



DSE 2012

Distributed Energy Storage 2012

Why Ontario? An overview of RD&D and
the capacity for innovation.

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Centre for Urban Energy

November 27, 2012

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Outline

Why Ontario? An overview of RD&D
and the capacity for innovation.

1. Introduction
2. RD&D @ CUE
3. Capacity for Innovation @ CUE
4. The Business Challenge
5. An Opportunity for Ontario
6. Q&A

There is a “perfect storm” brewing in Ontario’s energy sector?

with apologies to Sebastian Junger

1. our energy sector workforce is declining (skills shortage and skills disconnect)
2. our infrastructure is aging and will need to be replaced or refurbished.
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4. we have a surplus of power...
5. negative pricing with the electricity market
6. rising electricity prices for consumers
7. resurgence in oil and gas production in the USA – self-sufficient by 2020
8. climate change ...
9. a consumer who has been raised in a culture of plenty and expects cheap limitless reliable power...
10. And an endless list of the political challenges (NIMBY; BANANA)



= for the bureaucrats ... this means a “bumpy ride”
= for the entrepreneur ... this means “opportunity!”

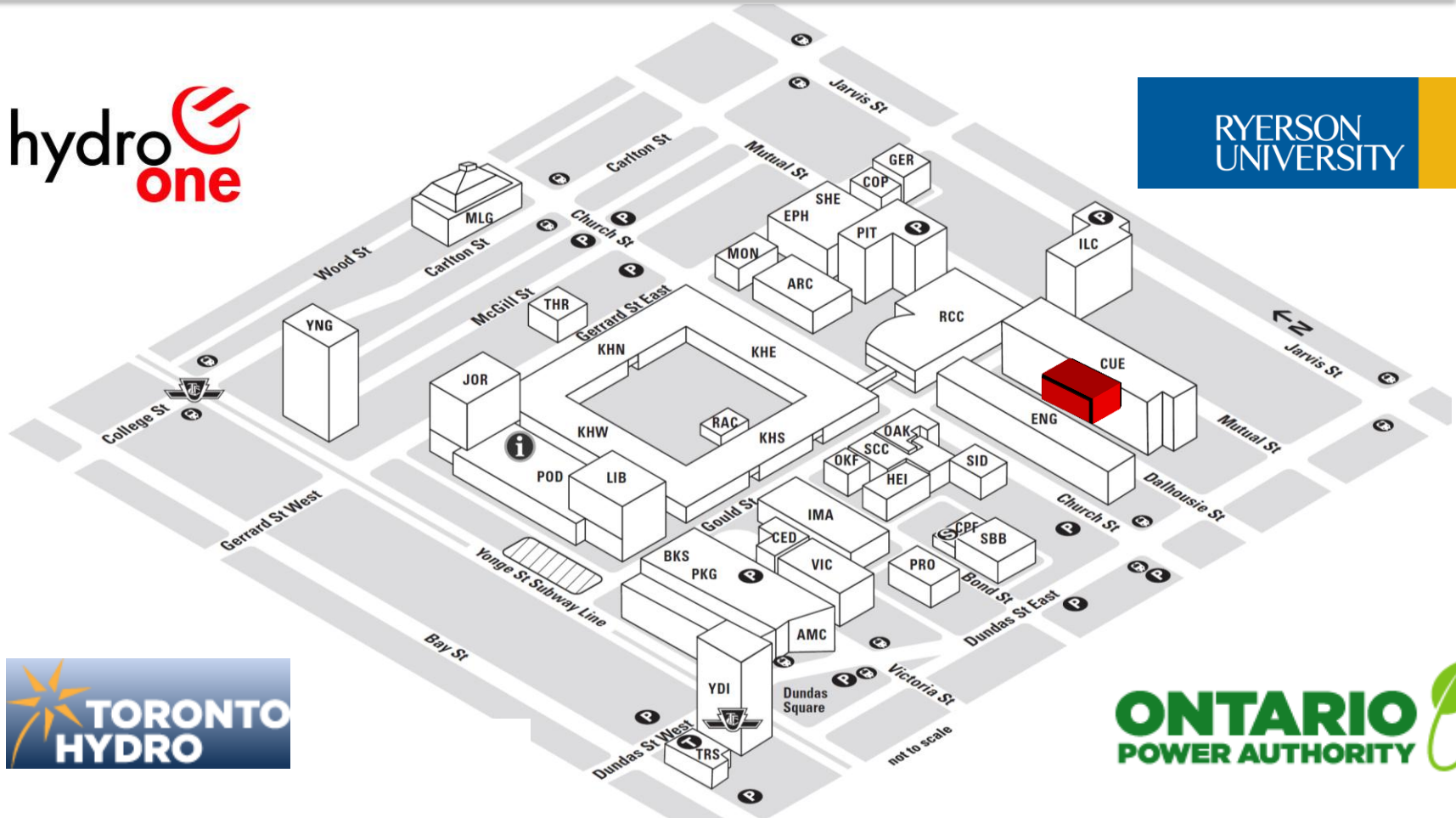


CENTRE FOR URBAN ENERGY

Empowering Urban Futures Through Research and Innovation

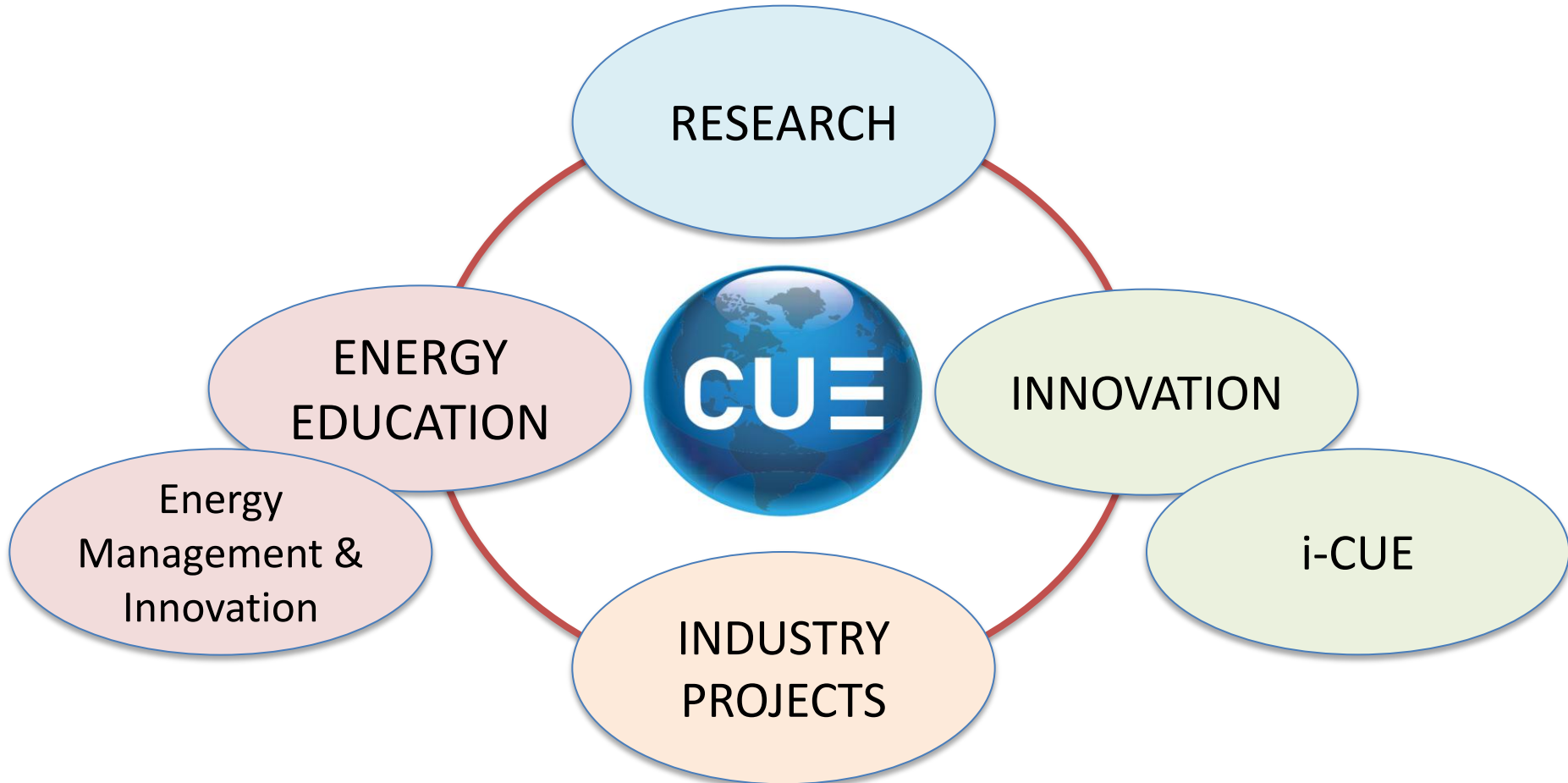


RYERSON
UNIVERSITY



EST. September 1, 2010

\$16 M



RESEARCH



- ③ ENERGY STORAGE
- ② SMART BUILDING & NET-ZERO HOMES
- ① POWER GENERATION & TRANSMISSION SYSTEMS
- ① EFFICIENCY, CONSERVATION & DEMAND MANAGEMENT
- ② ENVIRONMENTAL, SOCIAL & ECONOMIC IMPACTS
- ② ELECTRIC VEHICLES & INFRASTRUCTURE
- ① POLICY & REGULATORY ISSUES
- ② RENEWABLE ENERGY
- ② SMART GRID

RESEARCH



Energy Storage Flywheel

Design of
flywheel
controller to
maintain supply
voltage constant

K. Masteri

D. Xu

B. Venkatesh

Bob Singh

Aisha Bukhari

A. Lampe



long duration flywheels providing grid scale storage (50 kWh) with 95% efficiency on a 10 hour time frame.

