

# **ENERGY MANAGEMENT PROGRAM**

**For City of Toronto Facilities and Operations**

**Approved by City Council February 2003**

Facilities & Real Estate  
Energy and Waste Management Office  
Jim Kamstra (416-392-8954)  
March 5, 2003

# ENERGY MANAGEMENT PROGRAM

## Table of Contents

Executive Summary .....	1
Benefits of the Energy Management Program .....	1
Mission Statement .....	2
Background .....	2
Energy Management Program – 5 Year Plan .....	3
Introduction .....	3
1.0. Energy Supply .....	3
1.1. Electricity .....	3
1.2. Natural Gas .....	5
1.3. Green Power .....	6
2.0. Energy Efficiency .....	8
2.1. Energy Retrofits .....	9
2.2. New Technology .....	12
2.3. Energy Efficiency Guidelines for the Construction of New Buildings .....	13
2.4. Training, Education and Communications .....	14
3.0. Energy Information Monitoring & Tracking .....	15
3.1. Enhanced Energy Information System .....	16
3.2. Expanded Information System .....	17
4.0. Summary and Recommendations .....	18
<b>Appendix – List of Charts and Tables .....</b>	<b>19</b>

# ENERGY MANAGEMENT PROGRAM- 5 Year Plan

## Executive Summary

This Energy Management Program (EMP) guides the actions to be taken by the Energy & Waste Management Office (EWMO) and outlines how the program will support the City's goals, listed below, by:

- Coordinating the City's energy purchases.
- Integrating its energy tracking program with the City's accounting system.
- Co-ordinating energy efficiency retrofit programs in City Departments and as requested by City Agencies, Boards and Commissions, in order to reduce energy use.
- Steering the City's purchase of 25% 'Green' power.
- Communicating and encouraging energy conservation actions to City staff.
- Promoting the EWMO as the City's point of contact for internal corporate energy management expertise.

The operational initiatives that will be undertaken to achieve these goals are included under the following headings:

1. Energy Supply
2. Energy Efficiency
3. Energy Information Tracking and Monitoring

Some of the highlights of the program include continued administration of the energy supply contracts, steering the City's green power purchases, developing energy retrofits projects, establishing an energy efficiency training program and expanding the City energy tracking and monitoring program.

### Benefits of the Energy Management Program (EMP)

- The purchase of 5% of the City's electricity requirements from green power sources would result in a CO<sub>2</sub> emission reduction of 13,600 tonnes. This reduction represents 1/5 of the City's 20% reduction target.
- The proposed energy retrofit program in City facilities and buildings would result in a CO<sub>2</sub> emission reduction of 8,600 tonnes. This reduction represents 12.5% of the City's CO<sub>2</sub> emission reduction target of 20%.

The proposed investment of \$20 million in energy efficiency retrofits will result in annual energy savings amounting to \$2.5 million providing for a rate of return of 12.5%.

A further investment of \$20 million in energy saving retrofits for Water & Waste Water would double the above CO<sub>2</sub> reductions and double the energy savings projections.

### *Mission Statement*

The EWMO is committed to assisting the City meet Council's energy reduction targets. It purchases traditional and renewable energy effectively in an economical and sustainable manner. It co-ordinates the implementation of energy retrofits in City facilities and operations. It is the source of energy expertise for internal City organizations. Its commitment to excellence helps showcase the City of Toronto as a leader in energy conservation.

### *Background*

Two major City reports form the backdrop for the following Energy Management Program .

#### *1. City's Strategic Plan*

The City of Toronto is seen as a leader on many environmental fronts and has taken many steps to improve the energy efficiency of its operations through various programs. In addition, the City has ensured that energy efficiency and environmental management are included in all City activities.

The following directives are included in Council's Strategic Plan: City Directions

- (i) "enhance the environmental performance of City operations, e.g., minimize waste generation and use of resources and fossil fuels"
- (ii) "provide stewardship of City resources and assets through sound financial planning"

#### *2. City's Environmental Plan*

The following City goals are outlined in the City's Environmental Plan:

- (i) A 20% reduction in carbon dioxide emissions (CO<sub>2</sub>) by 2005 from 1990 levels.
- (ii) Departments to reduce energy use in their operations and in City buildings and facilities by at least 15% by 2005.
- (iii) The City to purchase 25% of its corporate energy needs from Green Power.
- (iv) Ensure that the City's accounting system allows energy use to be tracked.
- (v) Promote the use of district heating and cooling, especially Deep Lake Water Cooling.

This program directs the City's future energy efficiency activities, and its proactive approach will help meet the City's energy reduction goals while identifying it as a centre of corporate energy management excellence.

