Canadian GeoExchange Coalition
Coalition canadienne de l'énergie géothermique

Integrated Approaches for Providing Energy Services in Canadian Communities: The Role of Heat Pumps

Standing Committee on Natural Resources

March 24, 2009

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Created in 2002 thanks to the joint efforts of Natural Resources Canada and a group of electric utilities, the Canadian GeoExchange Coalition (CGC) represents 300 members from across Canada and the United States.

The CGC acts as the industry catalyst to unite private and public sector stakeholders, and to expand the market for ground source heat pumps and geoexchange™ technology in Canada.

As the nexus of information, training, certification, standards and public awareness, our mandate is to work with stakeholders to build the necessary infrastructure to foster the growth of the Canadian geoexchange™ industry.

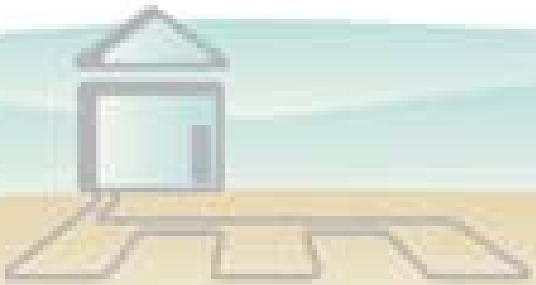
Our members are:

- *Energy Distribution Companies (electric and natural gas)*
- *Equipment Manufacturers and Distributors*
- *System Installers*
- *System Designers (Architects & Engineers)*
- *Building owners & managers, Developers, Facilities managers, and Governments*
- *Research centers, academic institutions*
- *Financial, legal, other industry support services*
- *Industrial / Professional Associations*

Integrated Energy Systems: A North American Challenge

Suddenly and simultaneously, we must:

- Adapt to noticeable fluctuations in energy prices
- Continue optimizing the overall energy supply and demand chain
  - Ensure and better manage energy supply and demand from traditional sources
  - Improve energy efficiency
  - Integrate renewable energy in demand and supply equation
- Understand and accept that Canada plays a key role for energy security in North America
- Define the role of communities in energy management issues
- Rethink how energy is moved in and around communities
- Build / upgrade infrastructure to reflect adoption of new energy technologies
- Ensure economic growth and sustainability
- …accomplish it all without losing a single job (!)



An increasing number of tasks that must be solved, without delay.

Traditional Approach for Providing Energy Services

Supply sources outside the community	Consumption units within the community
Oil	Cars and trucks
Natural Gas	Homes and buildings
Electricity	Industry and municipal processes

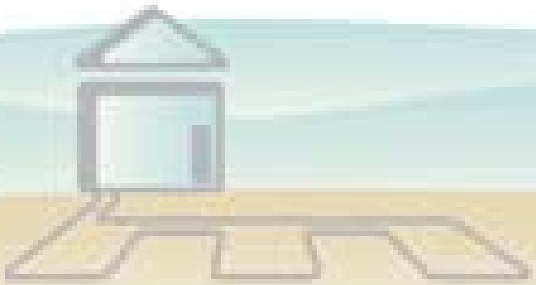
Integrated Energy Systems

Reality

- Most of the energy consumed within communities is thermal energy
- Most such thermal energy is generated by combustion of fossil fuels
- Most communities and organisations do not have a culture of energy management

