TORONTO STAFF REPORT

April 4, 2005

To: Administration Committee

From: Commissioner of Corporate Services

Subject: Status - Energy Management Program (EMP) for City Facilities

Purpose:

To report on the status of the Energy Management Program as requested by Council.

Financial Implications and Impact Statement:

There are no financial implications as a result of this report.

Recommendations:

It is recommended that this report be received for information.

Background:

City Council, on February 4, 5, and 6, 2003 adopted Report No. 2, Clause No. 1, titled "Energy Management Program (EMP) for City Facilities. Included in the amended report was the following recommendation:

(3) the Energy and Waste Management Office submit an annual report to Council regarding the status of the Energy Management Program, including an update on the progress of adopting Enwave's district heating and cooling technology (Deep Lake Water Cooling) for City-owned facilities;

City Council at its meeting of September 22, 23, 24 and 25, 2003 adopted Report No. 9, Clause No. 43 of The Administration Committee, titled "Standardization of Temperature Set-Points and Lights-Out Policy in City-Operated Buildings" and added the following recommendation:

> "It is further recommended that the Commissioner of Corporate Services be requested to submit a report to the Administration Committee, in one year's time, on the success of

the Standardization of Temperature Set-Points and Lights-Out Policy in City-Operated Buildings and any further adjustments that may have to be made to the Policy."

Comments:

The Energy and Waste Management Office (EWMO) is responsible for implementing the various aspects of the EMP under the following general headings:

1. Energy Supply:
   - Coordinating the City's energy purchases.
   - Steering the City's purchase of 'Green' power.

2. Energy Efficiency/Energy Retrofits
   - Co-ordinating energy efficiency retrofit programs in order to reduce energy use in City facilities and as requested by Agencies, Boards and Commissions.
   - Communicating, educating and encouraging City staff towards energy conservation actions.
   - Assisting in the development of green roofing technologies and other new technologies.

3. Energy Information Tracking and Monitoring
   - Tracking and monitoring energy use and costs in City facilities and operations.
   - Integrating its energy tracking program with the City's accounting system.

The City, through the EWMO, has introduced many energy saving measures into its facilities over the last number of years and continues to realize the benefits of these energy management initiatives.

The EWMO's mandate is limited to City-owned facilities, however, it will assist the City's ABCs when requested. The Energy Efficiency Office (EEO) has the mandate of promoting energy efficiency in the broader City context through the Better Building Partnership (BBP). The EWMO and the EEO share technical expertise and assist each other when appropriate.

The following is a status report on the Energy Management Program:

(1) Energy Supply:

The goal of the EWMO related to energy supply is to effectively manage the City of Toronto's supply and cost of energy in a deregulated energy market and to take steps to meet the City's green power targets. This goal is addressed with specific energy supply initiatives related to Electricity, Natural Gas, and Green Power. The total energy use in the City is shown in Appendix 1.

Electricity:

The City entered into a 3 year Power Purchase Agreement (PPA), that fixes and stabilizes electricity costs for all City facilities including ABCs, on May 1, 2002, with Toronto Hydro Energy Services Inc. (THESI). On November 11, 2002, the Province announced that electricity rates would be capped at 4.3 cents/Kwh retroactive to May 1, 2002. The City participated in the rate cap until the Province implemented the two-tiered rate cap on April 1, 2004. As of this date the City opted back into the contract since the City's contract rate with THESI was lower than the new rate cap.

City Council by adoption of Clause No. 9, Report No 3 on April 19, 20, 21, 22, 23, 26, 27 and 28, 2004 authorized the City to enter into an extension of the PPA from May 2005 to December 31, 2006. The extension included a modest increase in rates charged to the City, however, these are still lower than the Provincial rate cap.

Natural Gas:

Through adoption of Clause No.14 of Report No. 2 of the Policy and Finance Committee on March 1, 2 and 3, 2004 the City entered into a 3 year Natural Gas Supply arrangement with three natural gas suppliers and also approved the appointment of a Natural Gas Committee to provide oversight to the City's natural gas purchasing strategy. This arrangement commenced on November 1, 2004 and will, for the most part, fix and stabilize natural gas commodity prices for all City facilities including ABCs participating in the program. (the Toronto Transit Commission and former Metropolitan Toronto Housing Authority buildings have contracted separately for their needs).

