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Quality Urban Energy Systems of Tomorrow (QUEST) **Submission to the Council of Energy Ministers – August** **2009**

Supporting Integrated Community Energy Solutions

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 including indirect emissions generated by city-dwellers this figure could rise to 80 percent.¹

Much potential exists for curbing energy demand and reducing greenhouse gas emissions in our communities. This will require an integrated approach to decision making on land-use, energy, transportation, buildings, waste and water. QUEST is encouraged by the growing recognition policy-makers are showing for integrated energy solutions and supports the strategies outlined in the CEM Roadmap.

While there is no one solution to capture the gains for all communities, the application of the six QUEST principles allows for a variety of solutions that can be adapted to the unique needs of each community across Canada. There is a significant role for policy-makers to play in improving the outcomes and moving towards a new business model for community energy management. Governments can ensure significant progress on more efficient and effective community energy systems through:

- *Policy Leadership* – Articulate intentions to significantly advance the role of integrated energy solutions and lead by example with existing and new government facilities.
- *Investment Incentives* – Coordinate existing programs within a coherent communities strategy and provide targeted funding incentives for investment in integrated energy solutions and infrastructure.
- *Capacity Building: R&D, Skills and Knowledge Development* – Develop baseline data, planning and design tools, and a network of experts, in concert with technology demonstrations, to better inform decision-makers and stakeholders.

Detailed examples of potential actions are provided in section 3 of this submission - 'Opportunities for Action'.

¹ 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

1. Context

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. Integrated Energy Solutions (IES) include:

- Transportation choices – various modes and fuels;
- Energy efficient heating, cooling and other energy needs - for homes, institutions, businesses and industries;
- Local solid waste and sewer systems - often sources of wasted energy; and,
- Energy supply systems - including local renewables and traditional energy sources.

Energy choices and resulting emissions are strongly influenced by government policy choices and decisions that determine the layout of communities and the form of infrastructure within communities. Therefore, unlike individual industrial and consumer choices on equipment, appliances and vehicles, governments play *the* decisive role in setting how efficiently and effectively community energy systems develop over time, as well as how 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 often inconsistent with broader goals, particularly greenhouse gas emissions reduction targets. A study completed by Mark K. Jaccard and Associates entitled *Exploration of the capacity to reduce GHG emissions by 2020 and 2050 through application of policy to encourage integrated urban energy systems* (January 2009) concludes that 'deliberate infrastructure and land use planning could reduce emissions by 65Mt and virtually eliminate international permit purchases, saving \$6.5 billion in capital outflows annually'.

QUEST

QUEST is a collaboration among 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 solutions in Canadian communities. It has become a movement – more than just a coalition of interested parties. QUEST is encouraged by the growing recognition policy-makers are showing for Integrated Energy Solutions (IES) and supports the strategies outlined in the CEM Roadmap. The Roadmap's strategies call for cooperative policy leadership across jurisdictions, incremental transformation through community-level investments, and local capacity-building. The QUEST community has identified opportunities for action that support the Roadmap and that move Canada towards achieving the QUEST vision.

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 energy solutions:

- **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 IES 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 with an integrated energy system, and accordingly, all community development and redevelopment incorporates an integrated energy solution. The QUEST vision is designed to empower communities into action.

Implementation of this vision would bring considerable benefits to Canadians in the form of 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; a reduced energy cost burden; improved air quality; reduced GHG emissions; increased 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, vehicle and equipment efficiency standards, and building codes are important elements of the whole; however, local systems and infrastructure choices require identifying and using the best technology tools in our tool box.

2. Opportunities for Action

The CEM would be an excellent forum to launch a cooperative effort to advance the role of IES and make it part of a new “business as usual” energy future across Canada. Success in realizing the full potential for IES will require action at all levels of government, as well as collaboration with non-government actors and enablers.

The Actors

Municipalities	Developers, Builders & Owners	Utilities	Technology Providers
<ul style="list-style-type: none"> • Urban Planning • Zoning & Building Bylaws 	<ul style="list-style-type: none"> • Develop Land & Services • Construct • Own or Transfer 	<ul style="list-style-type: none"> • Build, Own & Operate Energy Systems 	<ul style="list-style-type: none"> • Conduct R&D • Manufacture Systems

The Enablers

Provincial Governments	Energy Regulators	Federal Government	Non-profit organizations
<ul style="list-style-type: none"> • Policy Framework • Program Support • Technology Support • Infrastructure Support • Policy Direction to Regulators 	<ul style="list-style-type: none"> • Approval Systems • Tariff Structures 	<ul style="list-style-type: none"> • Policy Leadership • Investment Incentives • Capacity Building: R&D, Skills & Knowledge 	<ul style="list-style-type: none"> • Create awareness • Help sustain public support • Advocate for new policies

What can CEM do to promote and support integrated energy solutions across Canada?

