

Microgrid

Meet Alectra's **Microgrid**: an alternative solution for **safe, stable** and **reliable energy**



Alectra Utilities was one of the first utilities of its size in North America to build a proof-of-concept microgrid. Alectra's microgrid, at its office in Vaughan, Ontario, works like the electricity distribution grid, but instead of delivering electricity to hundreds of thousands of customers at a time, it is scalable to service targeted customers — in this case, Alectra's Vaughan office.

A microgrid is able to function autonomously from the electricity distribution grid as an "island" allowing it to supply energy during power outages, and offering power resilience to the customers and communities it serves. Microgrids demonstrate that locally managed energy resources can meet consumers' increasing demands for clean, and reliable electricity.

Innovating & collaborating together to:

- ✓ Utilize multiple renewable energy resources into one managed solution
- ✓ Demonstrate the ability of microgrids to power multiple electricity loads, in this case lighting, air conditioning and refrigeration at Alectra's office in Vaughan
- ✓ Increase the reliability of electricity and effectively manage power quality issues
- ✓ Feed clean power back into the grid, demonstrating how communities can meet their sustainability goals

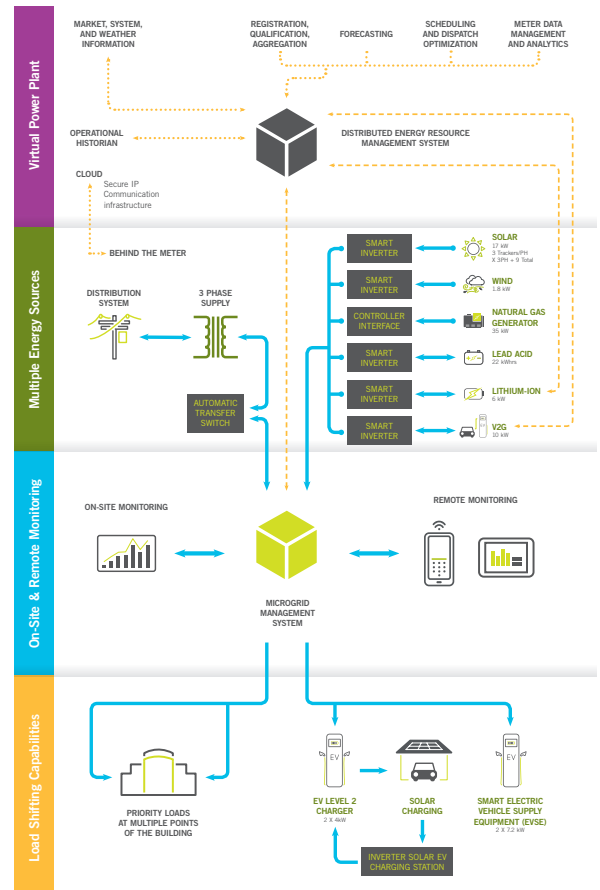
The Challenge

Utilities are facing ever-increasing challenges as a result of aging infrastructure, climate change, and growing customer demand for improved reliability, resiliency and cost-effective energy solutions. Traditional large-scale electricity distribution systems that rely on centralized generation sources are not able to respond effectively to these challenges — centralized generation is expensive and time-consuming to build, cannot respond quickly to changes in demand, and requires considerable infrastructure to move power to where it is used.

The Solution

Alectra's microgrid proof-of-concept aims to understand how to achieve flexible, scalable and sustainable operation of a microgrid that can maximize reliability and resiliency during power outages and disruptions. The microgrid management system is capable of real-time modeling, forecasting, optimizing, and dispatching energy and remote monitoring without the need for 24x7 operators. The project provides insight into how flexible loads and distributed energy resources (DERs) can offer new types of grid services.

This illustration shows how Alectra's cloud-based microgrid management system routes electricity from the company's existing generation to power the corporate building, directs Vehicle-to-Grid energy flow, and interacts with the Virtual Power Plant system.



PHASE I – GRID INDEPENDENCE (2014)

The goal of the first phase was to understand the microgrid's operation when disconnected from the electricity distribution grid.

PHASE II – GRID SUPPLY (2015)

The goal of the second phase was to demonstrate the microgrid's ability to enable two-way power flow through a vehicle-to-grid unit in which electric vehicles return electricity to the grid from their batteries.

PHASE III - VIRTUAL POWER PLANT (2018)

The goal of the third phase was to explore how controlling behind-the-meter assets can provide value to all distribution network ecosystem stakeholders.

The Benefits



Reliable electricity



Consumer choice in energy solutions



Continued energy during power outages



Scalable future deployments



Efficiency and low-cost clean energy



Meet sustainability goals

In collaboration with



Alectra GRE&T Centre
 395 Southgate Drive, Guelph, ON N1G 4Y1
 519.822.3010 | GREAT@alecrautilities.com | alecrautilities.com/GREATCentre

