



QUEST Policy and Next Steps

Draft paper for discussion and development at QUEST II Workshop

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DRAFT

Introduction

Fifty percent of Canada's greenhouse gas emissions come from large-scale energy resource developments, large industry and centralized power generation. The other fifty percent is emitted in urban areas where eighty percent of Canadians live. The federal government has set targets of reducing Canada's greenhouse gas emissions 20 percent by 2020 and 60-70 percent by 2050 while reducing industrial emissions by as much as 50 per cent by 2015 for key air pollutants. In addition, national ambient air quality standards will be set for particulate matter and ozone based on health and environmental assessments of these pollutants.

In the face of rapidly changing market conditions, it is also essential to work towards a more sustainable energy system. A more efficient, reliable, resilient, robust and adaptable energy system will improve Canada's overall economic competitiveness.

The challenge facing Canada is to achieve the targets and standards in ways that have broad public support and that improve industrial competitiveness and create new investment and jobs. To meet this challenge, current macro-energy policies, which focus on decarbonising large-scale fossil fuel resource development and use, must be complemented by micro-energy policies that reduce the demand for energy while providing the energy services that Canadians expect.

What is QUEST?

Quality Urban Energy Systems of Tomorrow (QUEST) is a dialogue among a growing number of stakeholders across Canada. It is an initiative focused on promoting integrated energy systems in communities and urban centres. The underlying QUEST proposition is that meeting Canada's climate change and clean air goals will require large reductions in energy consumption in these areas, as well as greater integration of on-site renewable sources of energy with existing energy grids.

The QUEST Vision is to foster integrated, community-based approaches that address energy end-use and reduce related greenhouse gas and air pollutant emissions.

QUEST is a collaborative that is encouraging governments, local industry and citizens to support integrated approaches to providing energy services in urban areas. The QUEST vision builds on progress that has been made on energy-efficient appliances, eco-efficient buildings, district heating systems, renewable energy technologies, waste heat utilization, waste recycling and landfill gas capture, net zero energy homes, green roofs, and many more innovations that have paved the way for radical changes in the way quality energy services can be provided. The vision calls for greater integration of these innovations in community-wide energy systems that significantly reduce overall energy consumption.

The vision is premised on six principles that guide sustainability in urban energy systems:

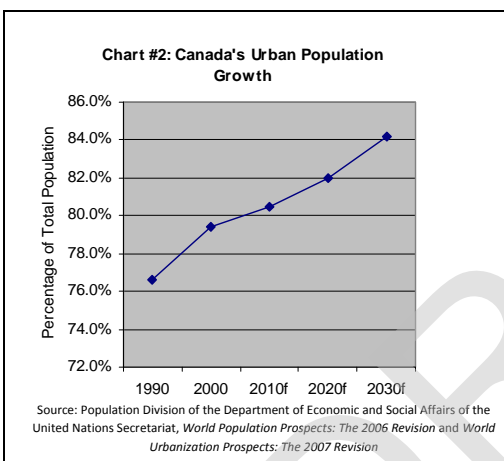
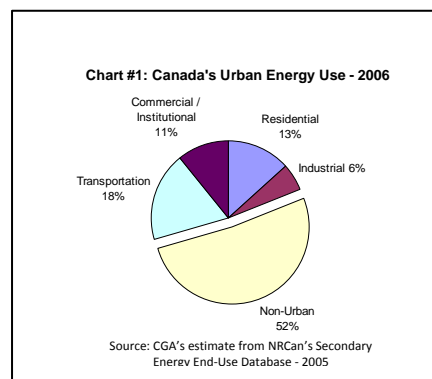
- Improve efficiency – first, reduce the energy input required for a given level of service;
- Optimize “exergy” – avoid using high-quality energy in low-quality applications;
- Manage heat – capture all feasible thermal energy and use it, rather than exhaust it;
- Reduce waste – use all available resources,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

The Numbers Tell the Story

Chart #1: Urban areas account for nearly 50% of Canada's GHG emissions

Chart #1 shows Canada's urban energy use in 2005, with a breakdown of the main urban end-uses. Transportation, residential and commercial/institutional sources dominate urban energy use.