# Energy Management Program – 5 Year Plan

## Introduction

The City is a large user of energy and has significant energy costs associated with its facilities and operations. Corporately, the City and its Agencies, Boards and Commissions (excluding the TTC and Housing) consume more than 1.0 billion Kwh of electricity and 55 million m<sup>3</sup> of natural gas. This energy consumption results in an annual energy bill exceeding \$110 million. Appendix 1, Chart 1 shows the City's energy consumption and cost for 2001.

The Energy & Waste Management Office (EWMO) fulfils the City's need for reliable and cost effective energy supply and management – elements which have changed greatly with the deregulation of both electricity and natural gas markets. To ensure the City continues to procure energy in an effective and economical manner in these ever-changing markets, it is essential to follow the clearly defined program outlined below. The application to the City's Agencies, Boards and Commissions (ABCs) is indicated in relation to each part of the program that follows.

The program outlines key energy management strategies for the City of Toronto for the next five years. It encompasses energy management activities in City-owned buildings and facilities but does not cover fleet (vehicles), general procurement or engineered processes in operating areas.

To ensure the effectiveness of the program, it is recommended that the EWMO be recognized and identified as the office to co-ordinate, in consultation with appropriate city staff, all internal energy management activities, including energy procurement, energy retrofits and energy consumption tracking.

To tie in the strategic initiatives with the City's goals, the program is comprised of the following three main sections:

- 1.0 Energy Supply
- 2.0 Energy Efficiency
- 3.0 Energy Information Tracking and Monitoring

Each section will identify (i) current operational initiatives and (ii) future initiatives.

### 1.0 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 and reregulated 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 (1) Electricity, (2) Natural Gas, and (3) Green Power. (It should be noted that the City uses steam and a small amount of heating oil for its facilities. While not specifically mentioned in this report both these energy sources fall under the management of the EWMO).

## 1.1 Electricity

### 1.1.1 *Current Operational Initiatives*

At its meetings of February 29, March 1 and 2, 2000, City Council, by the adoption of Policy and Finance Committee Report No. 3, Clause 6, approved the execution of a long-term power purchase agreement (PPA) with Toronto Hydro Energy Services Inc. (THESI) prior to the opening of the then deregulated electricity market in Ontario.

The City has entered into a 3 year fixed price contract with THESI, a wholly owned corporation of the City, which locks in electricity prices for the duration of the contract. The contract term is May 1, 2002 to April 30, 2005.

The Province's November 11, 2002 announcement may effectively override the PPA pricing arrangement with a capped electricity rate at 4.3 cents/Kwh for the duration of the contract and beyond to 2006. The applicability of the announcement to the City is subject to legislation which is to be tabled late November 2002.

Approximately 4,200 City of Toronto electricity accounts are included in the contract.. The contract is for the commodity only, which makes up about 65% of total electricity bill. The remainder of the bill, 35%, is related to distribution, debt retirement, transmission and other regulated charges. Appendix 1, Chart 2 shows 2001 electricity costs by Department and ABCs.

### 1.1.2 *Future Directions*

Future directions and activities in support of this initiative include:

- administering the electricity contract, in consultation with the Finance Department and the large energy users in the City.
- keeping track of all electricity accounts in relation to cost and annual consumption.
- providing all participants in the PPA with important information related to the contract.
- developing a method to collect the interval electricity data related to the contract and to analyze electricity usage in comparison to contracted usage.
- acting as a clearing house for electricity usage information related to the contract and the consolidated bill.
- providing policy advice to Council on electricity issues affecting the City, including reports on the status of the market and the PPA.
- developing strategies for future power purchases based on experience with the current contract.

It is recommended that the EWMO continue to provide assistance in the administration of the electricity contract and to develop methods and processes to manage electricity usage in relation to the costs.

The announcement by the Premier on November 11, 2002 may have a major impact on the City's PPA. The EWMO, in consultation with all stakeholders will be making appropriate provisions to accommodate the "new" electricity purchasing environment in its administration of the PPA.

## **1.2 Natural Gas**

### *1.2.1 Current Operational Initiatives*

Deregulation of the natural gas market began in Ontario on October 31, 1985. The City of Toronto has been taking advantage of the deregulated natural gas market since 1987 by arranging for its gas requirements directly with a natural gas supplier. The benefits of the deregulated natural gas market, to the City, have been significant. Savings in the early years of deregulation (1987 through 1996) resulted in savings in excess of \$10 million for the City of Toronto and the former Cities.

