

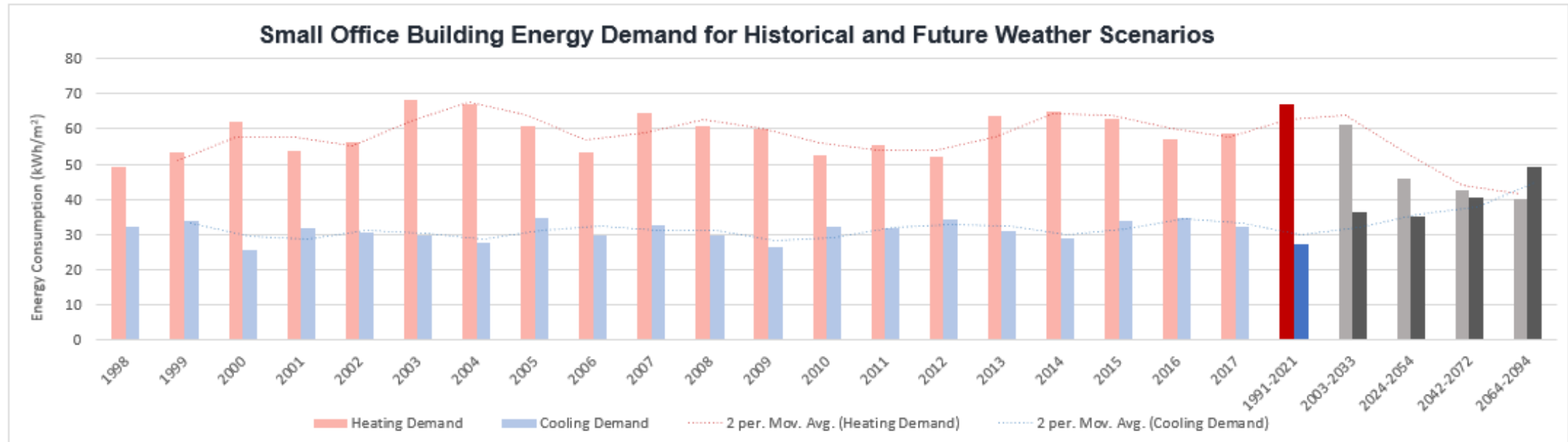


More Cooling in the Future? Opportunities not to Miss.

Presented by Valerie Fournier
M.A.Sc Student in Building Engineering
Concordia University

Impact of Climate Change

Small Office Building (NECB 2020)