Non-urban	52%
Urban	48%
Transportation	18%
Residential	13%
Commercial/Institutional	11%
Industrial (mostly SMEs)	6%



Chart#2: Canada's population is mainly in urban areas

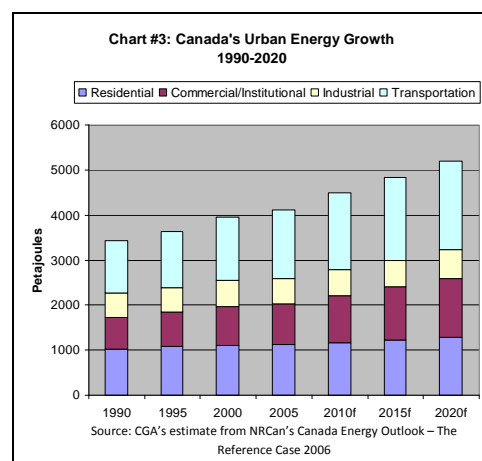
Chart#2 shows the growth in Canada's urban population. The number of Canadians living in urban centres is growing -- by 2020, 82% of Canadians will live in these centres.

Urban population:	1990	77%
	2000	79%
	2010	81%
	2020	82%
	2030	84%

Chart#3: Total urban energy use in Canada is increasing

Chart#3 shows the growth in Canada's urban energy use. Similar to population growth, energy growth in urban areas is increasing, from 3,400 Petajoules in 1990 to a projected 5,100 Petajoules in 2020.

Urban Energy Use:	1990	3,400 Petajoules
	2000	4,000 Petajoules
	2010	4,500 Petajoules
	2020	5,100 Petajoules



Message: Canada's energy use is rising. Urban areas are a major source of Canada's greenhouse gas emissions. To reach the federal government's 2020 target of reducing national emissions by 20% from 2006 levels, urban areas must be part of the solution. Decarbonizing Canada's energy supplies by 2020 cannot be accomplished in time on the scale required, and cannot by itself meet this target.

What does an Urban Integrated Energy System Look Like?

Key Features of the QUEST Vision:

QUEST is calling for an integrated approach to land-use, energy, transport, water and waste management -- one in which emphasis is placed on achieving much greater efficiency in these systems as a whole, rather than treating each in isolation. The result will be more resource efficient, adaptable, resilient and sustainable urban energy systems.

Key features of the QUEST vision include:

- Clustered, higher density, self-reliant, mixed use developments of energy-efficient housing, commercial space and industry that facilitate implementation of more efficient, accessible and affordable energy, water, waste and transportation infrastructure;
- District energy/utility grids and the cascading of energy uses between and among industrial, commercial and residential applications;
- Smaller scale urban energy systems, distributed more widely, located closer to and within buildings, and integrated with elements of buildings themselves and with other infrastructure systems; and,
- Increasing energy contributions from multiple local sources, such as solar, geothermal, landfill gas and other municipal, agricultural and forestry waste, wind and hydro, with these sources supported by larger scale electricity and gas grids as necessary.

The proposed Riverbend Heights community energy system in London, Ontario, has estimated that, compared to a traditional approach, more than 50% reduction in grid energy use can potentially be achieved using an integrated energy system approach. Canada has fallen behind leading countries in implementing this approach.

What is Going on in Canada?

Several integrated energy systems are being planned or built in Canada. Leading initiatives include:

- Drake Landing solar community, Okotoks, Alberta
- Smart Growth on the Ground, Maple Ridge, B.C.
- Whistler 2020, B.C.
- Project Green Eco-Industrial Park, Pearson Airport, Ontario
- Emerald Hills Urban Village, Strathcona County, Alberta
- Sustainable Community Planning, Wolfville, Nova Scotia
- City of Guelph Community Energy Plan, Ontario
- Toronto Waterfront and Regent Park, Ontario
- East Fraser Lands and Southeast False Creek, Vancouver, B.C.
- Angus Site Redevelopment, Montreal, Quebec
- Riverbend Heights, London, Ontario
- Dockside Green, Victoria, B.C.