The City has recently entered into a 3-year natural gas supply contract with THESI. Gas costs have been locked in for approximately 90% of the City's volume in the first year and 75% and 40% for the second and third year of the contract respectively. The term of the contract is November 1, 2001 to October 31, 2004.

As the natural gas market matured the available direct purchase options also changed. The City's natural gas contracts no longer provide direct savings to the City but provide for price certainty and price risk management.

The gas supply contract:

- balances lowest price expectations with price certainty in a volatile natural gas market.
- matches purchases with operational needs.
- provides for consolidated pricing arrangements.

All City of Toronto Departments, Agencies, Boards, and Commissions (a total of approximately 1065 accounts) are included in this supply arrangement. (Exceptions: The TTC and the facilities of the former Metro Toronto Housing Authority of the Toronto Community Housing Corporation are locked into other arrangements). The annual value of the contract is approximately \$19 million. Appendix 1, Chart 3 shows natural gas costs by department.

The contract applies only to the gas commodity and for transportation from Western Canada to the City's local distribution company, Enbridge Consumers

Gas and comprises approximately 65% of the bill. The remaining 35% of the bill is for Enbridge Consumers Gas's billing and distribution services.

Working closely with THESI and an independent natural gas consultant, the City is locking in gas prices for future volumes at strategic intervals.

The EWMO office administers the gas contracts and manages the purchase of the City's gas requirements in line with the yearly gas consumption at each of its facilities.

### *1.2.2 Future Directions*

Future directions and activities in support of this initiative include

- Administering the natural gas contract.
- Keeping track of all natural gas accounts in relation to their rate and annual consumption.
- Monitoring market prices and comparing to our contract price.
- Providing all participants in the contract with important information related to the contract.
- Acting as a clearing house for natural gas usage information related to the contract.
- Developing strategies for future natural gas purchases based on experience with the current contract.
- Confirming and adjusting, as required, gas supply volumes on an annual basis.
- Renewing gas transportation agreements on an annual basis.
- Reviewing opportunities to include the TTC's and all of TCHC's natural gas requirements in the City's natural gas purchase program.
- Providing policy advice to Council on natural gas energy issues affecting the City.

It is recommended that the EWMO continue to administer the natural gas contract and will start planning for contract renewal at the expiry of the current supply arrangements on October 31, 2004. The natural gas market has become more volatile in recent years and therefore will require more attention to ensure that the City continues to obtain the best available market pricing arrangements. Appendix 1, Chart 5 shows the volatility of the natural gas market over the last two years.

## **1.3 Green Power**

This section addresses the purchasing of Green Power as part of the City's energy supply strategy. New technology development is discussed separately under section 2.2.

### *1.3.1 Current Operational Initiatives*



Green power can be defined as electricity generated from renewable or from clean sources of energy. Examples of green energy include, wind, solar and water (small hydro). The City has adopted a target to purchase 25% of the City's electricity needs from green power sources by the year 2005. For the year 2002, Council has directed that green energy targets be met through a reduction in demand for electricity. This green power purchase target is for City Departments only. The ABCs would be encouraged to do the same.

The City is pursuing green power purchases to:

- Reduce CO<sub>2</sub> emissions related to the purchase of fossil fuel generated electricity.
- Show environmental leadership in the community.
- Stimulate the development of green power sources in Ontario.
- Contribute to the security of the City's energy supply.

Renewable or "green" energy is available in Ontario but only in limited quantities. In addition, there is a price premium for green power over conventional sources of power ranging from 40% to 800%. Additional supplies of green power are being developed and as more supply is available the pricing should also become more competitive.

The current initiatives being carried out by EWMO include:

- Working closely with Toronto Hydro to identify green power sources.
- Reporting to the Administration Committee regarding the status of the City's green power targets.
- Steering a request to purchase a small amount of green power through the City's 2003 operating budget process. This request has been included in the Environmental Plan priorities being co-ordinated by Toronto Interdepartmental Environment Team (TIE) for consideration in the 2003 budget process.
- Investigating methods and options to phase-out the purchase of coal-fired electricity from the City's electricity purchases and report findings to Council.

### *1.3.2 Future Directions*

Future directions and activities in support of this initiative include:

- Firming up the City's green power purchase commitments by making some modest green power purchases each year. It is proposed that the City purchase approximately 1.7% of its electricity requirements from green power sources in 2003 and each year thereafter to and including 2005 such that the City's total purchase be about 5% by the year 2005.
- Continuing to work with Toronto Hydro to identify additional green power sources that the City would be interested in.

