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millions of sites to emerge soon with

energy storage centric DERs for

✓ C&I Buildings
✓ EV Fast Chargers
✓ other Applications
AC coupling, Microgrid optional

DIFFICULT
DC coupling, Microgrid included

Oct 30, 2018
AC coupling: Interconnection

often nightmare DER and Microgrid (Islanding) Permit Process
DC coupling: Interconnection

Microgrid (Islanding) Permit not needed
DC coupling: Interconnection

- 500 kW
- 500 kW
- 500 kW

< 500 kW

DER size

DER Permit also not needed

Oct 30, 2018
AC coupling: EV Fast Charger + DERs

too large
nightmare
high cost
AC-DC, DC-AC, ...

Oct 30, 2018
DC coupling: EV Fast Charger + DERs

- DC + DC + DC + DC

- less than Half
- no Permits*
- low cost
- > 5% better

* Islanding Permit never needed, DER Permit not needed with uni-directional AC-DC grid tie

Oct 30, 2018
Phase 1 (2017): world’s first battery-centric DC Microgrid in industrial building

Phase 2 (mid 2019): world’s first DC coupled EV Fast Charger, DERs and Utility Grid
Burlington Project

Microgrid “Invisible” to the Utility

50kW  100kW  10kW  50kW  12kW

15kW

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Case 1: EV Fast Charger, Import/Export

- **AC**: 760 VDC
- **VDC**: 760 VDC
- **DC**: 760 VDC

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Case 2: Import Only (no DER Permit needed)
Case 3: Import larger than DER Permit

Oct 12, 2018
Case 4: add DC Load or Generator

Oct 12, 2018
Case 5: AC Load Demand Charges, Backup
Case 6: add existing Backup Generator
Case 7: serve AC Load without DER Permit
Case 8: AC Load on the DC side

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Case 9: Off Grid Application

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Case 10: Off Grid Residential Community
Case 11: On Grid Residential Community

Oct 12, 2018
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## ARDA Integrated DC Solution

### ARDA Master Controller
- inside ARDA Storage DCDC Converter
- flexible and easy to configure EMS
- interface to 3rd Party Optimization Software

### 3rd Party ESS
- Storage Technology Agnostic
- with ARDA Storage DCDC Converter

### 3rd Party Power Converters
- off-the-shelf Modular Converters / Inverters
- interfacing Utility Grid, Sources and Loads
- accompanied by ARDA Response Controllers

### 3rd Party DC Protection Panel
- coupling Battery, Sources, Grid and Loads
- DC Breaker Over-Current Protection
- Intelligent Ground Fault Protection
ARDA DC coupling: Plug-and-Play Controls

Oct 12, 2018
Modular Standard 3rd party PCS Components

Sinexcel

AC
DC

AC
DC

soconec
Innovative Power Solutions

Tabuchi Electric

DC
DC

ALENCON

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VAR Partnership with ESS integrator

Virelec is an independent designer, Integrator and manufacturer of Battery Energy Storage systems. Let our engineers design a solution for your residence, commercial or industrial application.

- Industrial Storage Systems
- Commercial and Residential Systems
- Canada’s Smart Battery Manufacturer
- Leaders in System Integration
- Trusted, Reliable and Dependable

Contact Virelec for more information.

Virelec Ltd., Oakville, Ontario

t: 905-569-8030  e: sales@virelec.com
w: www.virelec.com

Oct 12, 2018
EV Fast Charger with DC output & input

Andromeda power