Future Weather Scenarios



Cooling Energy Demand

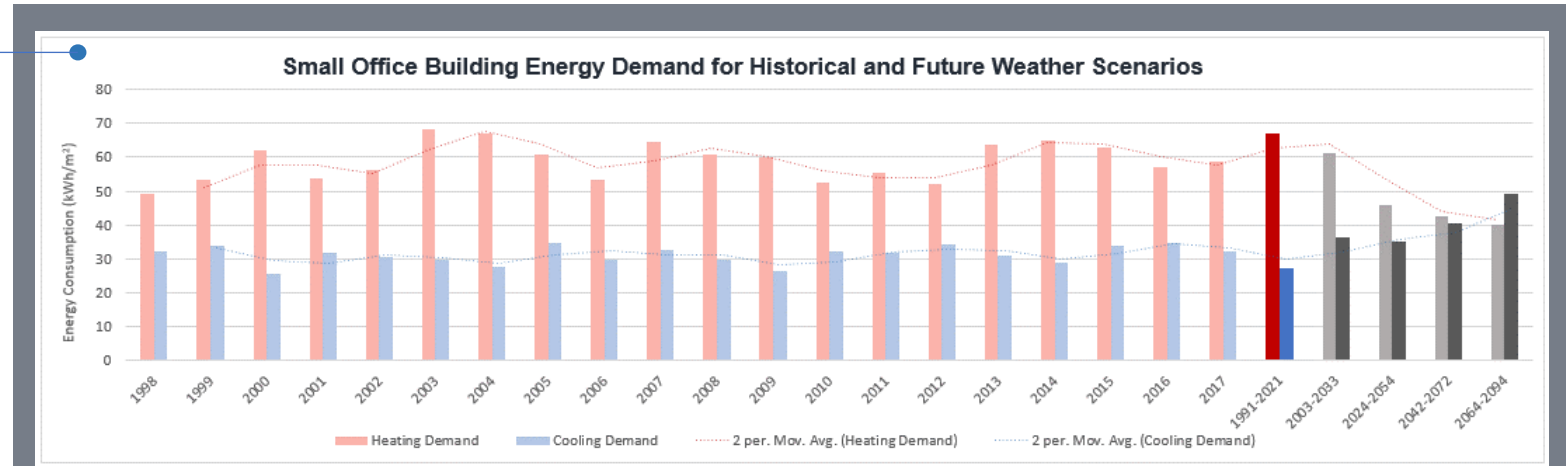


Heating Energy Demand

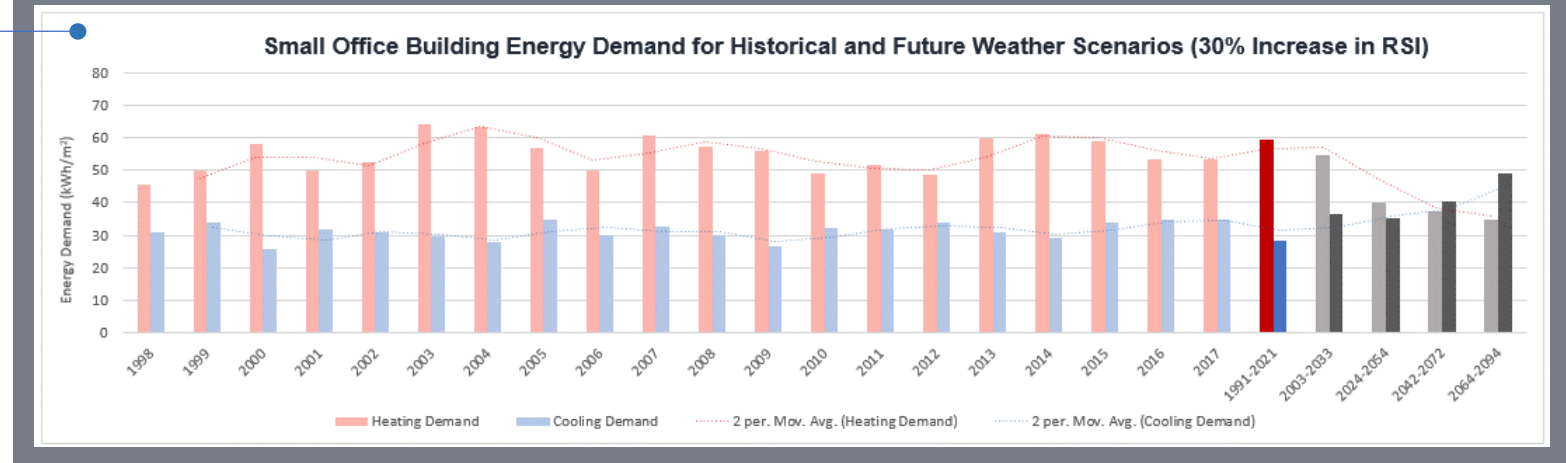


Impact of Higher Insulation Level Small Office Building

Energy Demand (NECB 2020)