- Reviewing co-generation opportunities at City operations and facilities in conjunction with City Departments and ABCs.
- Investigating options and opportunities to fund the premium cost of green power.
- Investigating the possibilities of purchasing electricity generated from the City landfill sites (as recommended in the June 25<sup>th</sup>, 2002 Administration Committee Report Clause 22).
- Reporting to Council regarding the potential phase out of coal-fired electricity purchases.

The purchase of 5% of the City's electricity requirements would result in a CO<sub>2</sub> emission reduction of 13,600 tonnes. This reduction represents 1/5 of the City's 20% reduction target.

While the recommended green power purchases falls short of the City's target, a 5% purchase is prudent and will demonstrate the City's commitment to the environment and leadership in this area.

Given fiscal constraints, it may not be possible for the City to commit funding to any green power purchases in the near term. In that event it would be recommended that the City's previous direction to meet its green power targets, through demand side management, be extended until such time as the City is able to purchase green power.

## **2.0 Energy Efficiency**

As part of a plan to improve energy efficiency in City-owned buildings and facilities, the following reports have been approved or are in the process of being approved by City Council.

- City Council, in April 2002, approved an Energy Retrofit Strategy for City owned Facilities which includes: a direction to sole-source 30 to 40 percent of this work to Toronto Hydro Energy Services Inc. (THESI) and requires the [Commissioner of Corporate Services Department] to coordinate the implementation of energy retrofits for City-owned buildings and facilities.
- A report reviewing and recommending financing options for energy retrofits along with a policy regarding the application of savings is to be forwarded by the Finance Department to the Policy and Finance Committee.

The City's Environmental Plan has two Goals related to energy efficiency in City operations:

- A 20% reduction in carbon dioxide (CO<sub>2</sub>) emissions by 2005 from 1990 levels; and
- Departments to reduce energy use in their operations and in City buildings and facilities by at least 15% by 2005

The City's Strategic Plan: City Directions includes the goal to:

- Provide stewardship of City resources and assets through sound financial planning.

These goals are addressed with four specific energy efficiency initiatives:

(1) Energy Retrofits , (2) New Technology (3) Energy Efficiency in Building Design and Construction Program and (4) Training, Education and Communication.

## **2.1 Energy Retrofits**

Based on preliminary studies through the EWMO, and based on a study completed by the International Council of Local Environmental Initiatives (ICLEI) a substantial amount of energy savings of at least 10 to 15% can be realized in City facilities.

A comprehensive energy efficiency approach is recommended, as apposed to picking and choosing measures, in order to maximize energy savings and effectiveness. Depending on the type of facility being retrofitted the following proven energy saving measures may be recommended: energy efficient lighting and controls, boiler replacements, building controls, HVAC modifications, new windows, improved insulation, motor replacements, weather-stripping and caulking, operator training, etc. Much of the energy-using equipment in City buildings is old and in need of repair or replacement. By doing the energy retrofits these required upgrades would also be possible.

Experience has shown that greater savings may be obtained and sustained when energy management is considered as part of an on-going process. Part of that on-going process is the auditing, tracking and monitoring of energy use in facilities. Benefits of energy retrofits include:

- Saving money on utility bills and reducing maintenance costs.
- Improving comfort, safety and productivity in the workplace and community spaces.
- Modernizing buildings and bringing operations into line with energy efficiency best practices.
- Upgrading staff credentials through training of systems and new equipment.
- Generating up to 20 local jobs for every \$1 million invested. (The Canadian government estimates that for every \$50,000 invested in energy retrofits, one person year of employment is created).
- Showing leadership and diligence in managing the environmental and financial performance of City assets.
- Reducing CO2 emissions through reduced energy use.

Prior to amalgamation each of the former Cities had completed energy retrofits in their facilities, ranging from simple lighting retrofits to full scale fuel conversions. All

facilities will be (re)visited to assess potential improvements, but some facilities, due to payback criteria, may not qualify for further improvements. A few examples of energy retrofit projects carried out by the EWMO are shown in Appendix 1, Table 1.

### *2.1.1 Current Operational Initiatives*

The following Energy Retrofit initiatives are currently underway and implementation could be started in 2003, subject to funding.