RESEARCH

Energy Storage Batteries



Ontario Centres of
Excellence



Drs. B. Venkatesh and D. Xu

- Large Scale Demo (1.2 MWh)

-Funded by OCE,

-NRCAN,

-Hydro One,

-Toronto Hydro,

-OPA,

-Tennessee Valley Authority,

-Manitoba Hydro

[\$4.328 M]

To be located at Ryerson:

- Church Street Parking Lot

- Monitored from CUE





ENERGY EDUCATION

Certificate in Energy Management and Innovation

Target Audience: individuals seeking to expand their expertise, change or advance their careers and those seeking professional development leading to management and leadership roles.

3 Required Courses: (single term)

- Energy Innovation and Entrepreneurship*
- Fundamentals of Project Management
- Renewable Energy and Clean Technology

2 Elective Courses: (single term)

- Energy Efficiency and Demand Response*
- Energy & the Public Policy Debate In Canada*
- Fundamentals of Sustainability I
- An Introduction to Smart Grid*
- Environmental Economics (CECN510)

1 Capstone

Educational Outcomes:

- Balanced understanding of the technical and non-technical (social, cultural, policy, regulatory) elements in energy generation, transmission conservation and consumption.
- Becoming “innovation ready”; Enriched knowledge of innovation and innovation literacy...
- Analytical acuity with renewables, smart grid, energy conservation, energy efficiency and demand-response.

i-CUE



Sources of Finance

Government Research Funding

Federal and Provincial Innovation Programs

e.g. SDTC; FEDDEV; OCE; ORF, IDF, etc.

CUE

i-CUE

Angel Investors

Venture Capital

IPO / Other

Banks

Industry



- Research Innovation
- Business Innovation
- Student Innovation



Commercialization Process

Fundamental / Pure Research

Applied Research

Technology & Product Development

Commercial Demonstration and Initial Operations

Market Entry & Volume Production

Ideation

Incubation

Acceleration

Investable

Profitable

i-CUE


Business Challenges for the Energy Start-up: *what works & what doesn't.*

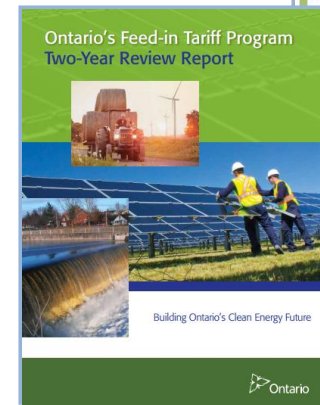
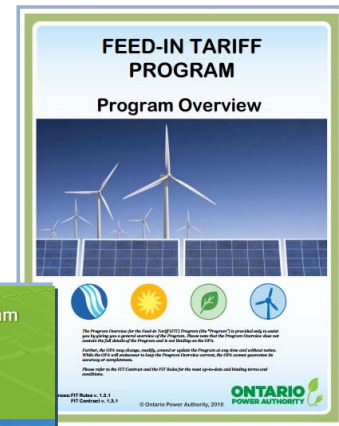
1. Technical feasibility – *1st and 2nd Law...*
2. Political feasibility – *policy, regulation and politics*
3. Financial Challenges – \$\$\$\$\$\$\$\$
4. Team tenacity – *focus and discipline*
5. Customer needs – *who, what, where, when, why, how?*
6. Competition – *competitive advantage, special sauce*
7. Business feasibility
 - a) Value Proposition
 - b) Revenue Model
 - c) Time to first revenue.





An Opportunity for Ontario

- The FIT Program (enabled by the Green Energy and Green Economy Act, 2009) offers stable prices under long-term contracts for energy generated from renewable sources, including: biomass, biogas, landfill gas, on-shore wind, solar photovoltaic, waterpower.
- No contracts have been offered for energy delivered from energy storage systems.
- What about a FIT for energy storage? 



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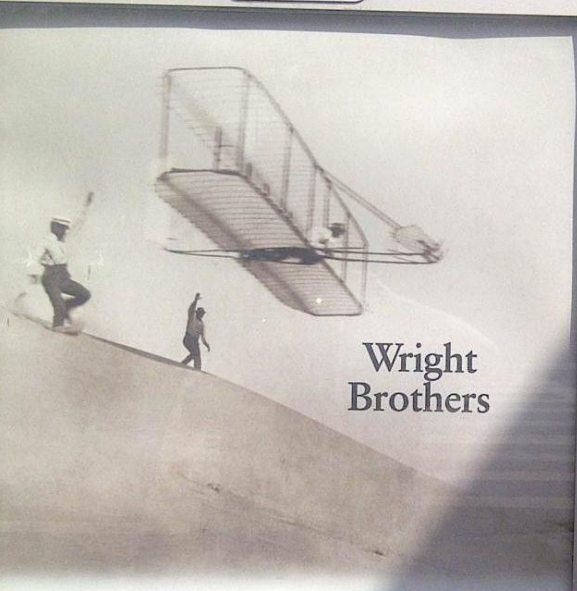


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✓ A FIT program for energy storage may be worth considering.



Phone

VanWagner



Wright
Brothers

The right
idea
will fly.

INNOVATION

Pass It On.

VALUES.COM THE FOUNDATION
FOR A BETTER LIFE