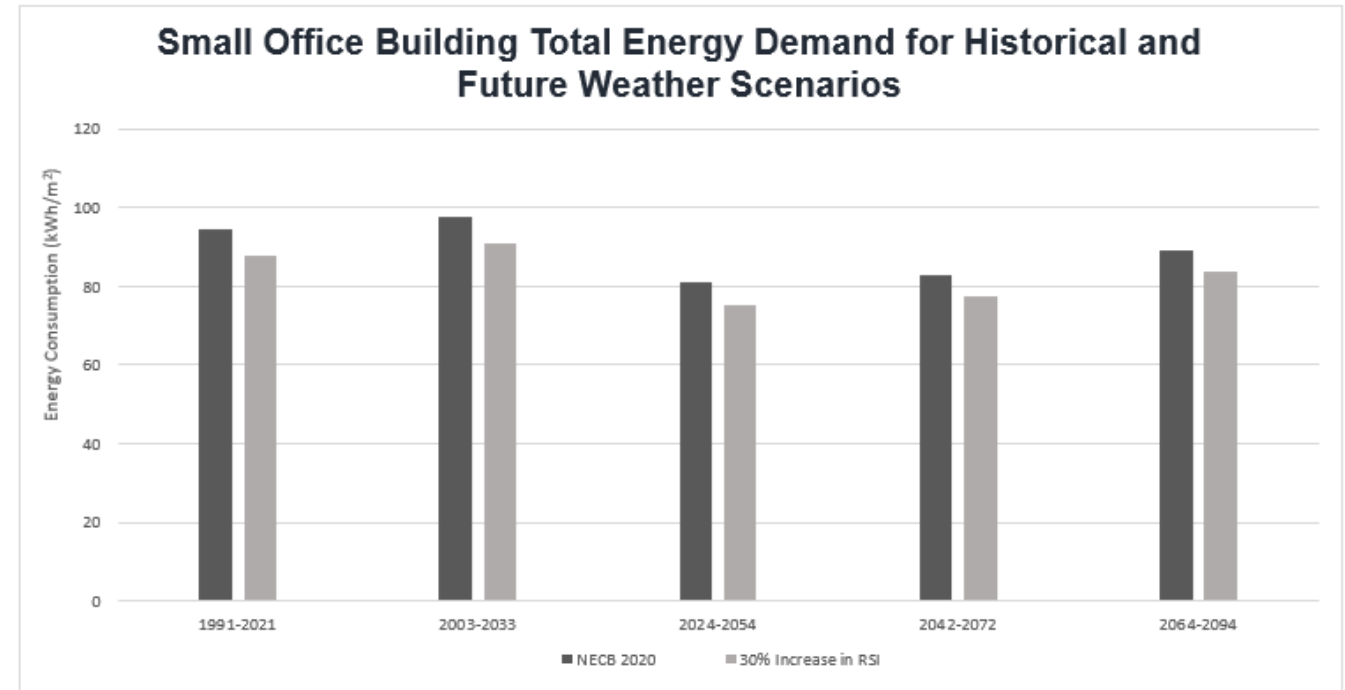
Energy Demand (30% Increase in RSI compared to NECB 2020)



Impact on Total Energy Demand

Small Office Building

- The total energy demand in the future weather scenarios is less than historical
- Small increase from the year 2042 to 2064 due to higher cooling demand from hotter temperatures.



