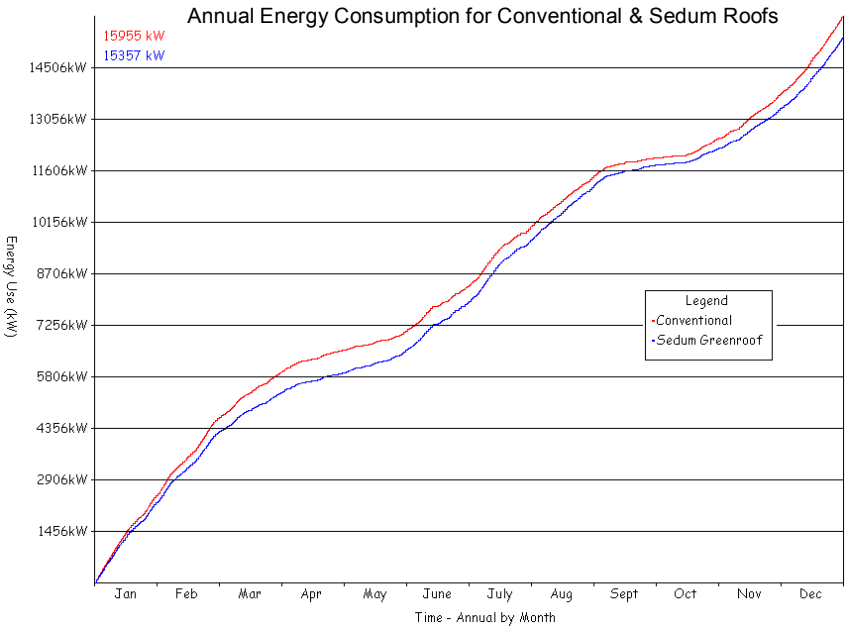
Green Roof Energy Calculator

Sample output from Green Roof Calculator.



Green Roof Energy Calculator

To reduce the energy consumption associated with the heating and cooling of buildings, Environment Canada's Adaptation & Impacts Research Division (AIRD) at the University of Toronto has increased its efforts to investigate the conservation potential of green roof infrastructure in the urban environment.

Using the Environmental Service Performance-Research (ESP-r) model, Dr. Brad Bass and a team of researchers have analyzed building energy consumption for buildings with asphalt roofs as well as intensive and extensive green roofs. The modeling process, however, requires a high degree of commitment due to the detailed nature of ESP-r. Information regarding building dimensions, material and constructions, HVAC operation and climate data are all required to effectively simulate and obtain the energy data. Thus, general inquiries concerning green roof technology and their associated energy savings are impossible to answer without an extensive time and resource commitment to collecting data and model construction.

Given the commitment required to run ESP-r, the Green Roof Energy Calculator is being developed to provide a rapid estimate of energy savings associated with a green roof for a range of generic building types.

It is appropriate for individuals conducting exploratory assessments of green roof energy benefits before committing to a customized simulation. The Green Roof Energy Calculator will allow the user to graph and output building temperature fluctuations and total energy consumption according to:

Building Type - Each building type is modeled after their real-world counterpart directly from the architectural floor plan and materials used in construction. Building types range from 3-story town homes to 5-story office buildings.

Roof type – These include asphalt, extensive green roofs and intensive green roofs.

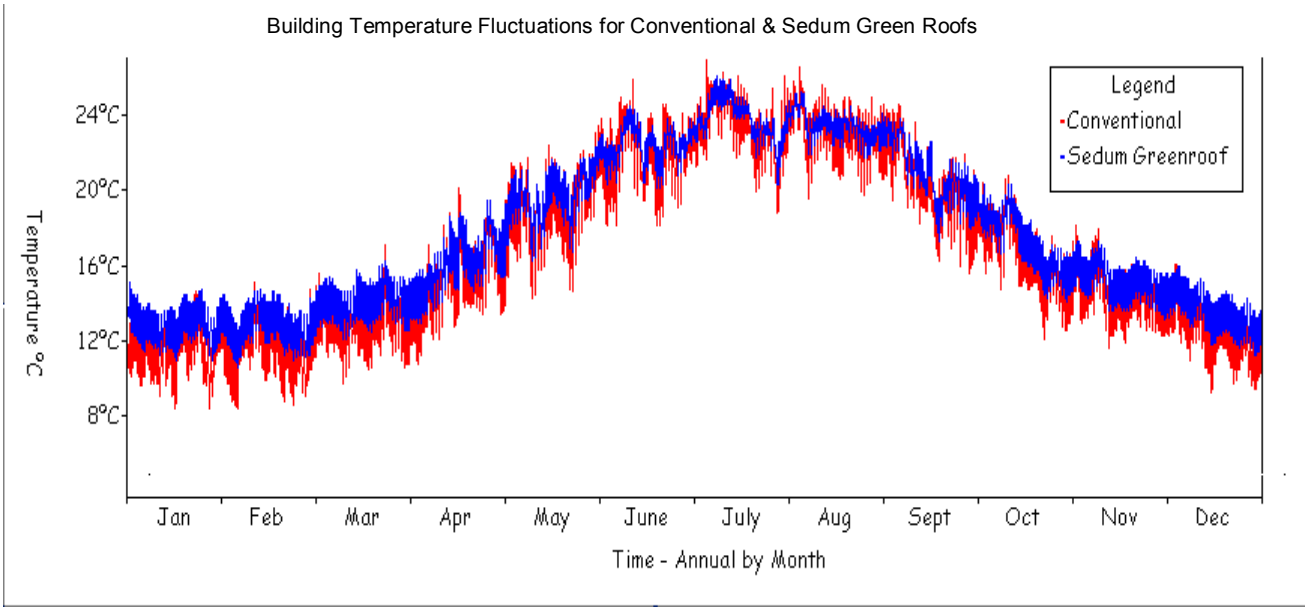
City – Green roof performance has been simulated in several cities including Vancouver, Calgary, Ottawa, Toronto, and Halifax. Other cities are planned for the final release.

Time Step – Spring, Summer, Autumn, Winter or Annual

Custom Simulation

The option of a custom made-model in ESP-r is available to individuals who are interested in a greater level of building detail. For a custom simulation, the modeling information used would be specific to your building dimensions and HVAC system. For more information regarding customization, please contact Brad Bass.

Sample output from Green Roof Calculator.



An Overview: Adaptation and Impacts Research Group

The Adaptation and Impacts Research Division (AIRD) was created by Environment Canada in 1994 under the auspices of the Meteorological Service of Canada. AIRD staff conducts research on:

- socio-economic and ecological vulnerability to climate change and extreme weather
- the impacts of climate change and extreme weather in Canada and other regions across a broad range of sectors
- adaptations that might emerge or might be planned in response to these impacts
- tools to generate high resolution and extreme event climate change scenarios
- policy responses to climate change

Contact Information

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Project Initiative: Dr.Brad Bass

Brad Bass is the Manager of the Climate Change Scenarios Network and a complex systems theorist with the Adaptation and Impacts Research Division, located at the University of Toronto. Brad received his Doctorate in Geography at Penn State University. Brad's PhD thesis dealt with the amount of information available in climate data and weather forecasts and the applications to pest management.

Since joining Environment Canada, Brad has conducted research in agricultural climatology, risk assessment of water resources under climate change, downscaling of climate data for local impacts assessment and decision making and incorporating uncertainty into decision making.

Brad's current research interests include ecological engineering, particularly the use of vegetation to reduce the impacts of climate change, adaptation of the energy sector to climate change and self-organizing systems.