With respect to energy, the emphasis in most of these developments is on improved efficiency in buildings and on thermal supply (i.e., district heating systems). None of them have on-site electricity generation or storage. Further detail on a few of the initiatives is given below:

- Drake Landing Solar Community - Solar seasonal storage providing 90% of space heating from solar thermal collectors, a district heating loop and a thermal storage system. While the system is serving 52 single family homes, rather than a higher density mixed-use neighbourhood, it is a remarkable example of the use of on-site renewable energy. www.okotoks.ca
- Emerald Hills Urban Village (the SUN Process pilot) – This is a 50 acre mixed-use development in Strathcona County, outside Edmonton. Plans are for a renewable-based district heating system, among other things, that will be owned and operated by the County. www.emerald-hills.ca
- City of Guelph Community Energy Plan – The City has made a commitment to implement a Community Energy Plan with several ambitious targets and actions. Priorities include: maximize energy and water efficiency for buildings, vehicles and industry; maximize use of heat produced by electricity generation and existing industrial processes; incorporate as many renewable energy sources as feasible; and, team with the existing electricity and gas networks to avoid wasteful duplication of assets. www.city.guelph.on.ca
- Southeast False Creek (Vancouver, BC) - Includes a neighbourhood energy system running on sewage waste heat, owned and operated by the City of Vancouver (currently under construction). http://vancouver.ca/sustainability/building_neu.htm
- Riverbend Heights Community Energy System (London, Ontario) – This project comprises plans for a mixed-use development that would include energy-efficient buildings, advanced sewage collection and anaerobic digestion of organic waste, combined heat and power generation, low-temperature district heating and cooling, aquifer thermal energy storage, and air source domestic hot water heat pumps. www.london.ca
- Dockside Green (Victoria, B.C.) – The Dockside Green community is being developed on fifteen acres of former harbourfront industrial land, with a planned total of 1.3 million square feet of mixed residential, office, retail and commercial space. It will showcase green buildings and best-practice energy technologies. The community will function as a total environmental system, in which form, structure, materials, and mechanical and electrical systems will be interrelated and interdependent – a largely self-sufficient, sustainable community where waste from one area will provide fuel for another. www.docksidegreen.com

Message: Canada has launched or is planning initiatives that are consistent with the QUEST vision. Only a small number of them approach the level of systems integration of infrastructure, technologies and practices that is envisaged by QUEST. The initiatives are, however, building a solid base of experience and expertise that can be drawn upon to implement the vision.

Who is participating in QUEST?

QUEST is a collaborative among a range of organizations across Canada. Participants in QUEST workshops and other initiatives include federal, provincial and municipal officials, industry associations and company representatives, academics, environmental organizations, charitable foundations, technical experts and consultants.

Core supporters include:

- BC Hydro
- Government of British Columbia
- Canada Green Buildings Council
- Canadian Electricity Association
- Canadian Gas Association
- Canadian GeoExchange Coalition
- Canadian Petroleum Products Institute
- Canadian Urban Institute
- Federation of Canadian Municipalities
- Natural Resources Canada
- Ontario Power Authority
- Pollution Probe
- Transport Canada

Building a network:

The QUEST collaborative is building a national network of champions and interested stakeholders. The first workshop involving 60 participants was held on November 14-15, 2007 in Niagara-on-the-Lake, Ontario. A second workshop that will involve 80 stakeholders will take place on November 26-28, 2008 in Victoria, B.C. A scan of stakeholders across Canada identified many more organizations that could potentially become part of the collaborative, based on their mandates and areas of expertise. These organizations include:

