


# QUEST: A Collaborative to Accelerate Integration of Energy Systems in the development of Sustainable Canadian Communities

Presented to the Federation of Canadian Municipalities  
Annual Conference and Municipal Expo

Michael Harcourt  
June 5, 2009



95% of the people in Canada live in or within a one hour radius of our 120 large & medium urban centers, this is where the majority of energy is consumed in Canada.



In 2003, over 55% of primary energy used in Canada ended up in losses.

# We need sustainable energy systems

- Sustainability is about ...
  - Delivering safe, affordable, reliable energy services, and
  - Accounting for all environmental and social externalities.
  - It is robust and adaptable in the face of uncertainty, including rapid technological change, resource supply disruption and a changing climate.
  - It is a process of adaptive evolution with many small steps and few big leaps.
  - It is increasing the diversity of energy and technology options, and
  - Ensuring efficient energy markets by reflecting all costs including environmental and social externalities.

# The Challenge

- Managing Energy expectations with:
  - Economic growth
  - Population growth
  - Liveable communities
  - GHG Targets

# Who and What is QUEST?

- **QUEST mission:** To foster a community-based integrated approach to land-use, energy, transportation, waste and water and reduce related greenhouse gas, air pollutant emissions and waste.
- **QUEST vision:** By 2050 every community in Canada is operating as an integrated energy system, and accordingly, all community development and redevelopment incorporates an integrated energy system.
- QUEST is a coalition of key players from industry, environmental movement, governments, academia and the consulting community. QUEST is supported by the following organizations:
  - Federal Government
  - Provincial Governments
  - Municipal Governments
  - Energy Industry
  - Environmental Groups
  - Building Sector
  - Academics

# Why QUEST?

- An integrated approach to energy systems in Canada's communities will build a sustainable energy future and deliver GHG reductions.
  - No or low carbon environment.
  - Reduction of other environmental impacts.
  - More affordable energy.
  - More reliable, resilient & adaptable energy services.

# QUEST - Six Guiding Principles

1. **Improve efficiency** – reduce the energy input required for a given level of service;
2. **Optimize “exergy”** – avoid using high-quality energy in low-quality applications;
3. **Manage heat** – capture all feasible thermal energy and use it, rather than exhaust it;
4. **Reduce waste** – use all available resources, such as landfill gas, gas pressure drops and municipal, agricultural, industrial and forestry wastes;
5. **Use renewable resources** – tap into local biomass, geothermal, solar and wind energy; and
6. **Use grids strategically** – optimize use of grid energy and as a resource to optimize the overall system and ensure reliability.

# The Building Blocks

## Mixed-use higher density communities and integrated energy systems.



1. Mixed-use and higher density development allows the cost-effective integration of systems, including transportation.
2. LEED certified buildings reduce energy use and environmental impact.
3. The unique characteristics of each energy form is matched with its end-use.
4. A district energy system allows thermal energy to be effectively managed across the different end-uses.
5. Energy from waste, such as sewer systems and garbage, is recovered.
6. Local renewable energy contribution, like solar energy is maximized.
7. Electricity and gas grids allow optimization of the overall system and ensure reliability.

# The Players

## The Actors

Municipalities
<ul style="list-style-type: none"><li>• Urban Planning</li><li>• Zoning &amp; Building Bylaws</li></ul>

Developers, Builders & Owners
<ul style="list-style-type: none"><li>• Develop Land &amp; Services</li><li>• Construct</li><li>• Own or Transfer</li></ul>

Utilities
<ul style="list-style-type: none"><li>• Build, Own &amp; Operate Energy Systems</li></ul>

Technology Providers
<ul style="list-style-type: none"><li>• Conduct R&amp;D</li><li>• Manufacture Systems</li></ul>

## The Enablers

Provincial Governments
<ul style="list-style-type: none"><li>• Policy Framework</li><li>• Programs Support</li><li>• Technology Support</li><li>• Infrastructure Support</li><li>• Policy Direction to Regulators</li></ul>

