

Energy, the Great Acceleration, and the Future of Technology

Dr. Umberto Berardi
Ryerson University, Canada

Office buildings are responsible for a substantial portion of the energy demand in the commercial sector. To better understand and address the impacts of climate change on building energy demand and comfort levels, this keynote will present studies done in different regions (cool-humid, cold-humid, and very cold climate zones) of Canada using climate projections for the 2056-2075 period. This work also investigates the effect of extending thermostat setpoint, as a demand response strategy, on reducing energy demand under future climate conditions. The results indicate a decrease in the heating demand and an increase in the cooling load because of the warmer temperatures on average across Canada. However, the magnitude of change varies significantly among the different selected climate zones (5, 6, and 7). In addition, extending the temperature setpoints would reduce the average energy demand by 8.0-19.2% in Quebec City, 1.8-9.0% in Toronto, and 1.8-9.6% in Vancouver. Finally, the greenhouse gas emissions linked to space heating and cooling of the office building model are determined, illustrating the critical need to transition to low-carbon sources of energy, especially in areas with high emission factors.