

March 30, 2009

## **Achieving integration of energy services in Canadian communities: The Role of the Federal Government**

### **Summary**

Approximately half of Canada's energy use and related greenhouse gas emissions result from daily activities in Canadian communities, from the largest metropolitan areas to smaller communities across the country. International studies indicate that if it was to include indirect emissions generated by city-dwellers this could rise to 80 percent.<sup>1</sup>

Real potential exists for curbing energy demand and reducing greenhouse gas emissions in our communities. This will require an integrated approach to land-use, energy, transportation, buildings, waste and water. While there is no one solution to capture the gains for all communities, the application of the QUEST principles fosters the emergence of a variety of solutions that can be adapted to the unique needs of each community across Canada. There is a significant role for the Federal government in improving the outcomes and moving towards a new business as usual for community energy use. The Federal government can foster significant progress towards more efficient and effective urban energy systems through the following:

- *Policy Leadership* – Articulate federal intentions to significantly advance the role of integrated community energy systems and lead by example with existing and new federal buildings.
- *Investment Incentives* – Coordinate existing programs into a coherent communities strategy and provide targeted tax and funding incentives to support investment in integrated community energy systems and infrastructure.
- *Capacity Building: R&D, Skills and Knowledge Development* – Create and support a network of integrated energy systems experts and resources across the country to support municipalities and develop advanced planning and policy analysis tools to better inform policy-makers and stakeholders.

Detailed examples of potential federal actions are provided in section three, 'Opportunities for Federal Action'.

### **1. Background**

Approximately half of Canada's energy use and related greenhouse gas emissions result from daily activities in Canadian communities, from the largest metropolitan areas to smaller communities across the country. Community energy systems include:

- transportation choices - what modes and fuels are available;
- heating, cooling and lighting options for homes, institutions, businesses and industries;
- local waste and water systems, often sources of wasted energy; and,
- the energy supply system including local renewables and traditional energy sources.

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<sup>1</sup> Anna Tibaijuka, Executive Director of UN-HABITAT and Director General of UNON in presentation at the International Conference on Cities and Climate Change, March 17, 2009, Oslo, Norway

Energy choices and resulting emissions are strongly influenced by government policy choices that determine the layout of our communities and the form of infrastructure within our communities. Therefore, unlike individual industrial and consumer choices for equipment, appliances and vehicles, governments play *the* decisive role in setting how efficiently and effectively community energy systems develop over time, and how other stakeholders can engage in the design process. Given the long-lived nature of community developments and infrastructure, the result is that we are choosing our future community energy use and emissions patterns today and those choices are inconsistent with broader goals, particularly greenhouse gas emissions targets.

QUEST is a collaboration of key players from industry, the environmental movement, governments and academia that is encouraging all levels of government, industry and citizens to support integrated approaches to providing energy services in Canadian communities.

The QUEST mission is to foster a community-based integrated approach to land-use, energy, transportation, buildings, waste and water and to reduce related greenhouse gas and air pollutant emissions and waste. The mission 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 biomass, geothermal, hydro, solar and wind energy; and
- Use grids strategically – optimize use of grid energy and as a resource to optimize the overall system and ensure reliability.

Applying the principles, the building blocks of integrated community energy systems are:

- Integration of land-use, transportation, energy, water and waste systems planning;
- An enabling platform of higher density, mixed use developments of energy efficient buildings and homes;
- A backbone of smart district energy/utility grids, allowing optimal management of available energy;
- Distributed smaller scale, local energy systems; and
- Using local renewables - solar, geothermal, hydro, wind and biomass.

