

Building a sustainable future with a **clean Virtual Power Plant solution**



Alectra's Power.House Hybrid pilot shifts energy generation from large centralized GHG emission-intensive sources to decentralized, clean generation using solar panels, in-home EV charging stations, battery storage, dispatchable hybrid heating (dual fuels, gas and electric), and combined heat and power (CHP). Alectra is collaborating with Enbridge, the City of Markham, and Ryerson University to deploy the technology across 10 Markham, Ontario homes. Local controls will optimize the electrical and hybrid heating technology to minimize GHG emissions within the home, any electricity not used is fed into the provincial grid to power neighbouring communities with clean energy.

The project will deliver innovative change to the electricity system with clean and digitally managed generation technology acting as a “mini” virtual power plant across participating homes. Power.House Hybrid reduces GHG emissions, lowers customer bills, and optimizes energy flow from and to the grid.

Innovating & Collaborating together to:

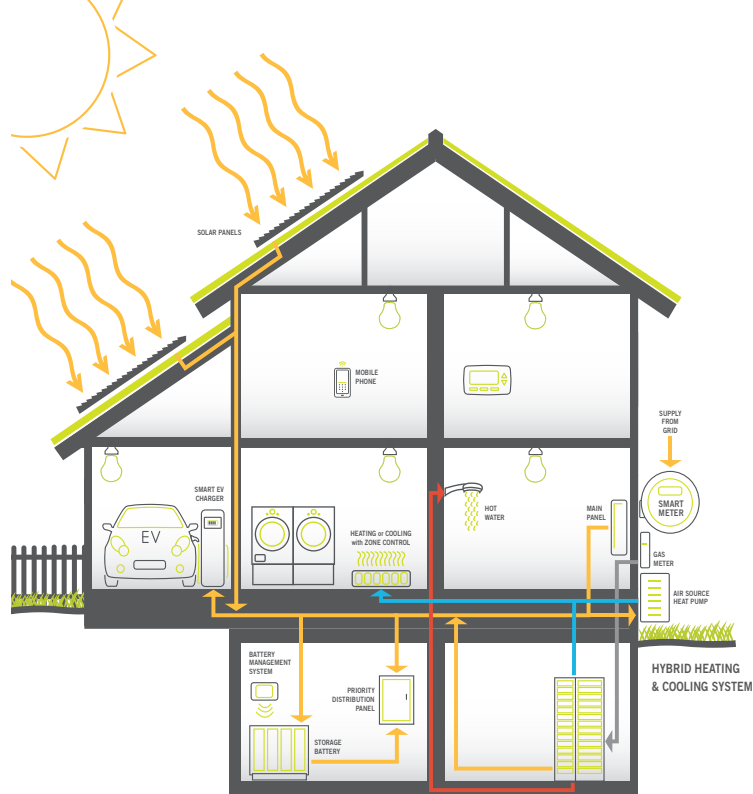
- ✓ Deliver innovative change to Ontario's electric system
- ✓ Develop and test cloud-based energy management solutions
- ✓ Lead the shift from GHG-intensive centralized power generation to decentralized, clean generation

The Challenge

Individual use of distributed energy resources (DERs) such as solar PV, air source heat pumps and other emerging energy technologies can reduce household greenhouse gas (GHG) emissions but are insufficient by themselves to meet GHG reduction targets either locally or Canada-wide. The challenges include: 1) improving household energy usage to achieve significant reductions in household GHG emissions while still meeting all energy needs; and 2) finding ways to improve the sustainability, reliability, and resilience of the power grid using home-based renewable DERs.

The Solution

The project will retrofit 10 Markham homes with controllable electrical and thermal technology, integrated controls, and real-time grid GHG signals with the goal of achieving significant reductions in household GHG emissions. Alectra and Enbridge will operate and control the electric- and thermal-based DER assets throughout the pilot phase. Alectra will build a virtual power plant solution, develop cloud-based energy management assets, and deploy the assets in conjunction with the on-premise electrical and thermal DER assets. Together, these innovative technologies should reduce GHG emissions while delivering a reliable supply of clean power to local homes and to the grid.



PHASE I - PLANNING & PROCUREMENT (2018–2019)

Development of key working teams, an updated project management and evaluation plan, a communications and engagement strategy, followed by customer screening and enrolment, designing the electrical and thermal system, procuring equipment and developing a maintenance mechanism.

PHASE II - INSTALLATION (2019–2020)

Installation (including site audits and implementation of thermal and electrical efficiency measures); shipping and installation of all equipment and software; integration between physical and digital assets.

PHASE III - OPERATION & OUTREACH (2020–2022)

Customer and technological support; measurement and verification; continued system operation; knowledge dissemination; establishment of a Power.House Hybrid Community Outreach Office to increase customer uptake and NZEE market development; development of an NZEE modelling tool.

Benefits



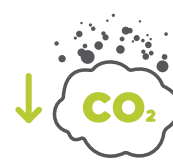
Improved reliability



Peace of mind during power outages



Reduced electricity bills



Reduced GHG emissions



Support clean energy jobs & market transformation

In Collaboration With



Natural Resources Canada

Ressources naturelles Canada



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