Steam and Deep Lake Water Cooling:

Enwave currently provides steam to six (6) City facilities including City and Metro Hall. The EWMO is currently reviewing the contracts related to steam supply in order to maximize benefits to the City.

The EWMO is currently reviewing proposals from Enwave to connect Metro Hall and possibly Old City Hall to Enwave's deep lake water cooling system. This will be the subject of a future report to Council.

Green Power:

Green power can be defined as electricity generated from renewable or from clean sources of energy. Examples of green power include wind, solar and water (small hydro). The City has adopted a target to purchase 25 percent of the City's electricity needs from green power sources by the year 2005.

To date the City has not purchased any green power. The main reason for this inaction is due to the premium associated with green power, which is substantial. Green power premiums can be up to double and more than conventional power. In 2002, Council directed that the green energy targets be met through a reduction in demand for electricity.

A request to purchase approximately 1.7 percent of the City's electricity requirements costing $550,000.00, was included in the Environmental Plan priorities co-ordinated by Toronto Interdepartmental Environmental Team (TIE) during the 2003 budget process but was not approved.

Given current fiscal constraints, it may not be possible for the City to commit funding to any green power purchases in the near term. The City had previously directed that demand side management initiatives be used towards meeting its green power targets until such time as the City is able to purchase green power.

(2) Energy Efficiency/Energy Retrofits:

The EWMO has developed a comprehensive energy retrofit program for City facilities. The goal of energy retrofits is to increase energy efficiency in City facilities by reducing overall energy use.

Energy Retrofit Program

During the budget process in 2004, City Council established the Energy Retrofit Program (ERP). The ERP is a revolving energy retrofit fund, with initially $20 million in capital funding, to under take energy retrofits in City facilities. The following is a summary of the projects that have been approved to receive ERP funding:

Project	Description	Status/Cost	Savings
City Arenas	Energy retrofit program to improve the energy efficiency of the City's indoor and outdoor arenas	Contract signed with Cinergy in December 2004 in the amount of $10.2 million and will take approximately 2 years to complete.	$1,350,000 annually 8,000 tonnes CO2 emission reduction annually
Firehalls	Energy retrofit program to improve the energy efficiency of the City's approximately 80 firehalls	Council approved a project to be negotiated with MCW Energy Reduction Services in the amount of $3.6 million. This project is underway and will take two years to complete.	$438,000 annually 2,600 tonnes CO2 emission reduction annually

Exhibition Place	Energy retrofit of 5 facilities at Exhibition Place.	Contract to be signed with Toronto Hydro Energy Services Inc. in the amount of $1.4 million. This work is to commence in 2005	$ 148,000 annually 880 tonnes CO2 emission reduction annually
Exhibition Place	Installation of a Tri-generation system serving the National Trade Centre and adjacent buildings	Total cost is estimated at $4.4 million. This work is to commence in 2005	$550,000 annually 3,100 tonnes CO2 emission reduction annually
Exhibition Place	Upgrade of the lighting system in the National Trade Centre	Total cost estimated at $800,000. (not yet approved)	$175,000 annually 1,000 tonnes CO2 emission reduction annually
Total		$20.4 million	$2.661 million in savings and 15,580 tonnes

In addition to the above the following projects are being completed by the EWMO, using capital funds:

Project	Description	Status/Cost	Savings
Civic Centres	Energy Retrofit of 14 Corporate facilities including the Civic Centres	A contract was signed with Toronto Hydro Energy Services in the amount of $4.2 million and this work is 50% complete.	$525,000 annually 2,600 tonnes CO2 emission reduction annually
843 Eastern Ave	Installation of Solar Wall on the south side of the building to capture solar heating for use in the building. Project completed.	$277,000 (funding of $30k from TAF and $60K from Federal Government). This work was completed in 2003 and 2004.	$30,000 annually 160 tonnes CO2 emission reduction annually

The entire $20 million in approved ERP funding has been allocated. EWMO staff will be working with City departments to identify additional energy retrofit projects in time for the 2006 capital budget process. It is expected that an additional $10 to $20 million in energy retrofit projects will be identified for funding in 2006. As previously directed by Council, THESI is to be sole-sourced for approximately 30 to 40 per cent of all retrofit work.