Energy Regulators
<ul style="list-style-type: none"><li>• Approval Systems</li><li>• Tariff Structures</li></ul>

Federal Governments
<ul style="list-style-type: none"><li>• Policy Leadership</li><li>• Investment Incentives</li><li>• Capacity Building: R&amp;D, Skills &amp; Knowledge</li></ul>

Non-profit Organizations
<ul style="list-style-type: none"><li>• Create Awareness</li><li>• Help Sustain Public Support</li><li>• Advocate for New Policies</li></ul>

# QUEST is Bringing People Together-

## Who Showed Up at QUEST I & II

- **Federal Government**
  - Natural Resources Canada
  - Industry Canada
  - Infrastructure Canada
  - NRTEE
  - National Research Council
- **Provincial Governments**
  - Agence de l'efficacité énergétique du Québec
  - Ontario Power Authority
  - Alberta Climate Change Central
  - Saskatchewan Office of Energy Conservation
- **Municipalities**
  - City of Calgary
  - City of Guelph
  - City of Vancouver
  - City of North Vancouver
  - City of Dawson Creek
  - City of Malmo, Sweden
  - District of Saanich
  - Resort Municipality of Whistler
- **Associations**
  - Canadian Gas Association
  - Canadian Electricity Association
  - Canadian Petroleum Products Institute
  - Canadian GeoExchange Coalition
  - Net-Zero Energy Home Coalition
  - Canadian Urban Institute
- **Consultants**
  - Marbek Resources Consultant
  - Enerlife Consulting
  - ICF International
  - Lawson Research
- **Buildings Sector**
  - Canada Green Building Council
  - Windmill Development Group
- **ENGOS**
  - Pembina Institute
  - Canadian Energy Efficiency Alliance
  - WADE Canada
  - IVEY Foundation
  - Sustainable Cities Foundation
  - Pollution Probe
- **Academics**
  - Seneca College
  - University of Toronto
  - Processus International Research Network
  - Simon Fraser University
  - University of Ontario Institute of Technology
  - University of Michigan
  - University of British Columbia
- **Energy Industry**
  - Veridian Corporation
  - Terasen Gas
  - Union Gas
  - New Brunswick Power
  - BC Hydro
  - Toronto Hydro
  - Enbridge Gas Distribution
  - Gaz Métro
  - CORIX Utilities

# What's Happening Today?

## District Energy for Brownfield Re-development

**Location:** Coquitlam, BC (Terasen Gas)

### Type of Development:

- 89 acre brownfield re-development
  - 3,700 residential units,
  - 275,000 sq. ft of commercial/retail
  - 600,000 sq. ft. of business park/ light industrial
  - 16 acres of open space, parks and trails.

### Energy System:

- District energy system to incorporate alternative energy sources integrated with natural gas:
  - Local waste heat (industrial recycling plant)
  - Geo-exchange (groundwater or earth)
  - Possibilities for biomass

