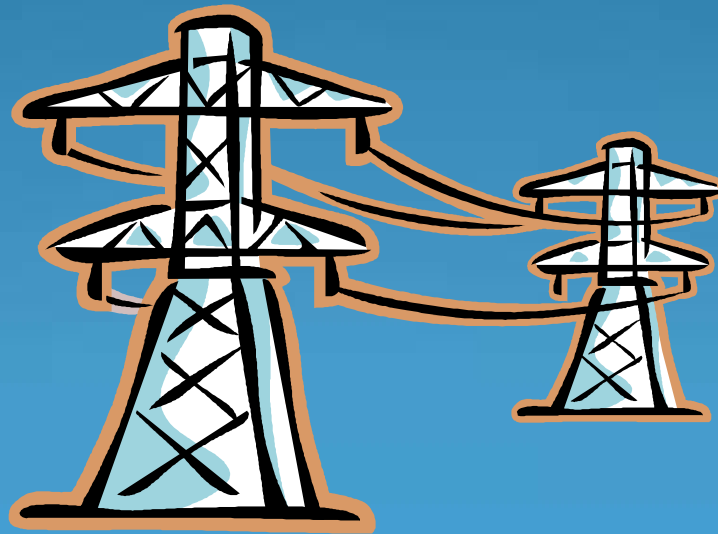


Intelligent Microgrid

A Unique Opportunity for BCIT

Presentation to BCIT's Leadership Team

Dr. Hassan Farhangi, Director BCIT GAIT Lab, March 19, 2009



The Opportunity for BCIT

- Provide unique training and research opportunities for faculty and students
- Industry support for education, research & advancing state-of-practice
- National Leadership Profile
- Attract major funding
- Commercial Services



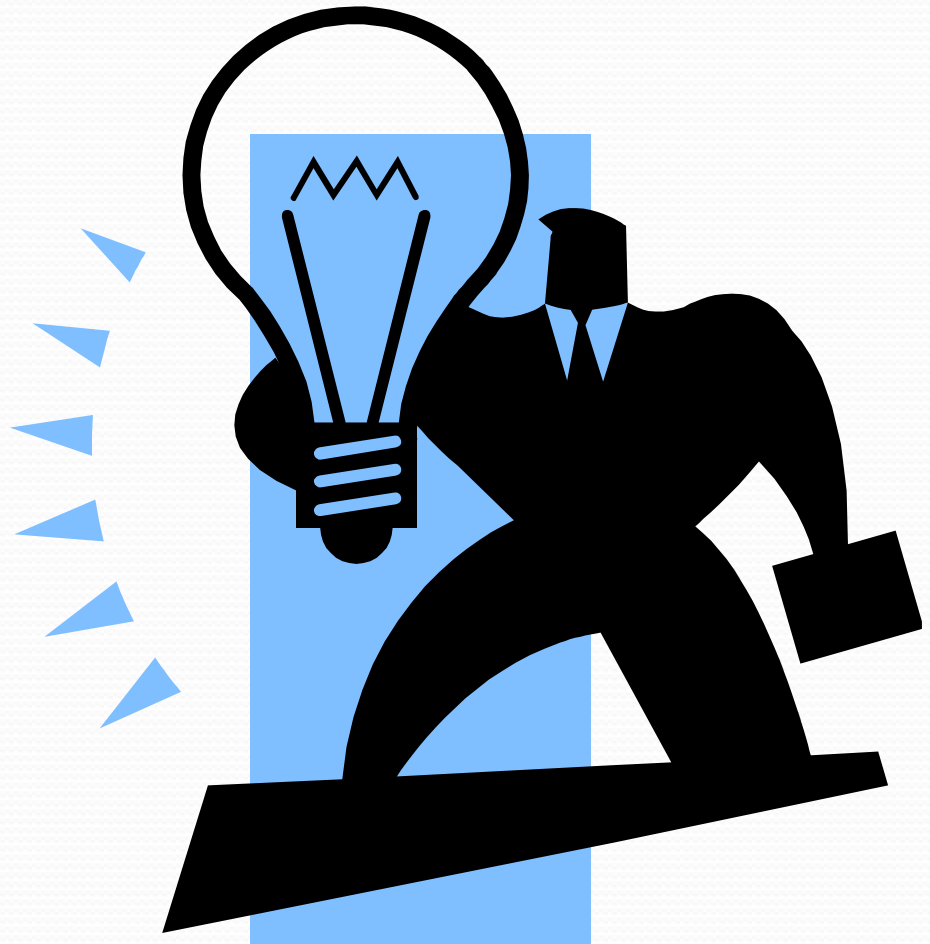
The Challenge

- **Critical services**
- **New technology**
- **Proprietary solutions**
- **Interoperability standards**
- **Field unproven**



