Smart Cities, Smart Energy

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Overview

- Brief introduction to BCIT and our Smartgrid team
- Smart Cities and Smart Technologies
- Some Research and Solutions

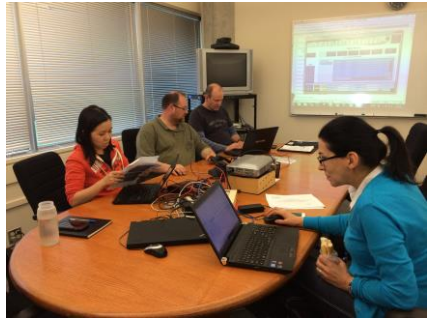
BCIT Quick Facts

Location:	Greater Vancouver
Founded:	1964
Number of Campuses:	5
Institute Budget:	$320M
Number of Students:	47,000
Number of Faculty & Staff:	2200
Dedicated Research Staff:	50
Research Infrastructure	$100M

Our SMART Team

- BCIT's Smart Microgrid Program provides opportunities for electrical utility companies, technology providers and researchers to work together. This enables researchers to develop and validate technologies required to integrate clean energy technologies into the existing and future grids.

- Expertise
  - Communications / IT / Networks
  - Computer science / Software architecture
  - Electrical & Power Engineering



Smart City

“What is a smart city? It’s where urban networks – human and technological – are integrated in order to optimize convenience, efficiency and the quality of life for the people who live and work in it.

Such cities aim to be self-sustainable, with minimal impact on the environment, where new innovations enable an intelligent exchange of energy and resources, and where connectivity via ICT (Information and Communication Technology) and the IoT (Internet of Things) puts citizens in control, able to improve their day-to-day lives through their own decision-making”

Huffington Post, May 16 2017

Smart Technology?

- What do we mean by smart?
  - Smart often means that our infrastructure can “think for itself”.
  - It often only means that it is (or can be) interconnected.

- How many have heard of IoT (The Internet of Things)?

- We are building intelligence and connectivity into everything.
  - This has only been done before in limited ways.

Smart City Problems?

- What is the biggest problem with new technology?
- Much of our infrastructure was designed in the late 1800's or early 1900's.
- The electrical grid was not designed to behave the way it needs to be used in the future. High levels of large distributed loads (electric vehicles) and the moving away from fossil fuels to electrical energy will drive up demand and place more stress on the grid.
- Security is no longer physical.

Energy OASIS Grid-Interactive Solar Microgrid

RD&D Objectives

- Integration of Solar PV panels into the BCIT Smart Microgrid system
- Use of Battery Storage System
- Mitigation of impacts of electric vehicle charging on the main grid
- Build foundational expertise and models for future replication projects (remote or urban microgrids).

Canada has 367 off-grid communities and BCIT is pursuing off-grid Microgrid projects

Energy-SMART Home - integration with smart distribution grid

BCIT's Near Net-Zero House

- PV and Wind Generation
- Will be upgrading energy storage to Powerwall 2
- Experimental multi-objective optimizing EMS
- Smart Appliances (demand-response capable)
- Level 2 EV Charger

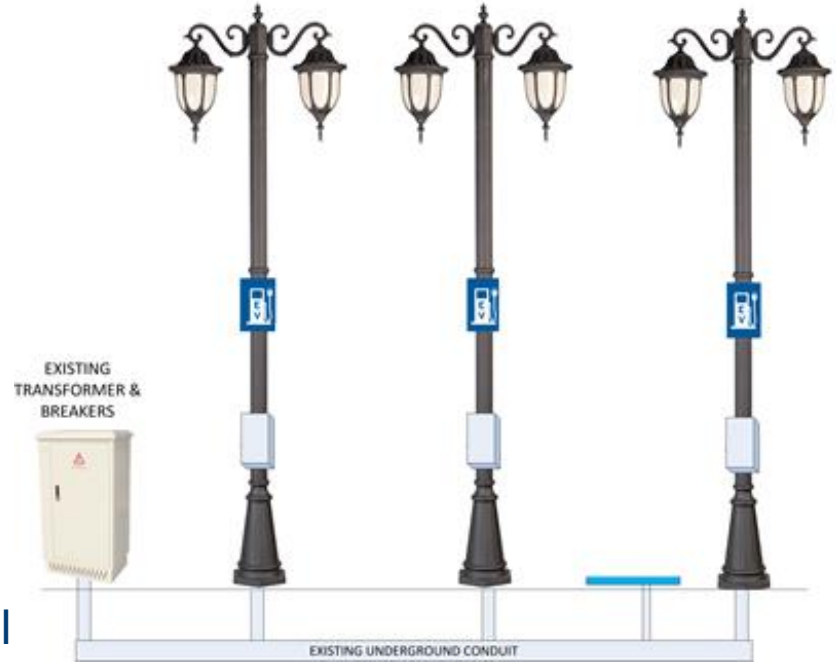
AFRESH Energy-SMART House @ BCIT

Smart (V1G) EV Charging R&D & Pilot Projects

Project to add Smart L2 EV Charging to city street light network

- 6 chargers in a BCIT campus parking lot
- Then add chargers to a local municipality's streets
- Replace lighting with LED – lowers demand
- Add chargers + smart power control
  - Time-shares power among vehicles if needed
  - Reduces EV charging when street lights turn on

- How can we connect BCIT Smart EV Charging control systems with larger smart-city power distribution grid?



Smart EV Chargers at street lights

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Questions?

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