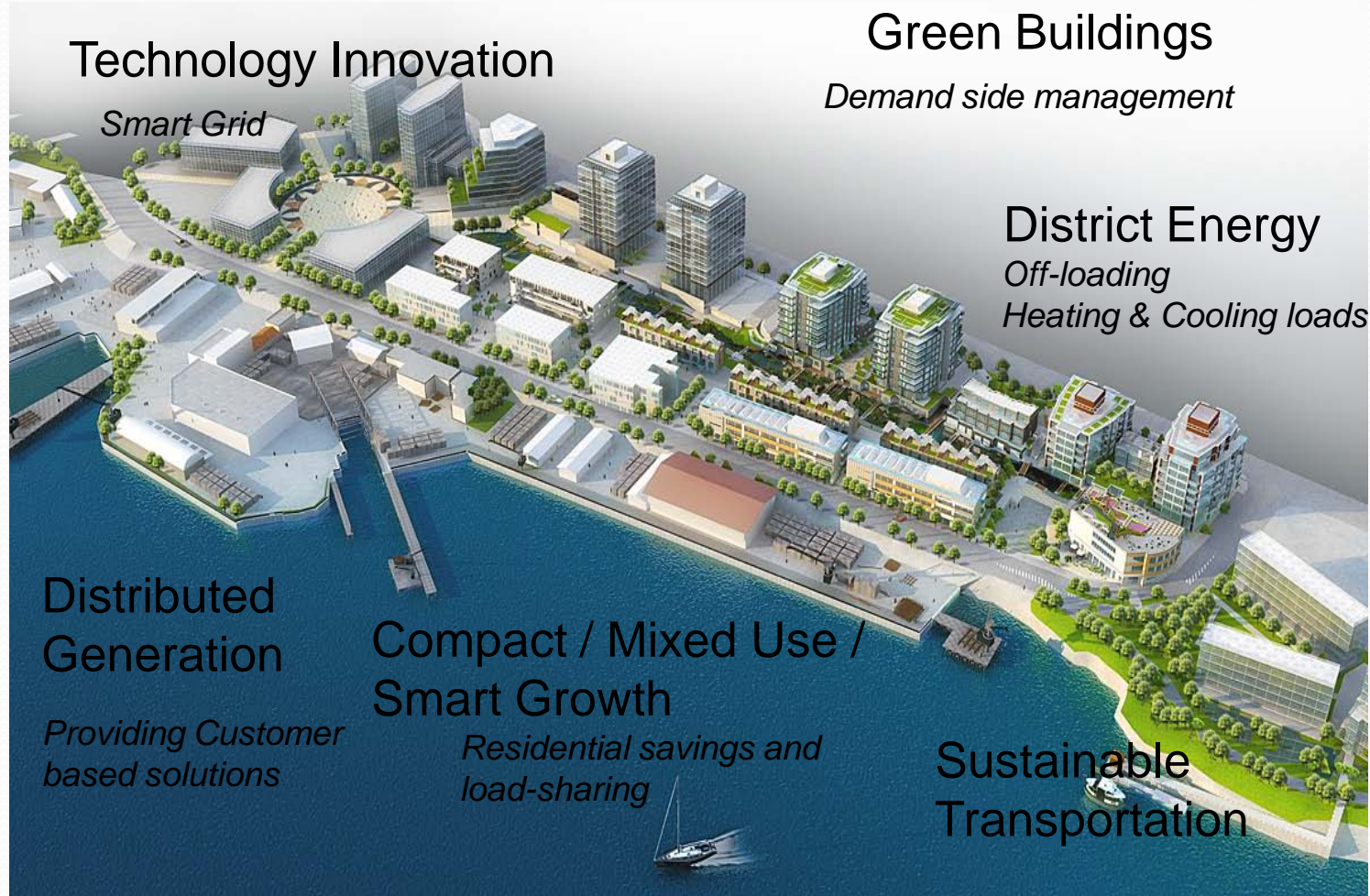


### Environmental Benefits:

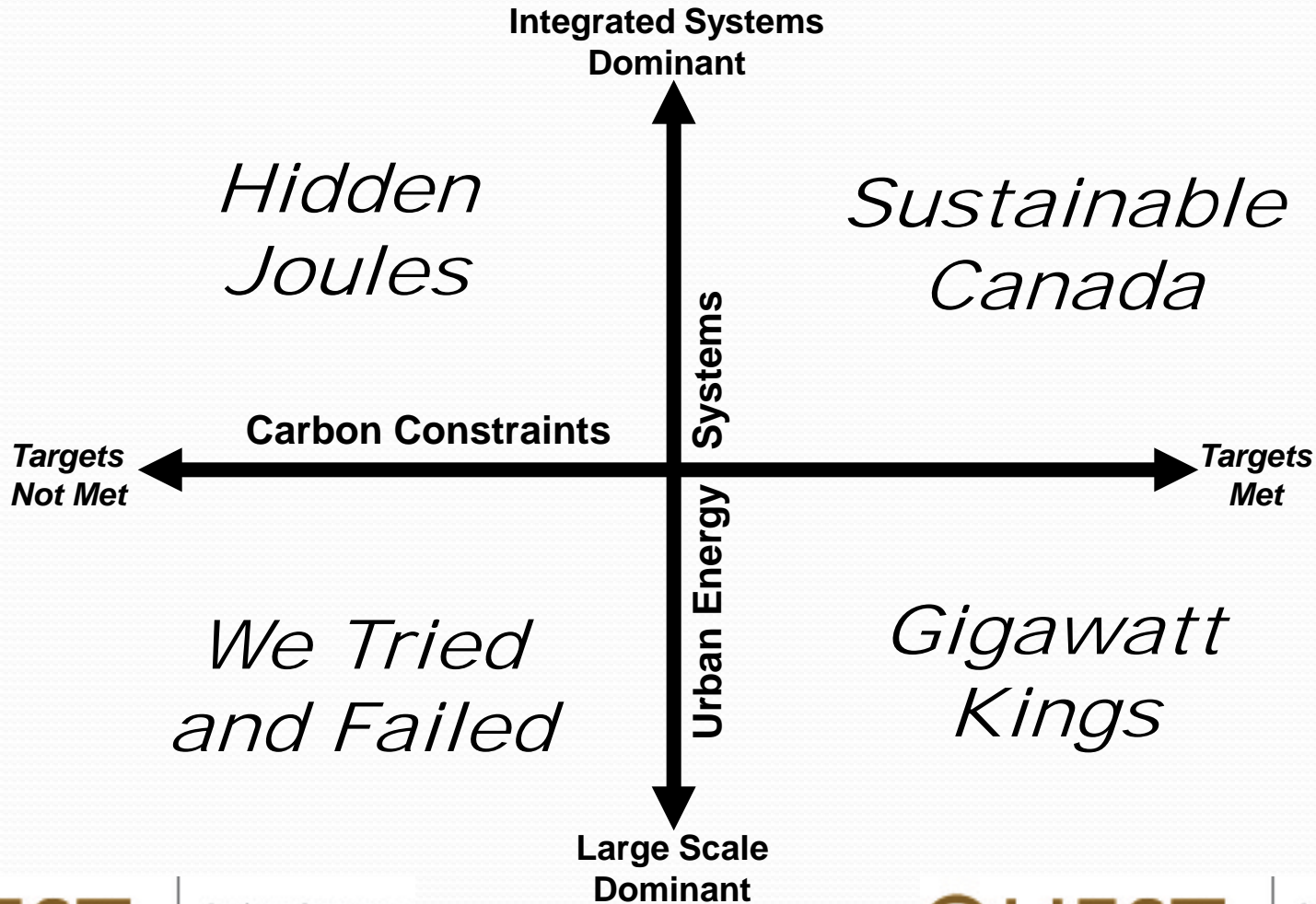
- Reduced demand on BC's electricity grid
- Savings of >8,200 tonnes of GHGs per year (equivalent to removing >2,500 cars from the road)

# What's Happening Today?

## Sustainable Communities and the Value to BC Hydro



# 4 QUEST Scenarios – where do you want your community to be?



# QUEST Efforts in 2009

- Accelerate adoption of integrated community energy planning
- Quantify the potential energy savings and associated environmental benefits
  - Multi-disciplinary collaboration led by MKJA
  - Influence NRTEE and NRCan community Road-Map
- Develop an inventory / case studies of best practices
- Develop of Regional QUEST caucuses
- Build support for long-term effort
  - Expanding the network of supporters
  - Groups have expressed interest in initiating provincial “QUESTs” e.g. B.C., Alberta, Ontario & Québec.
- Annual Workshop – Integrated Energy Systems: Putting the Pieces Together, Québec City, October 2009.

# Contact QUEST

QUEST Coordinator

Tonja Leach

613-797-6008

[tlease@questcanada.org](mailto:tlease@questcanada.org)

[www.questcanada.org](http://www.questcanada.org)