Alberta Climate Change Centrals
B.C. Sustainable Energy Association
Solar B.C.
Ontario Sustainable Energy association
Community Power Fund (Ontario)
Toronto Renewable Energy Co-Operative
Manitoba Sustainable Energy Association
Solar Nova Scotia
International Centre for Sustainable Cities
Sustainable Cities: PLUS Network
EnviroTech Solutions

Canadian Institute of Planners
Royal Architectural Institute of Canada
Net Zero Energy Home Coalition
Windmill Development group
Sustainable Buildings Canada
EcoCite Developments
Sustainable Urbanism Initiative
Smart Growth Canada Network
Centre for Sustainable Transportation
Canadian District Energy Association

What Support Does QUEST Get in Canada?

Many government programs and incentives support parts of the QUEST vision. But they mostly operate in isolation or are poorly coordinated. A major challenge in achieving the QUEST vision will be to cross-link existing programs and incentives to enhance their effectiveness by integrating them into a more cohesive framework.

Relevant programs, incentives and initiatives across Canada include:

- Federation of Canadian Municipalities, Green Municipal Fund
- Municipal Rural Infrastructure Fund
- Technology Early Action Measures
- Sustainable Development Technology Canada
- CANMET Energy Technology Centre
- NRCan (various program, such as the Office of Energy Efficiency)
- Urban Transportation Showcase Program, Transport Canada
- Infrastructure Canada
- EcoTrust
- Moving on Sustainable Transportation
- Ontario Power Authority programs and incentives (e.g., Renewable Energy Standard Offer, Clean Energy Standard Offer, Demand Response Program)
- Ontario Greenbelt
- Vancouver and area initiatives (e.g., EcoDensity, Translink, Greenways Plan, Community Visions Program)
- Revi-Sols, Montreal and Quebec City

These initiatives fit within the QUEST vision. More support for these, and other, QUEST-related initiatives is required.

Message: The federal government runs a variety of energy-related programs and provides a variety of incentives to industry, commercial enterprises and the public. While support is available for elements of the QUEST vision, end-use approaches are not sufficiently funded by the federal government and there is no program support at present for urban integrated energy systems as envisaged by QUEST.

Where Does QUEST Go From Here?

QUEST is a growing movement. It is attracting interest from diverse sectors of society and from stakeholders across Canada. The Victoria workshop in November 2008 will be the second gathering of interested stakeholders and will be a staging ground for generating new ideas and launching new efforts to further build momentum. QUEST needs ongoing support from governments, industry and the many organizations that are doing leading edge work on parts of the vision. QUEST needs to become better organized, with the capacity to network among the growing number of QUEST advocates and supporters, and to reach out more broadly to both policy makers and the public. The role of communications will require an ongoing presence and financial support.

CONCLUSION

QUEST is a new and growing movement with many valuable contributions to make to Canada:

- It is a collaborative that will stimulate and guide dialogue among a broad range of sectors and stakeholders;
- It is a complement to de-carbonization of large-scale energy resource development and use;
- It will help achieve Canada's greenhouse gas and air pollution reduction goals;
- It will enhance energy security and reliability for consumers;
- It will stimulate investment, technological innovation and new job creation; and,
- It will strengthen the economic base of urban centres and small communities and improve Canada's overall competitiveness.

BUT

QUEST needs government policy and program support:

- Urban planners and energy system planners must think in terms of integrated urban energy systems;
- Barriers to deploying energy efficiency and renewable energy technologies must be removed;
- Long term, stable financial mechanisms must be put in place for municipalities and private sector energy service providers; and,
- New technologies must be developed and supported by a strategy that will bring investment and jobs to Canada.

QUEST is more than a vision – it is an essential part of Canada's commitment to meet its climate change and clean air goals and to foster sustainable development.

Canada needs to move on the QUEST vision NOW before a high-consumption and high-carbon, energy-intensive infrastructure is locked in and opportunities to implement the vision are lost.