

EVLO

Energy Storage Systems: A Flexible Grid Asset

MathWorks EXPO

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Energy's natural evolution



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Introduction



EVLO at a glance

- > EVLO is a **fully owned subsidiary of Hydro-Québec**, North America's largest producer of renewable energy headquartered in Montreal, Canada
- > Our **patented, eco-friendly battery chemistry is the culmination of 40 years of research** by our parent company's advanced innovation lab
- > EVLO is a **turnkey energy storage system and service provider** offering:
 - + Customized lithium iron phosphate (LFP) based battery energy storage systems for a wide range of applications
 - + Leading edge Energy Management Software capabilities
 - + Installation, commissioning, operation, and maintenance management
 - + End-of-life recycling program
- > EVLO's **energy storage product line** ranges from compact commercial solutions to large utility-scale solutions



EVLO and The Mathworks Inc.

- > EVLO extensively use of Mathworks product
 - + Site controller
 - + Utility numerical models
- > Full support of the V model
 - + Requirement management using Simulink Requirement
 - + Design and implementation using Simulink, Simscape and Stateflow
 - + Testing using Simulink Test and ICT
 - + Code deployment using Coder tools
- > Great collaboration
 - + Interactions with support / dev teams / MAB
 - + Mandates to the Consulting group
 - + EVLO featured in Mathworks articles... and invited to this seminar !

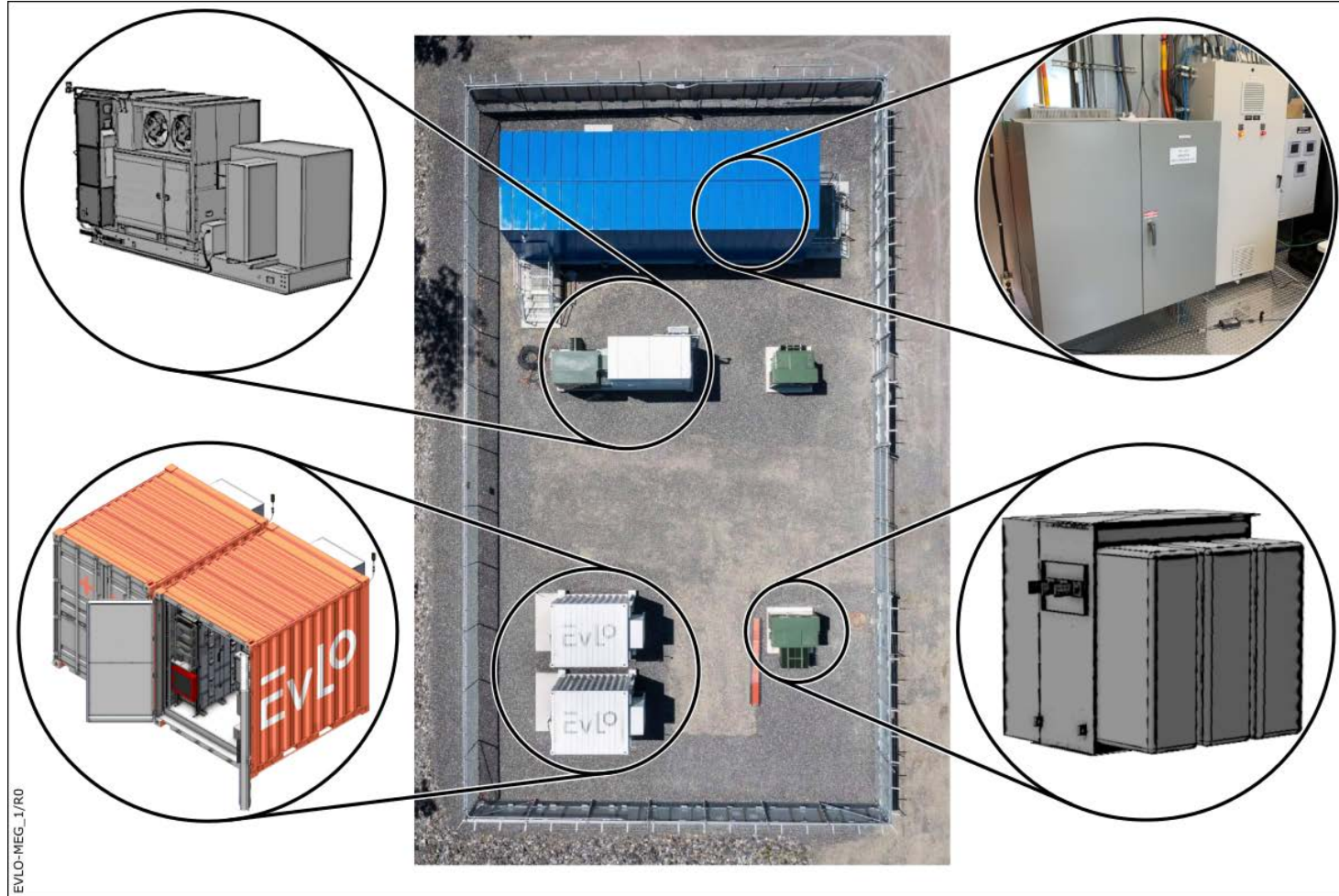


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Energy Storage Systems and the Grid



An ESS overview



ESS: a flexible grid asset

- > Support different sizing and location requirements
- > Provides various customer tailored services
- > Accommodate different grids



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EVLO Projects



Hemmingford: EVLO's first commercial project



> Project Scope

- + Inject power in the grid during peak hours
- + Defer T&D investments

> System Capacity

- + 1.2 MW / 2.4 MWh (2 hours)
- + 25 kV interconnection

> Software Services

- + Static & Dynamic Peak Shaving
- + Peak on Demand



Lac-Mégantic: Québec's First Microgrid



> Project Scope

- + Supply electricity during grid outages
- + Couple with solar production

> System Capacity

- + 600 kW / 600 kWh (1 hour)
- + 600 V interconnection

> Software Services

- + Black Start
- + “Island-to-Grid” & “Grid-to-Island” Transitions



Quaqtaq: Operation in Extreme Weather



> Project Scope

- + Couple with diesel generators
- + Couple with solar PV

> System Specifications

- + 600 kW / 600 kWh
- + 4.16 kV / 60 Hz

> Software Services

- + Black Start
- + “Island-to-Grid” & “Grid-to-Island” Transitions
- + Static Peak Shaving



Tonnerre: EVLO's First International Project



- > Project Scope
 - + Grid stability during unforeseen circumstances
 - + Maintaining the target frequency of 50 Hz
- > System Specifications
 - + 9 MW / 9 MWh
 - + 33 kV / 50 Hz
- > Software Services
 - + Frequency regulation
 - + AC voltage control



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Takeaways



Key Takeaways

- > Energy Storage Systems provide a variety of grid services
- > Energy Storage Systems promote more efficient usage of existing assets and increased utilization of renewable intermittent sources of energy
- > Mathworks products and services provide a complete development ecosystem for industrial grade control



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