QUEST has identified three areas in which CEM can support IES:

Policy Leadership

- State CEM support for IES in each jurisdiction.
 - Adopt the QUEST principles and identify the building blocks of IES as a central part of a greenhouse gas emissions reduction strategy.
 - Ensure that information and statistics produced by the government agencies capture and reflect the potential of IES.
- Make government facilities nodes for IES development.
 - Facilities can be linked through existing district heating and cooling systems and act as a catalyst for new systems development.
 - New facilities can be sited with consideration to public transit access and district heating and cooling potential.

Investment Incentives

- Coordinate existing government programs to support community energy strategies such as, incorporating QUEST principles into infrastructure and public transit funding requirements and apply an energy lens to spending in partnership across governments, utilities, developers and property owners.
- Provide long-term funding / financing for 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.
- Implement streamlined, predictable and long-term federal and provincial funding programs for public transit.

Capacity Building: R&D, Skills and Knowledge Development

- Generate major capacity building efforts to support regional delivery by supporting the QUEST initiative and building the coordination capacity required for the planning, design and implementation of IES. Energy Ministers are encouraged to support:
 - feasibility studies and the development of community energy plans;
 - monitoring and reporting on IES projects;
 - a regional delivery network for coordination of services and activities, including education and outreach to local stakeholders;
 - development of analysis, planning and measurement methodologies and tools; information and education materials and activities; policy and market studies; and research and development.

The Role of QUEST

QUEST is the on-the-ground Canadian body to implement a strategy to transform energy delivery and use in communities. QUEST is:

- The only comprehensive approach to address energy end-use and reduce greenhouse gas emissions in Canadian communities.
- An inclusive approach providing national level networking, including all the key stakeholders; as well as facilitation, outreach and policy research in collaboration with private and public sectors across Canada.

QUEST needs to continue and thrive as an agent of change in the way Canadian communities generate, access and manage end-use energy services; tying the energy system to the sustainability agenda. It is an important resource to the three levels of governments for the following reasons:

- QUEST presents a vision for integrated energy systems that can serve the environmental, economic and social needs and values of Canadians.
- QUEST can leverage the role of the federal and provincial energy ministers to support a vision with support from industry, ENGOs and academia.
- QUEST can leverage resources from the public and private sector to achieve the vision.

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Appendix1: The Reach of QUEST

Federal Government

- Industry Canada
- Infrastructure Canada
- National Research Council
- Natural Resources Canada
- National Roundtable on the Environment and the Economy

Provincial Governments

- Nova Scotia - Department of Energy
- Agence de l'efficacité énergétique du Québec
- Quebec - Ministère des Affaires municipales, des Régions et de l'Occupation du territoire
- Government of Ontario - Growth Secretariat
- Ontario Power Authority
- Saskatchewan - Office of Energy Conservation
- Alberta Climate Change Central
- Government of BC - Office of Energy Efficiency

Municipalities

- Québec
 - Blainville
 - Boisbriand
 - Montréal
 - Québec City
- Ontario
 - City of Guelph
 - City of Toronto
- Alberta
 - City of Calgary
- British Columbia
 - City of Dawson Creek
 - City of North Vancouver
 - City of Surrey
 - City of Vancouver
 - District of Saanich
 - Resort Municipality of Whistler

Associations

- Canadian Electricity Association
- Canadian Gas Association
- Canadian GeoExchange Coalition
- Canadian Home Builders Association
- Canadian Petroleum Products Institute
- Canadian Urban Institute
- Net-Zero Energy Home Coalition

Consultants

- Dunsky expertise en énergie
- Enerlife Consulting
- ICF International
- Lawson Research
- Marbek Resources
- SNC Lavalin

Buildings Sector

- Canada Green Building Council
- Windmill Development Group
- Canadian Home Builders Association

ENGOS

- Association Québécoise pour la maîtrise de l'énergie
- Canadian Energy Efficiency Alliance
- IVEY Foundation
- Pembina Institute
- Pollution Probe
- Sustainable Cities Foundation
- WADE Canada

Academics

- Québec
 - École Polytechnique de Montréal
 - HEC Montréal
 - Université Concordia
 - Université Laval
 - Université de Montréal
- Ontario
 - Seneca College
 - University of Ontario Institute of Technology
 - University of Toronto
- British Columbia
 - Royal Roads University
 - Simon Fraser University
 - University of British Columbia

Energy Industry

- BC Hydro
- CORIX Utilities
- Enbridge Gas Distribution
- Enerconcept Technologies Inc.
- Gaz Métro
- Hydro Québec
- New Brunswick Power
- Terasen Gas
- Toronto Hydro
- Union Gas Limited
- Veridian Corporation