Conclusions

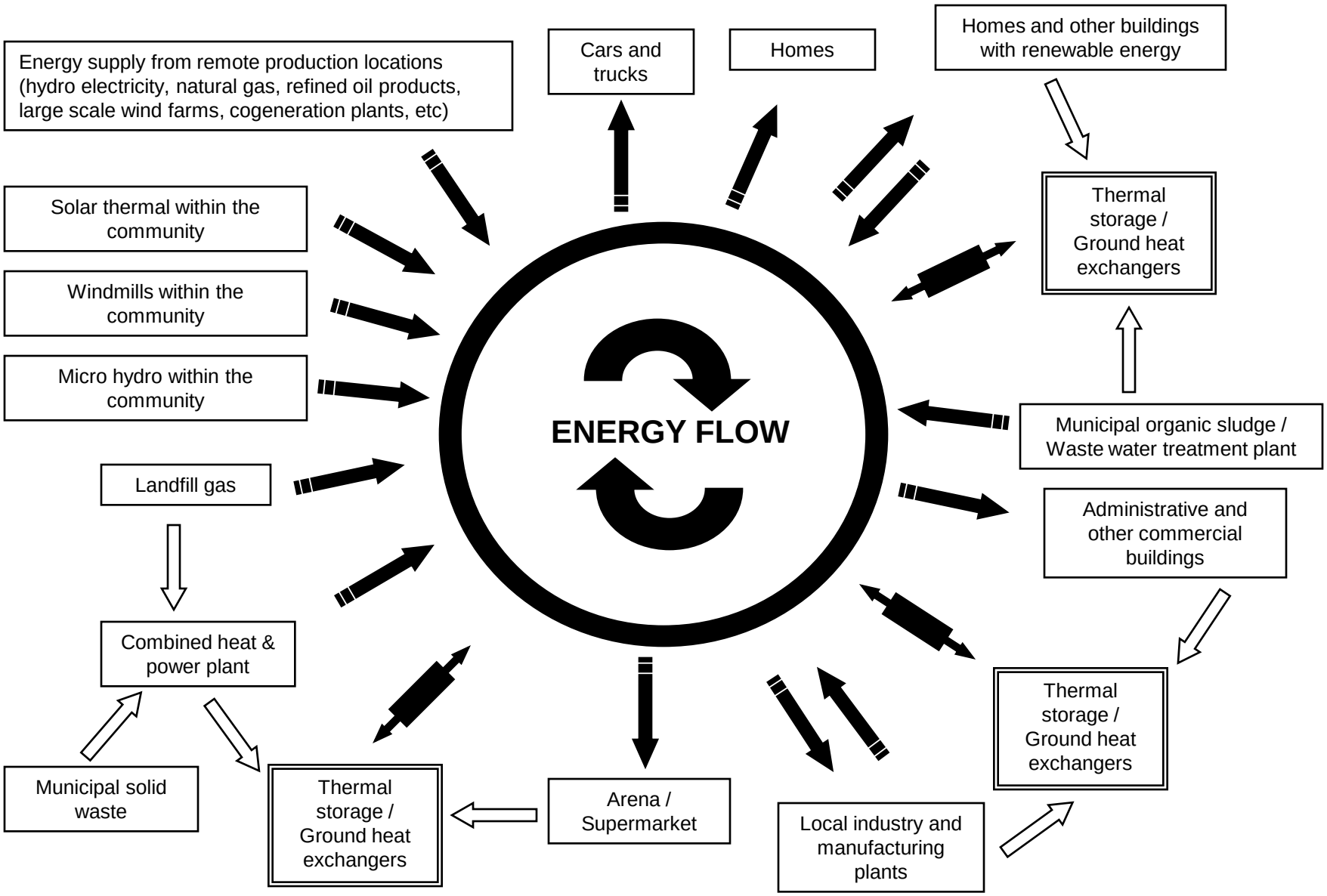
- We must promote wider use of technology which produces thermal energy more efficiently within the entire supply-demand chain
- We must accelerate the wider and wisest use of available technologies to move thermal energy within our communities



A key technology? <u>Heat Pumps</u>

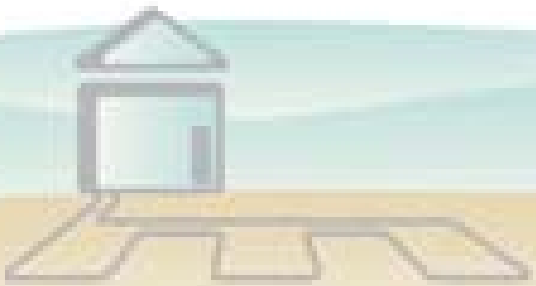
A key tool? <u>Integrated Energy Systems</u>

Integrated Approach for Providing Energy Services



Market Barriers – Integrated Energy Systems

1. Reluctance to move away from current practices – decisions influenced by sporadic irrational behaviour
2. Financial Issues
   - Investment timing with capital stock turnover
   - Lack of adapted financing
   - Inappropriate incentives – creates market disturbances and disequilibrium
3. Market structure – supply issues for new technologies / equipments
4. Regulatory issues like wrong price signals
5. Standards issues
   - Standards which do not reflect the state of science and innovations
   - Confusing and contradictory language
6. Lack of information or outright disinformation
7. Training and labour issues
8. …



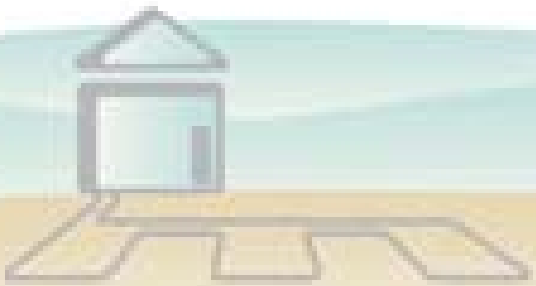
Integrated Energy Systems - Market Transformation