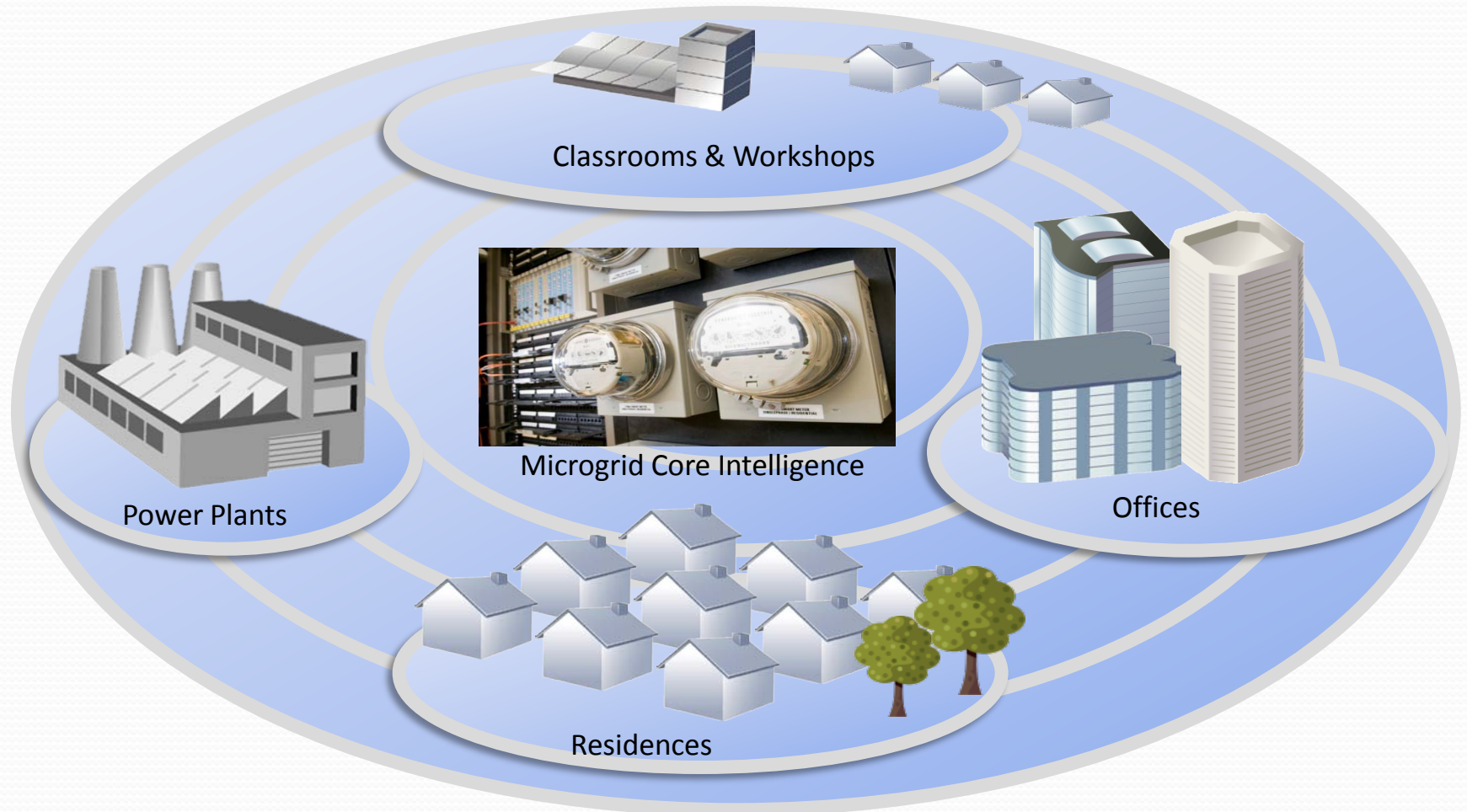
The Solution

- Near-real test bed
- Controlled
- Qualify Solutions
- Validate Standards



These require a Microgrid !

The Microgrid

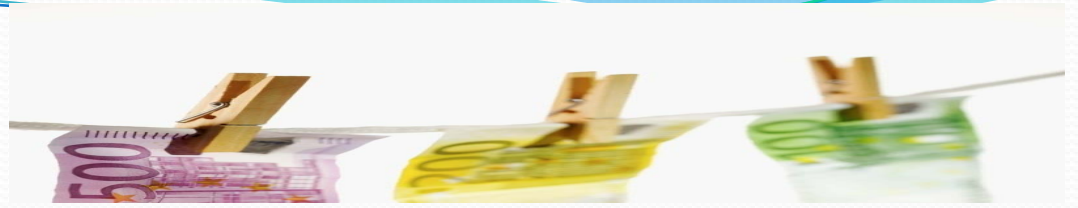


BCIT — *The perfect home for the Intelligent Microgrid*

- **Core Infrastructure:**
 - **Variety of Loads**
 - **PV Tower & New Co-Gen**
 - **AFRESH**
 - **IEL**
- **Multi-disciplinary skills:**
 - **Power & Instrumentation**
 - **Computer & Telecom**
 - **Building & Construction**
 - **Business & Management**