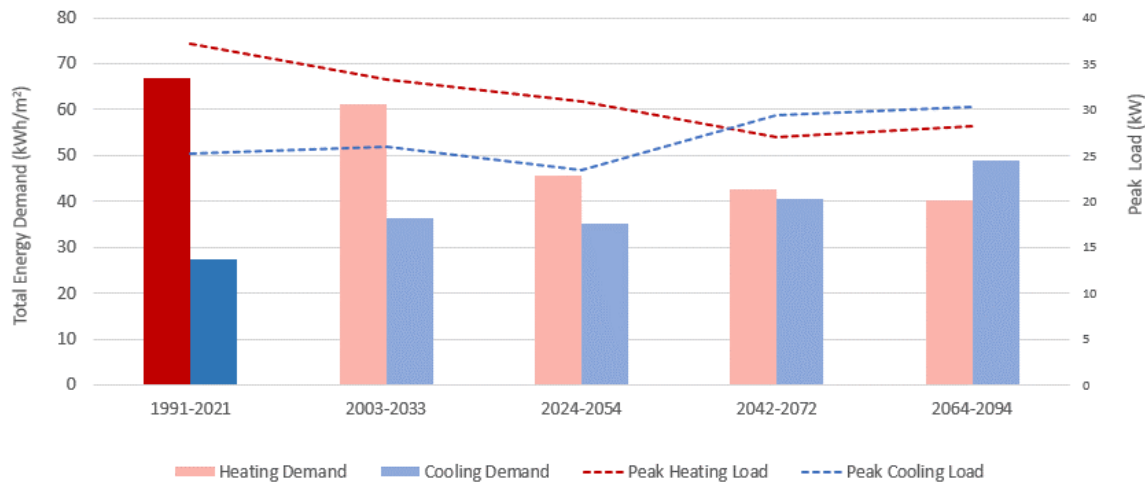
Impact on Peak Loads

Small Office Building

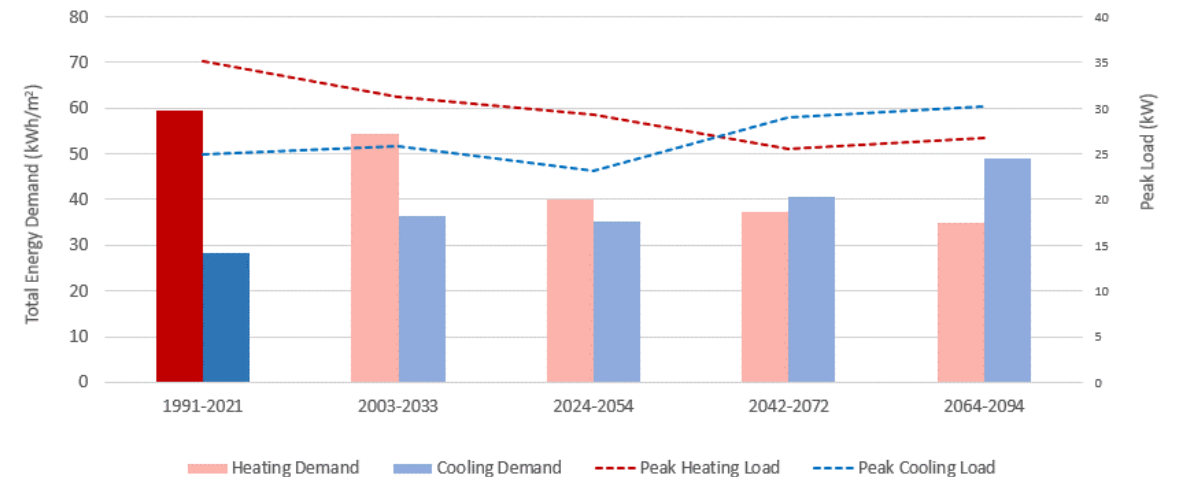
NECB 2020

30% increase in RSI
compared to NECB 2020

Small Office Building Energy Demand and PEAK Loads for Historical and Future Weather Scenarios (NECB 2020)



Small Office Building Energy Demand and Peak Loads for Historical and Future Weather Scenarios (30% increase in RSI Compared to NECB 2020)



Opportunities of a Balanced System Ground Source Heat Pump

Impact of Future Weather Scenarios

Balanced Heating and
Cooling Energy Demand



Opportunity for use of GSHP

Balanced Soil
Temperature

Balanced Heating and
Cooling Peak Loads



Balanced Heat
Pump Sizing

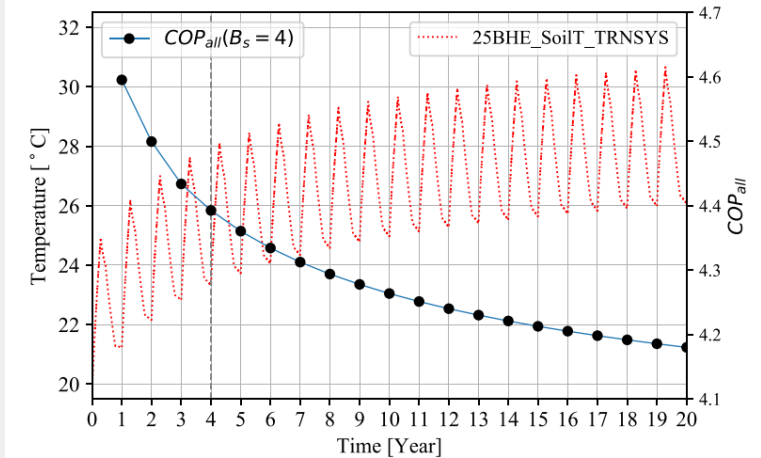
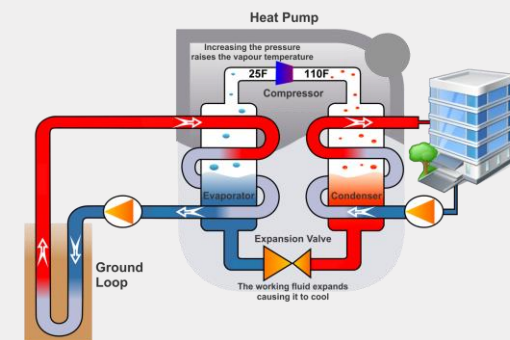


Fig. 3. Variation of the average storage temperature predicted by TRNSYS over 20 years.

Cai, W., Wang, F., Chen, S., Chen, C., Hu, D., Kolditz, O., & Shao, H. (2022b). Importance of long-term ground-loop temperature variation in performance optimization of Ground Source Heat Pump system. *Applied Thermal Engineering*, 204, 117945. <https://doi.org/10.1016/j.applthermaleng.2021.117945>





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Thank you!