Building Indoor Temperatures/Lights Out:

As part of the overall energy management program and in response to measures to be taken when a Smog Alert is announced, City Council adopted a policy in 2003 which standardized heating and cooling set-points in all City buildings as follows:

(1) City departments responsible for operating City buildings will, where technically feasible:

i) maintain building during the cooling season at no lower than 21 degrees Celsius (21^{o}C) during business hours – except during Smog Alerts when the cooling set point should be increased and maintained at 24 degrees Celsius (24^{o} C)
ii) maintain buildings at no higher than 21 degrees Celsius (21^{o} C) during the heating season; building temperature should be reduced by 4-5 degrees Celsius when buildings are unoccupied; and
iii) turn off all non-essential equipment when buildings are generally unoccupied; and

(2) all City-operated buildings to turn off non-essential lights when business is completed at the end of the day and during weekends.

Some problems in standardizing temperatures were experienced in several facilities due to the type of temperature controls currently in place, however these problems will largely disappear due to the new Building Automation Systems (BAS) being installed over the next few years in these facilities. In most facilities, there were no major problems in complying with the 'lights out' section of the policy.

The purpose of the policy was to standardize temperature set points in buildings and to show leadership with regard to turning-off lights when buildings are unoccupied. The benefits include energy and cost savings.

New Technology and Energy Efficiency in Building Design and Construction:

A small amount of new energy technologies have been incorporated into city buildings such as:

- solar energy wall air-heating system at 843 Eastern Ave (2003)
- green roofing technology at City Hall and Eastview Neighbourhood Community Centre (2002/2003)
- a ground-source heating system for the new Yonge Hearts Child Care Centre at 5176 Yonge St. (2004)

A guideline for Energy Efficiency in Building Design and Construction for City facilities was developed some time ago but needs to be updated to reflect emerging technologies and best practices in energy efficient design and equipment.

A new specification for building automation systems in City buildings was completed in 2004 and this is to become the standard for all City-owned facilities in order to maximize energy efficiency with building control systems.

Training, Education and Communications:

Training, education and communications is a key area to the success of any energy management program and can realize, on its own, energy savings of approximately 5 percent. It is especially critical to include a training program in conjunction with energy retrofits to ensure that operating staff are trained in the optimal operation of new systems and equipment.

All energy retrofit projects listed above include a training, education and communication component to them. The training, aimed at building operators, will assist building staff to maximize energy efficiency of all the new equipment and systems installed in their buildings.

A comprehensive education plan for building operators and managers is also being considered to ensure that energy saving becomes an integral part of building operating practices. In the mean time energy saving reminders have and will be provided by the EWMO to staff via messaging in City publications and newsletters.

(3) Energy Tracking and Monitoring

Energy Information System:

The EWMO tracks, monitors and analyzes energy consumption and costs for all City-owned facilities. Tracking and monitoring plays a vital role in the EMP and is a tool to realize the full economic potential of energy management and provides the necessary background information for energy purchases and for prioritizing energy retrofit projects.

For a number of years the EWMO has been using an energy information program called FASER™ to track and monitor the City's energy consumption and costs. The program tracks utility billing information on a monthly basis for over 5,000 utility meters/accounts and serves as a 'data warehouse'.

In 2004, a new software program was purchased called EnergyCap which will replace FASER in 2005. EnergyCap has additional functionality and is web-based which will allow all City facility energy users access to their energy use information via the intranet. In addition, the EWMO hopes to add in additional users, such as the TTC and TCHC to utilize the program.

This is an important component of the EMP since end users need to have access to their utility information in or to understand it and manage it.

Conclusions:

The City is a large energy user and has significant energy expenditures in carrying out its operations. Much has already been accomplished in the two years following the approval of the 5-year EMP program. The City's energy supplies are being managed, a new energy tracking program is being put in place and the energy retrofit program is implementing energy retrofits in City facilities.

The energy retrofits will assist the City in meeting its 15% energy reduction target and will also result in annual CO_2 emission reductions of approximately 18,500 tonnes.

In addition, the EMP shows leadership in reducing energy use in and will assist the City in meeting its Kyoto obligations.

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