The Funding



- Secured \$2.69 Million from BC's ICE Fund
- Secured more than \$1 Million contribution from Industry
- Initiative sponsored by BC's utility companies

Student Interaction

- Provide 'Capstone Program' with various project opportunities within Intelligent Microgrid initiative
- Enrich student training and research experiences thru close collaboration with industry partners
- Provide BCIT students with learning opportunities thru joint research with other academic institutions (NSERC's Strategic Network Grant)
- Facilitate inter-disciplinary education (School of Construction, MEIP, CST, Health, etc) thru EMS development projects in the Afresh and/or Dorms.
Example: Student Competition at BCIT Residences to reduce energy consumption in BCIT's dorms

Institute

- Reduced carbon footprint and reduced energy cost
- State-of-the-art educational opportunities for students
- Modern Energy Management System & Facilities
- Leadership position among Canadian post-secondary
- International recognition (Gridwise Alliance, ISTP)

The screenshot displays the GridWise Alliance website. At the top, the logo reads "GRIDWISE ALLIANCE" with the tagline "RETHINKING ENERGY FROM GENERATION TO CONSUMPTION" and the URL "WWW.GRIDWISE.ORG". Below the header is a navigation menu with items: "GridWise™ Action Plan", "Join GridWise™", "Industry Events", "GridWise™ in the News", "Why GridWise™", "GridWise™ Members" (highlighted), "GridWise™ Leadership", and "GridWise™ Home". The main content area is titled "GridWise® Alliance Members" and features a grid of logos for various companies, including 3TIER, ABB, accenture, Alcatel-Lucent, AMBIENT, AMERICAN ELECTRIC POWER, ARCADIAN Networks, AREVA, AUSTIN ENERGY, Autodesk, BChydro, Beacon POWER, BCIT, Cellnet+ Hunt, and CenterPoint Energy. The website is viewed in a browser window with a taskbar at the bottom showing the time as 8:48 PM.

The Team

- **BCIT SoMEIP (Trevor Williams, Alex Rosenthal)**
- **BCIT SoCE (Wayne Stevens, Donald Yen)**
- **Other schools?**
- **BCIT Facilities (Marvin Rogers, Tim Wong)**
- **BCIT Campus Planning (John Wong)**
- **BCIT Student Housing (Tom Moore)**
- **BCIT ARLO (Rob Duncan, Stefan Joseph, Joe Boyd)**
- **BCIT TC (Joe Newton, Collin Wilson, Susan Ostermann)**
- **BCIT Management (Jim Reichert, Norman Streat)**

- **and BCIT's Group for Advanced Information Technology (GAIT)**

Next Steps

Phase 1: Construction of Microgrid (2008-2010)

- **Installation of Smart Metering on designated loads**
- **Installation of Load Control Devices in Afresh/Dorms**
- **Installation of Comm Network (HAN/LAN/WAN)**
- **Completion of Co-Gen and the required sensors/CTRL**
- **Completion of protection/islanding of BCIT Campus**
- **Retrofitting and Integration of AFRESH with Microgrid**
- **Dev of BCIT EMS system (target 10% annual saving)**

Phase 2: Research and Development (2010-2015)

- **Setup of NSERC Strategic Network (BCIT is the lead, UoNB, McGill, UoT, UoWO, UoA, UBC, SFU & UVIC)**

Phase 3: Microgrid Commercialization (2010-2017)

- **Setup of Industry Canada's NCE (Network of Centers of Excellence) in pan-Canadian Smart Grid technology**

Critical Success Factors

- **Timely construction of the Microgrid**
- **Participation of faculty and students**
- **Teamwork among internal stakeholders**
- **Institute-wide support & collaboration**
- **Project Management & coordination**
- **Expansion of industry partnerships**



Conclusions

BCIT's Intelligent Microgrid Initiative is about:

- **Providing new and unique educational/training services for students, faculty and industry**
- **Reducing the carbon footprint and energy costs of BCIT and other Microgrid campuses across Canada**
- **Putting BCIT on the map as the leader in training & development of smart energy management systems**
- **Helping utilities modernize their services & assets**
- **Mitigating critical infrastructure risks, security, reliability and vulnerability**
- **Creating a 'sandbox' where new technologies and solutions can be developed, tested and qualified**

Questions?

Come see us – we love to demo!

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