



Ontario Centres of Excellence

Where Next Happens

Modeling Green Roof Technology

"When OCE first came to my office, I was skeptical about whether they could be of any help in this particular area. But they demonstrated the breadth of what they are able to do and their ability to get real results."

Joe D'Abramo, Manager, Environment and Zoning By-law Project, City Planning, City of Toronto

Advocates have always been confident about the environmental benefits of green roof technologies. With the cost of energy rising, and concerns over air quality growing each season, innovations allowing energy conservation have a real opportunity to seize the public imagination. But the initial capital investment necessary to buy and install the technologies – anywhere from 36% to 82% higher than conventional roofs – has stood in the way of their adoption by many but the most committed environmentalists.

Knowing the initial investment necessary was a frequent roadblock for the use of green roofs, Ontario Centres of Excellence (OCE)

Inc., in partnership with the City of Toronto and the Federation of Canadian Municipalities, engaged a team of Ryerson researchers to find a clear way of determining the return on investment for the adoption of green roof technologies. The researchers were charged with the task of developing further insight into the types of available green roof technologies, the measurable benefits of green roofs to the city's environment, potential monetary savings through use of green roofs, and minimum thresholds of green roofs that could be used to inform incentive programs.

The Ryerson team undertook to develop a model to compute the monetary value of green roof benefits and, using a Geographic Information System (GIS) database, extend that cost/benefit analysis on a city-wide scale. The information this kind of modeling produces was previously inaccessible in North America and is now considered novel globally. The model is flexible and can be adapted to any scale, whether it be for use by a private builder or a city planner.

The project envisions a Toronto of the future where, in specific areas of the city, every opportunity for green roof use has been realized. The results would include reduced direct energy use, decreased air pollution, storm-water flow reduction, urban heat

mitigation and more. Beyond these, the benefit to the consumer includes extended roof life, energy consumption savings, and reduced interior noise.

The study showed that hundreds of millions of dollars in savings could be realized by the city both in energy costs and in wastewater infrastructure. As a result of the partnership, green roofs form part of the new City of Toronto Act, and a \$200,000 incentive program has been developed. On a large scale, green roof technology will actually contribute to sustainable development.

OCE was able to connect the City of Toronto with the kinds of innovative thinking that could help them understand more clearly the cost/benefit equation around green roof technologies, and how they might go forward to encourage their use. Through the OCE-supported research and development, the Federation of Canadian Municipalities can more confidently promote the technology to other municipalities based on the findings.

The green roof project considered the long-term sustainability of Ontario municipalities, and the ways innovative thinking might enhance the quality of life and the economic strength of the province. OCE lives these goals in all the partnerships it creates.