the USGBC. The USGBC was used as the Canadian Green Building Council (CaGBC) had not yet adopted a standard for new retail buildings.

The energy saved in comparison to the reference building is almost 85,000 kWh/year which is equivalent to 8 typical homes electrical energy use for one year.





MEETING CLIENT'S NEEDS:

Overall the project met the client's goal of achieving a Net Zero Energy Ready building using the Integrated Project Delivery process that serves as a prototype for future bank branches.

"This concept branch merges our commitment to delivering a legendary experience to our customers with our commitment to the environment," said Patricia Romeo, Branch Manager, TD Canada Trust. "The branch combines customer-centric functionality and engaging meeting spaces, so our employees can deliver a unique banking experience and meet our customers' evolving needs."

The flexibility of the bank design including the raised access floor allows the energy efficient branch space to be quickly reorganized to accommodate the growing needs of the local customer base; whether that means adding more rooms for customers to meet with financial experts, or additional teller space to cut down on wait times.

The branch also displays and educates the public on the use of sustainable design techniques including high performance envelope, solar PV panels and geo-exchange technology to reduce the environmental footprint of the banks operations.