1. Market transformation is about addressing market failures

    - In general, market barriers contribute to reduce the overall level of investment
    - On the other hand, market failures happen when markets alone are incapable of resolving market barriers

2. Market transformation is about making lasting changes within markets to ensure sustainable market growth

    - Find solutions to market barriers
    - Implies the revision and promotion of standards and best practices
    - Implies the application / enforcement of standards and best practices



Market Transformation – A Simple Successful Model

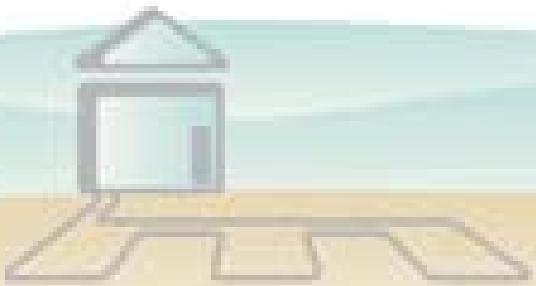
CGC response to market failures

- 10 years + of consultations by government and industry stakeholders
- CGC *Global Quality GeoExchange Program*®
- A self-regulating, industry led approach
- Program based on existing standards and best practices
- Quality Equation:

  Training + Accreditation + Certification

  = market discipline for the industry

  = consumer / stakeholder confidence in technology

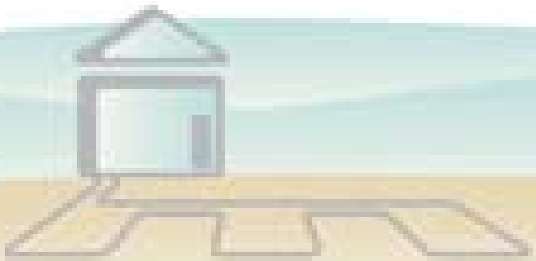


CGC Results and Replicable Model

- Training
  - 1529 installers
  - 130 upgrade workshops (installers)
  - 835 residential designers
  - 61 commercial designers
  - 13 municipal inspectors

- Accreditations et qualifications
  - 479 accredited installers
  - 333 accredited residential designers
  - 197 qualified companies

- System certifications
  - 1847 fully certified residential systems since April 1st 2008
  - 2335 compliance reports (standard compliance) before April 1st 2008

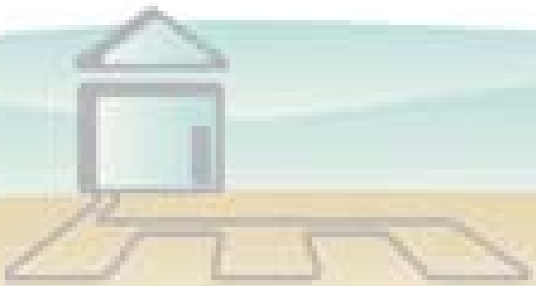


Opportunities for Industry to Grow, and Government to Help

1. Ensure technology program and infrastructure funding is aimed at integrated systems
   - Strategies for integrated energy systems will be more successful if combining 2 or more sources of energy / technologies
   - Scale does not necessarily matter – sizing matters

2. Set performance goals for energy use in buildings in Canada – lay out a vision for how Canada should look in future on a Joule / m^2 basis
   - Set an example through action: procurement and 50-year LCA for federal properties

3. Recession might provide the right opportunities
   - Need for training and retraining a growing group of unemployed
   - Public investments for replacement of aging infrastructures – need to invest wisely in full system
   - Focus on capital stock turnover cycles – timely action
   - Beware of lost opportunities – need to look at life cycle analysis



A Few Conclusions

1. A strong exergy, sustainability and a strong economic case exists for integrated energy systems and geoexchange deployment in Canada as part of high-exergy energy systems.
2. GeoExchange and other energy systems can help Canada meet its sustainability, efficiency and affordable housing goals.
3. Need to adapt existing standards – and develop new standards – to facilitate the expansion of integrated energy systems
4. A key barrier is information, both technical and consumer; Government can help industry greatly by helping develop better information.
5. Industry (self-regulating) infrastructure and information infrastructure is in place for ground source heat pumps now through the national quality program. This easily replicated model, and Canadian success story, is a key opportunity for quality integrated energy systems