

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



**A**lectra's Power.House Hybrid pilot shifts energy generation from large centralized GHG emission-intensive sources to decentralized, cleaner generation using solar panels, battery storage, hybrid heating (gas and electric), combined heat and power (CHP), and more. Real-time grid GHG signals and integrated controls optimize these electrical and thermal technologies to minimize GHG emissions. Any electricity not used by the home is fed into the provincial grid to power neighbouring communities with clean energy.

Alectra is collaborating with Enbridge, the City of Markham, and Ryerson University to deploy these technologies across 10 Markham, Ontario homes. Together these homes act as a localized mini virtual power plant (VPP), leading the shift away from large centralized power generation.

### **Innovating & collaborating together to:**

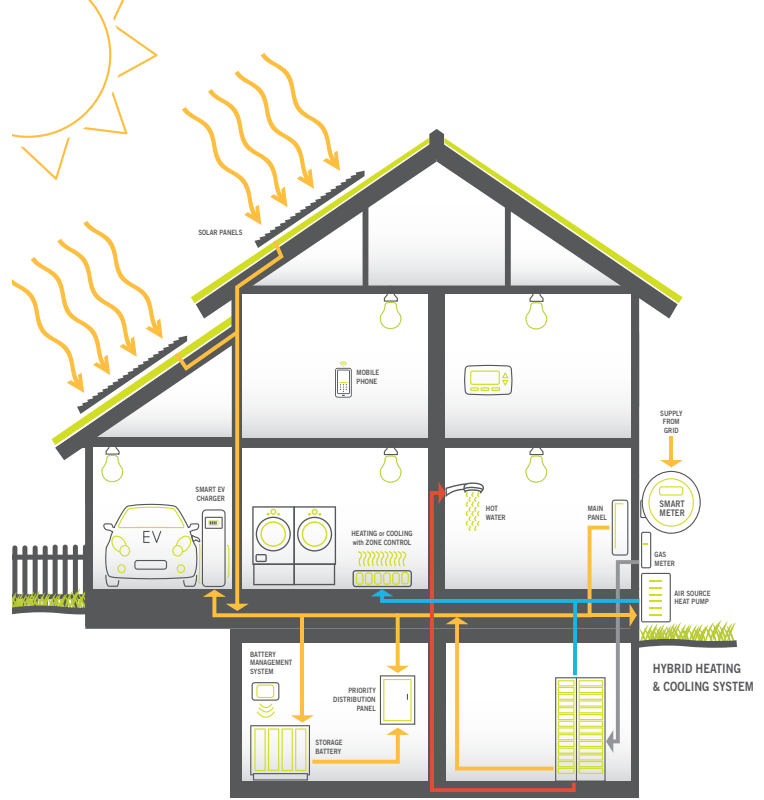
- ✓ Empower households to generate and store clean energy
- ✓ Optimize electrical and thermal technologies to minimize GHG emissions
- ✓ Lead the shift from large centralized power generation to decentralized, cleaner generation

# The Challenge

Individual use of clean distributed energy resources (DERs) such as solar panels, air source heat pumps and other emerging clean energy technologies can reduce 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 a cluster of 10 homes with controllable electrical equipment (Solar PV, Li-Lon battery, and L2 EV charger) and thermal equipment (microCHP, Air Source Heat Pump, Boiler, and Air Handler Unit). Alectra will build a VPP platform based on a cloud-based energy management software to deploy these electrical and thermal DERs in conjunction with real-time grid GHG signals and household energy needs. 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)

Customer on-site audits and installation of thermal and electrical equipment and software, including integration between physical and digital assets.

## PHASE III - OPERATION & OUTREACH (2020–2022)

Customer and technology support; operations; measurement and verification; knowledge dissemination; and establishment of a net zero energy emissions community and modelling tool.

# The Benefits



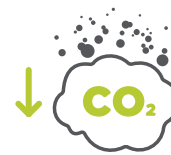
Improved reliability



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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