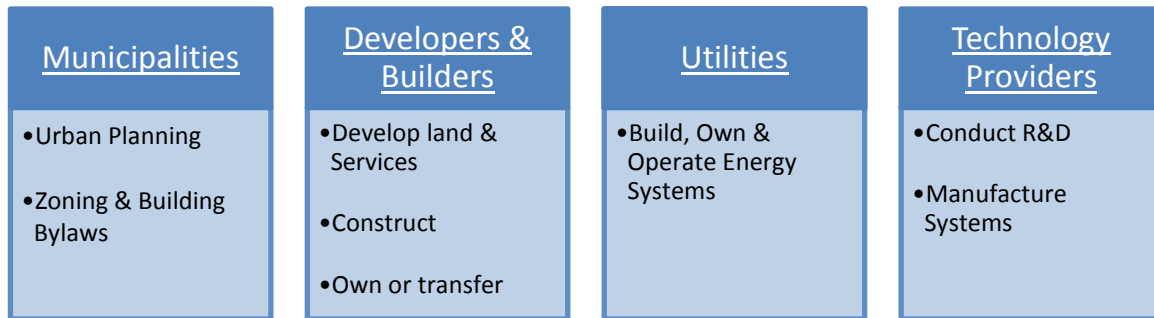
The QUEST vision is that by 2050 every community in Canada is operating as an integrated energy system, and accordingly, all community development and redevelopment incorporates an integrated energy system.

Implementation of this Vision would bring considerable benefits to Canada & Canadians in the form of a more efficient use of our natural resources; a more robust, resilient and adaptable energy system that meets the specific needs and circumstances of individual communities, large and small; reduced energy cost burden; improved air quality; reduced GHG emissions; local employment and economic development; and overall better quality of life in our communities.

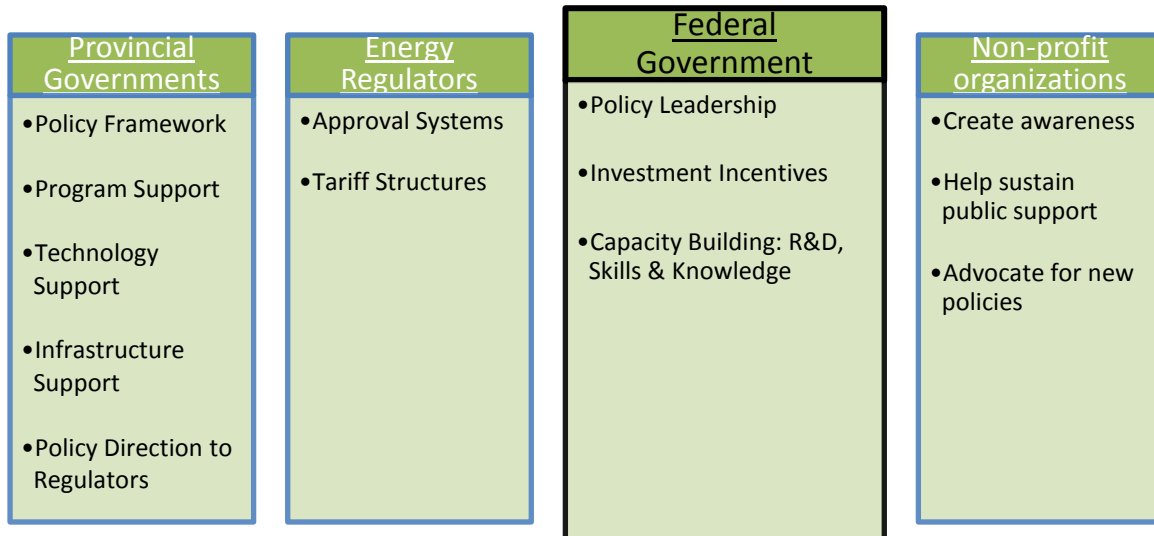
There is no one solution to capture the gains for all communities. Macro-level policies such as carbon pricing and vehicle and equipment efficiency standards are important elements of the whole, however local systems and infrastructure choices require identifying and catering the best technology tools in our tool box and using them in different combinations. Many decisions that shape community energy systems, such as zoning and property tax regimes, are made at the provincial and municipal level, however there is a significant role for the Federal government in improving the outcomes and moving towards a new business as usual for community energy use.

