# Energy OASIS

(OPEN ACCESS TO SUSTAINABLE INTERMITTENT SOURCES)

**The Next Chapter in the Evolution of BCIT / BC Hydro's Smart Microgrid**

## PROJECT SUMMARY

The Energy OASIS aims to investigate the impact of clusters of level 3 Electric Vehicle Charging Stations on Utility feeders and design mitigation strategies to reduce the charging loads of such infrastructure on the stability and reliability of already stressed utility circuits.

## BATTERY ENERGY STORAGE SYSTEM (BESS)

A large Li-ion battery energy storage system (500kWhrs storage capacity)

## POWER PROTECTION & CONTROL / MONITORING & MEASUREMENT SYSTEM

Comprising of:

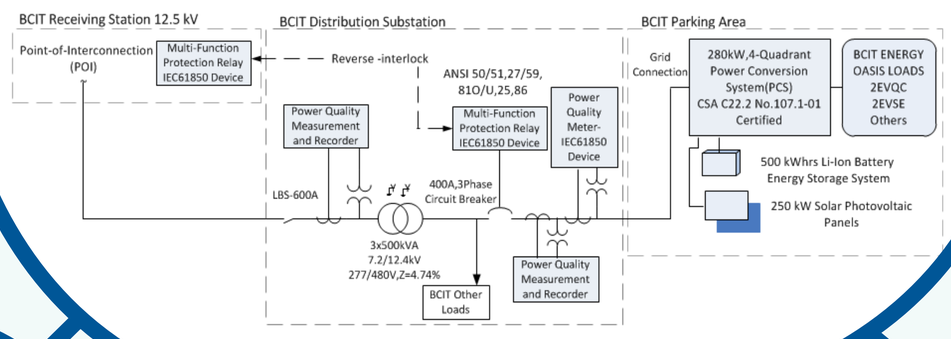
- One "Power Monitoring Device & Power Quality Recorder" on substation incoming feeder (@12.5kV)
- One Multifunction Protection Relay on feeder to OASIS (@480V)
- One "Power Monitoring Device & Power Quality Recorder " on Energy OASIS feeder.
  - One IEC61850 compliant "Power Quality Meter"
  - All required sensors
  - One relay-controllable breaker

## MICROGRID LOADS WHEN ISLANDED

- Two "level-3" DC Quick EV Chargers
- Two "level-2" EV (charging posts)
- Other campus/ microgrid loads (i.e. lighting, etc.)

## SOLAR PHOTOVOLTAIC ARRAYS

814 solar modules, providing a total of 250 kW solar generation capacity.



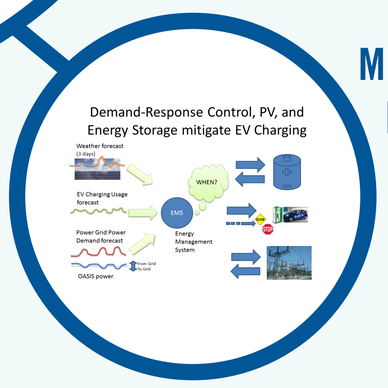

## MOBILE BROWSER


A Mobile-browser-based web application to enable EV drivers to interface with OASIS system.

## USER INTERFACE (KIOSK)

Provides required interaction with EV drivers, enabling queing, charge scheduling, and potentially EMS network access for drivers.


## MICROGRID ENERGY MANAGEMENT SYSTEM



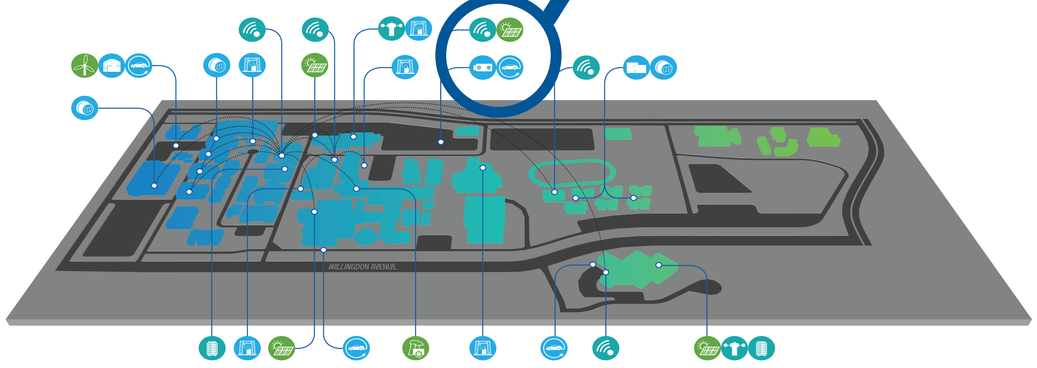

Capable of controlling loads, generation and planning for energy dispatch.

## POWER CONVERSION SYSTEM (PCS)

PCS system comprising of:

- Four 70 kW bidirectional DC/DC converters
- One 250 kW DC/DC photovoltaic converter
- A bidirectional ,four- quadrant, 3-Phase , 280 kW DC/AC grid-tied and islandable Inverter
- Electrical balance- of-system including DC and AC disconnect switches, protection modules, isolating transformer, etc.

## BCIT SMART MICROGRID INFRASTRUCTURE





BCIT Applied Research

Hassan Farhangi
hassan_farhangi@bcit.ca
bcit.ca/appliedresearch