

## **Carbon Footprint Reduction on the three City West District Design Initiative sites**

<b>Date:</b>	April 22, 2008
<b>To:</b>	Planning & Growth Management Committee
<b>From:</b>	Chief Corporate Officer
<b>Wards:</b>	Wards 3 & 5
<b>Reference Number:</b>	P:\2008\Internal Services\F&re\Pg08045F&re – (AFS 7631)

### **SUMMARY**

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A community energy assessment will determine projected energy demand profiles and opportunities to minimize energy needs and explore options, including geo-energy and district energy systems, for meeting energy demands for the purpose of reducing the development's carbon footprint, on the three City-owned sites referenced in the West District Design Initiative: Etobicoke Civic Centre, Westwood Theatre Lands and Bloor-Islington Lands.

#### Purpose

For the Etobicoke Civic Centre, Westwood Theatre Lands and Bloor-Islington Lands, recommend a strategy for reducing the developments' carbon footprint and on a pilot project for Geothermal source Heating and Cooling on the Westwood Theatre Lands.

### **RECOMMENDATIONS**

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#### **The Chief Corporate Officer recommends to City Council that:**

1. The Chief Corporate Office, in conjunction with Toronto Hydro Energy Services Incorporated (THESI) and Enwave Energy Corporation (Enwave), carry out a Community Energy Assessment for the 3 development areas: Etobicoke Civic Centre, Westwood Theatre Lands and Bloor-Islington Lands developments, consistent with the strategy for reducing the carbon footprint for the sites.

2. The Chief Corporate Officer continue to work with Toronto Hydro Energy Services Incorporated (THESI) and Enwave Energy Corporation (Enwave) on the implementation of a pilot project for Geothermal Source Heating and Cooling on the Westwood Theatre Lands.

### **Financial Impact**

Approval of this report will have **no** financial impact beyond what has already been approved in the current year's budget.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

### **DECISION HISTORY**

<http://www.toronto.ca/legdocs/mmis/2007/pg/bgrd/backgroundfile-8765.pdf>

<http://www.toronto.ca/legdocs/mmis/2007/cc/decisions/2007-12-11-cc15-dd.pdf>

At its meeting on December 11, 12 and 13, 2007, Council considered the report on the West District Study: Results of the West District Design Initiative (WDDI) and directed:

“7. The Chief Corporate Officer work with Enwave and Toronto Hydro on developing a strategy for reducing the carbon footprint of development on the three City owned sites referenced in the WDDI; and report specifically to the Planning and Growth Management Committee in May 2008 on implementing a Pilot Project for Geothermal Source Heating and Cooling on the Westwood Theatre Lands for the first phase of development on the site.”

### **ISSUE BACKGROUND**

The City is undertaking the redevelopment of three sites: Etobicoke Civic Centre, Westwood Theatre and Bloor-Islington Lands. These sites are collectively referred to as the City's development sites in this report. Descriptions of these sites are provided in Appendix A.

To address climate change and green house gas reduction objectives the City has an interest in achieving sustainable energy use on the sites.

### **COMMENTS**

#### **Carbon Footprint**

The carbon footprint can be seen as the total amount of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases emitted over a full life cycle.

The energy use attributed to the construction, use and operation of the buildings to be placed on the development sites are major factors in determining the carbon footprint of the sites.

The carbon footprint of a development can be reduced by applying the following steps:

- A Lifecycle Assessment to determine environmental impacts of construction, uses and activities on a site.
- Identification of energy consumption and associated CO<sub>2</sub> emissions.
- Optimisation of energy efficiency and, thus, reduction of CO<sub>2</sub> emissions and reduction of other GHG emissions contributed from processes.
- Identification of solutions to neutralise the CO<sub>2</sub> emissions that cannot be eliminated by energy saving measures.

### **Community Energy Assessment**

In consultation with representatives of THESI and Enwave, it was determined that a Community Energy Assessment that takes a long range view towards a sustainable future is a sound strategy for reducing the carbon footprint of the development sites. The Community Energy Assessment considers land use, site planning, building design, infrastructure design and efficiency and planning for new energy supply options. The goal is to minimize energy use, establish energy security and maximize renewable energy.

Where the Toronto Green Development Standard focuses on individual buildings, the Community Energy Assessment looks at what the total community energy needs are and establishes and evaluates opportunities that exist for alternative energy supply options. A significant criterion for evaluating energy supply options is the reduction of the communities' carbon footprint.

The following process for investigating the methods and facilities that are available to meet the energy needs of the future buildings with the objective of determining a strategy for reducing carbon footprint was developed:

1. Determine the projected energy demand of the site(s) based on basic construction requirements.
2. Determine the projected energy use based on highly efficient buildings and infrastructure. The energy efficiency measures to achieve the performance goals should be specified. We would expect at least a 20% reduction in energy demand. Up to 50% should be considered.
3. Project an energy use profile for time of day and year for the individual sites in the community.
4. Compile the energy demands of the community. This will include the lands under development and may also include existing or projected uses in the vicinity. Particular characteristics of the community should also be considered, such as proximity to existing district energy system.
5. Investigate alternative methods to provide this energy demand, including district energy, waste heat utilization, geo-energy, co-generation and solar technologies

6. Evaluate these alternatives based on a lifecycle assessment and including all possible funding mechanisms and other implementation issues such as regulatory requirements and infrastructure ownership, with the objective of minimizing the developments' carbon footprint.
7. Select preferred energy supply methodology for the site(s).

City staff, supported by THESI and Enwave, will undertake this process which requires knowledge and skills in energy use projections, building operation simulation, energy supply alternatives and lifecycle costing.

### **Geothermal Source Heating and Cooling for Westwood Lands**

Representatives for THESI and Enwave have provided a preliminary review of the Westwood site and have, based on their experience with other sites advised that it is probable that a geothermal system for supplying heating and cooling on this site is feasible. As these lands are being prepared for sale, staff will work with the perspective purchasers to encourage an examination of the potential use of Geothermal heating and cooling on the site.

### **CONTACT**

Eleanor McAteer, P. Eng.  
Senior Engineer, Energy Efficiency Office  
Business and Strategic Innovation, F&RE  
Ph: 416-392-7003  
Fax: 416-392-1456  
Email: [emcatee@toronto.ca](mailto:emcatee@toronto.ca)

### **SIGNATURE**

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Bruce Bowes, P Eng.  
Chief Corporate Officer

### **ATTACHMENTS**

Appendix A: West District Lands Redevelopment (Etobicoke CC Complex, Westwood Theatre Lands, Bloor-Islington Lands)