## 2. The Key Players and Their Role

### *The Actors*



### *The Enablers*



### 3. Opportunities for Federal Action

#### *Policy Leadership*

- Articulate the Government of Canada's intention to significantly advance the role of integrated community energy systems in Canada's energy future.
  - Include adoption of the QUEST principles and identifying the building blocks of integrated community energy systems as playing a key role in meeting Canada's greenhouse gas emissions reduction goals.
  - Initiate discussions regarding QUEST at the Council of Energy Ministers.
  - Building on their current work, encourage Canada Mortgage and Housing Corporation and the National Research Council to become more actively involved with QUEST and to adopt the principles in their work on housing and communities, and the national building code.
  - Ensure the information products and statistics produced by the relevant federal government departments and agencies capture and reflect the potential of integrated community energy systems.
  - Encourage Natural Resources Canada to continue and expand the scope of the work that has been done to date on integrated community energy systems and its building blocks (e.g. efficiency for buildings and homes, renewable and distributed energy systems).
- Lead by example and make federal buildings (existing and new) nodes for integrated community energy development.
  - Federal buildings can join existing district heating and cooling systems or help to initiate new systems.
  - New Federal buildings can be sited with consideration to public transit access and district heating and cooling potential.
  - New and existing federal buildings can lead by example of energy efficiency by reducing demand on integrated energy solutions.

Example: the Federal/Provincial Community Energy Solutions Roadmap coordinated by Natural Resources Canada for the Council of Energy Ministers (to be released in the fall of 2009).

#### *Investment Incentives*

- Coordinate existing programs (e.g. infrastructure, technology and energy efficiency funding) into a coherent communities' energy strategy, under the above noted policy umbrella.
  - Incorporate QUEST principles into infrastructure funding requirements and apply an energy lens to infrastructure spending across Canada, in partnership with provinces, municipalities, utilities, developers and property owners.
  - Increase planning, infrastructure and technology funding specific to integrated community energy systems through funds such as Sustainable Development Technology Canada and the Green Infrastructure Fund.
  - Allocate a specified portion of Federal infrastructure funding to demonstrate flagship integrated energy systems in communities in all regions of Canada.
- Implement a direct incentive for district heating and cooling systems (new systems and for expanding existing ones) modeled on the ecoEnergy for Renewable Power incentive.
- Provide accelerated depreciation of integrated energy systems infrastructure components (e.g. district heating networks, privately funded distributed energy and waste management systems) to alleviate the high upfront investment costs.
- Provide additional funding to the Green Municipal Fund to grow its capacity to specifically fund integrated energy systems.

### ***Capacity Building: R&D, Skills and Knowledge Development***

- Create and support a network of integrated energy systems experts and resources across the country to support municipalities with implementation.
  - Create centres of expertise across Canada to provide training so that local experts can build, operate and evaluate integrated community energy systems.
- Develop advanced planning and policy analysis tools to better inform policy-makers and stakeholders about the environmental and economic impacts of their options.
  - Create and distribute a community energy planning guide to assist communities in developing a community energy plan that can be integrated into an Official Plan and/or an Integrated Community Sustainability Plan.
  - Advance policy analysis tools to include a spatial component to characterize community design, local renewable energy resources, recoverable waste heat and transportation patterns.
  - Create a toolkit for energy mapping so that communities can better understand their energy flows, including recoverable heat, transportation and waste.
- Support community energy solutions through increased R&D on the building blocks of integrated community energy systems (e.g., renewables, district heating and distributed power generation and micro-CHP) and their interactions.
- Establish energy performance benchmarks, design and operations standards for new and existing buildings and homes and their interaction in neighborhoods and communities, to optimize the design of and investment in community energy systems – a systematic approach to enhancing system efficiency from building design/retrofit (demand side efficiency) to integrated energy systems (supply side efficiency).

#### Examples:

- The Canadian Urban Institute's Energy Mapping Study for the City of Calgary
- The CaGBC Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ for Neighbourhood Development (LEED ND).
- FCM Partners for Climate Protection and Green Municipal Fund.

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