SSRIA
SMART SUSTAINABLE RESILIENT INFRASTRUCTURE ASSOCIATION

GREEN BUILDING TECHNOLOGY NETWORK

Evaluating Innovative NZE/NZEr MURB Design and Impacts of Large-Scale Implementation to Utility Grid

Project Lead: Landmark Group of Companies Inc.

Project Partners: University of Alberta, Solarmax

Building Owner: Sierra Holdings at Maple Crest

The housing Industry has been striving to reduce energy consumption and to minimize the environmental Impact of residential buildings for over a decade. While over 500 Net Zero Energy (NZE) and Net Zero Energy Ready (NZEr) homes have been constructed across Canada, most of these homes are customized single-family homes for early adopters who have the financial capacity to afford the additional costs of NZE upgrades. For Multi-Unit Residential Buildings (MURB), it is more challenging to achieve NZE/NZEr as many home buyers are price sensitive and the limited roof area can only accommodate a small solar PV system for each unit, requiring dramatic reductions in energy use. However, the opportunities to further Improve the building envelope are limited and not cost-effective due to the smaller wall to floor ration. To achieve 40% greenhouse gas emission reductions by 2030, the housing industry needs an affordable and replicable solutions for MURBs.

Location
Edmonton

Project Dates
09.20 – 04.22

Sector
Residential

New
Construction

GHG Emission Reduction
59 t/yr

Energy Use Reduction
36%

ABOUT SSRIA

The Smart Sustainable Resilient Infrastructure Association (SSRIA) is fostering collaborative partnerships across the Architecture, Engineering, Construction (AEC) industry that apply innovation to reduce energy consumption and greenhouse gas (GHG) emissions in the built environment while positioning Canada as a global leader in innovative design and construction.

The Green Building Technology Network is jointly funded by the Alberta Innovates Clean Resources - Clean Technology Program and Western Economic Diversification Canada.

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PROJECT SUMMARY

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Another major obstacle for widespread and community-scale NZE and NZEr home implementation is the capacity of the electrical grid. Most NZE homes built are all-electric, using electric air source heat pump (ASHP) as the heating source for space and water heating. Although the overall energy consumption of a NZE and NZEr home is minimized via utilization of advanced building technologies, the peak loads of these homes at severe conditions are generally higher than the peak loads of conventional code compliant homes. In Edmonton, a typical home requires 100 amp service while a NZE home generally needs 150-200 amp service to accommodate the added electricity loads of space heating, as well as to support peak generation of large roof-top solar PV systems. A large-scale implementation of NZE and/or NZEr homes in a community will significantly change the load profiles that the grid must service and may lead to remarkable cost increases in site serving.

The primary goals of the project are:

1. Demonstrate and test an affordable and replicable solution for multi-Unit Residential Buildings (MURB) to achieve NZE and/or NZEr performance
2. Develop a generic simulation tool to predict and analyze the aggregate energy profile of highly energy-efficient MURBs and distributed solar PV systems on a community level.

PROJECT TEAM

LANDMARK HOMES

SOLARMAX POWER INC

UNIVERSITY OF ALBERTA