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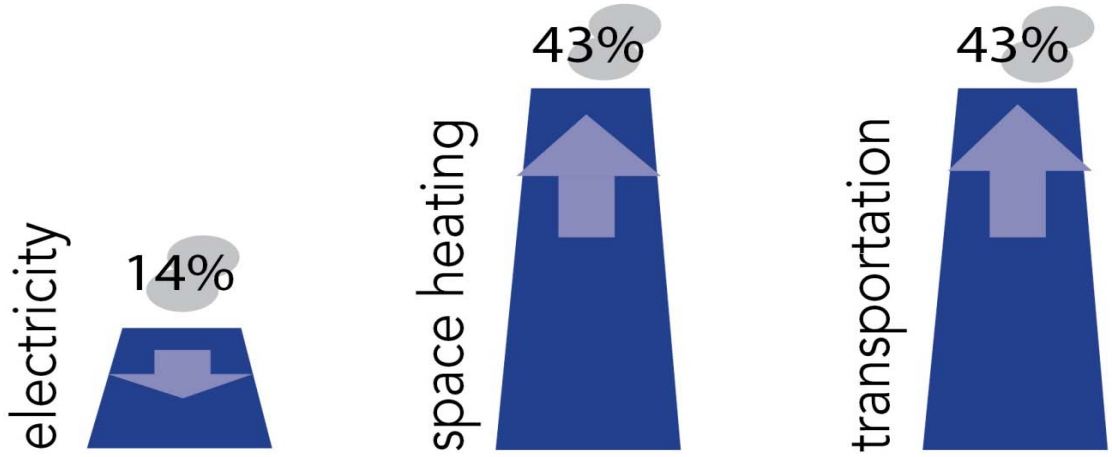
GEO-CITY: GREEN HEAT FOR THE GTA



City of Toronto GHG reduction target, from 1990 baseline of 22 MT/yr:
6% by 2012 >>> 30% by 2020 >>> 80% by 2050

With nearly 50% of urban energy use and greenhouse gas emissions attributable to the use of natural gas for space heating and electricity for space cooling, alternative approaches are needed that are reliable, affordable, compatible/feasible in a range of urban settings, and sharply reduce net emissions.

For millennia people have made use of the earth's constant subsurface temperature to naturally cool or avoid freezing. While predominantly deployed in rural and suburban settings, various systems have been installed in the Toronto region, and there is growing interest for both multi-unit and single-family applications, in both a new development and retrofit context. Recent improvements in air-sourced heat exchange technologies which make it viable in colder climates are perking interest in this approach, especially given ease and cost of installation. Similarly there may be opportunities to extract heat from the lake during winter, not only cooling during summer.

However, there are significant technological, capacity, policy/financial barriers to implementation. Understanding the potential, the barriers, the relative merits of the various energy-exchange opportunities, and mapping out a pathway for advancing deployment of heat exchange energy in the urban context is the focus of this collaborative initiative.

Goal

Reduce the emissions associated with the use of conventional/fossil fuels by advancing the use of heat exchange technologies for space heating and cooling.

Objectives

- Assess the potential to offset fossil fuels in a densely-built urban environment, both in the retrofit and Greenfield contexts.

- Incubate, demonstrate, validate and de-risk the opportunities, addressing technical, regulatory and financing/business case barriers

- Pave the way for mainstream urban deployment at-scale.

Approach & Activities

Convening. GeoCity is an independent, collaborative initiative, drawing on the interests and expertise of key stakeholders. TAF acts as 'secretariat to engage and harness the skills and interests of stakeholders related to scaling up urban heat exchange opportunities. Ryerson University's Centre for Urban Energy, TRCA, Ontario Geothermal Association, Canadian Geo-exchange Coalition, City of Toronto, Toronto Hydro, and several industry players have been involved to date.

Technical Research. Priority research gaps related to urban deployment, including siting, drilling, efficiency, hybrid systems, bed-to-building connection, etc. Post hoc analysis of systems in the GTA can serve as a stepping stone to best practice. Refinement of the benefit case is also needed, with special emphasis on GHG emission reduction.

Business case and financing. Various models require exploration and incubation; for instance private, district, utility and other approaches to ensuring that capital is available for long-term investments.

Policy alignment. A comprehensive, integrated, effective and cost-effective regulatory regime is a prerequisite to implementation at-scale. For instance, the City of Toronto is in the process of streamlining regulatory requirements for geothermal, with specific attention to use of City land/right-of-ways and district systems, and discussions are underway with the province regarding groundwater protection.

Demonstration, communication. Actual deployment and profiles of leading-edge technologies and implementation conditions by enthusiastic adopters can help raise awareness, establish champions, build confidence, and de-risk new approaches. Several 'emblematic' urban projects would be sought, for instance high-rise retrofits, school/residential, district, downtown, etc.

Roadmap. Together, develop the action plan for advancement of urban heat exchange in the GTA.

We look forward to working with academic, public and private sector stakeholders to advance 'green heat' in the GTA.