- EDCT, Parks and Recreation Division (P&R): P&R in consultation with the EWMO is developing an energy retrofit program across all facilities of the P&R Division. In 2001 the total cost of energy for 550 P&R facilities was \$17 million. An investment of \$13.6 million would result in annual cost savings of \$1.7 million for an 8-year payback. The first phase of the program is targeting all the Arenas and Curling Rinks with an estimated capital investment of \$3.2 million and projected annual savings of approximately \$407,000.
- Corporate Services Department: A comprehensive energy feasibility study has been completed for 11 Corporate facilities including the Civic Centres. The study results show that over \$500,000.00 can be saved annually for a return on investment of approximately 7 years. Capital investment would be \$3.5 million.
- Corporate Services Department: Energy audits commenced on 30 additional facilities under the operation of the Facilities & Real Estate Division in October 2002. The energy efficiency improvements to be implemented based on the study recommendations are expected to yield an annual cost saving of approximately \$400,000. An investment of \$3.2 million would be required with a payback of 8 years.
- Works & Emergency Services, Fire Services: Annual energy saving of approximately \$130,000 has been identified for the City's 88 Firehalls with an investment of about \$1.2 million.

Table 2 of the Appendix 1 summarizes the projects currently being developed.

### *2.1.2 Future Directions*

The EWMO is charged with developing a city wide comprehensive energy conservation plan. The goal of the energy retrofit program is to increase energy efficiency in City facilities by reducing overall energy use. The expected value of energy retrofit work in City facilities over the next five years will amount to approximately \$20 million (not including WES and ABCs). THESI will be sole-sourced for approximately \$6 to \$8 million of

this amount. The future directions and activities in support of this significant initiative include:

- Co-ordinating, developing and implementing the expansion of the energy management retrofit program to all City's departments.
- Drawing upon the Better Buildings Partnership's pre-qualified list of energy management firms (EMF) in order to deliver high quality energy services through a competitive bid process.
- Confirm the main criteria for the sole-sourcing of 30 – 40% of the energy retrofit work to THESI be based on matching THESI's expertise with project requirements.
- Developing the criteria for EMF selection in consultation with energy using Departments consistent with the directive to sole-source 30 – 40% of the energy retrofit work to THESI.
- Reporting to the Policy and Finance Committee, as part of the annual budget process, on overall energy retrofits investments and financial and environmental benefits.
- Developing and putting into operation the procedures necessary to ensure that retrofit work is of acceptable quality, with minimal disruption at the facilities.
- Working with Water & Wastewater Division of the WES Department in promoting new water saving technologies in City buildings.
- Requiring, where relevant, retrofit service providers to consult and explore partnerships with district heating and cooling providers, such as Enwave, as part of the process of identifying appropriate retrofit options.
- Investigating the benefits of connecting the Building Automation Systems (BAS) of all major City facilities to the Network (Intranet) in order to achieve improved control and savings.
- Identifying, in consultation with the Finance Department, traditional and non-traditional sources of funding for energy retrofit work. In particular the EWMO will work closely with the Finance Dept in developing a "Energy Retrofit Revolving Fund" mechanism for financing the energy retrofit projects. (It is anticipated that a minimum of \$20 million in the revolving loan fund would be required for financing the energy retrofit projects in City buildings over the next five years).
- Investigate external funding support such as Federation of Canadian Municipalities (FCM) Green Municipal Funds, Ontario Superbuild/Federal Infrastructure Funds and other external sources of funds.
- Establishing policies related to indoor temperature set-points for both heating and cooling and when City buildings are generally unoccupied.
- Establishing a "light out" policy whereby lights are turned off in City buildings after business hours.

The proposed energy retrofit program in City facilities and buildings would result in a CO<sub>2</sub> emission reduction of 8,600 tonnes. This reduction represents 12.5% of the City's CO<sub>2</sub> emission reduction target.

The proposed investment of \$20 in energy efficiency retrofits will result in annual energy savings amounting to \$2.5 million.

A further \$20 million investment in energy saving retrofits for Water & Wastewater would double the CO<sub>2</sub> reductions and double the energy savings projections.

## **2.2 New Technology**

This section addresses the City's role in the development of new energy technology, including Green Power technology. The purchase of Green Power as part of the City's energy supply strategy is discussed separately under section 1.3.

Three of the Goals of the City Environmental Plan relate to renewable energy technologies. These are:

- A 20% reduction in carbon dioxide (CO<sub>2</sub>) emissions from City's facilities by 2005 from 1990 levels.
- Departments to reduce energy use in their operations and in City buildings and facilities by at least 15%.
- The City to purchase twenty-five percent (25%) of its corporate energy needs from "Green Power".

### *2.2.1 Current Operational Initiatives*

The following initiatives are under way within the City of Toronto.

- Photovoltaic Systems - The City has recently installed two small photovoltaic (PV) lighting systems at Alexmuir Park.
- A solar energy wall air-heating project is planned to open in April 2003 at Central Maintenance Garage, 843 Eastern Avenue.
- Green Roofs demonstration sites have been completed at City Hall and Eastview Neighbourhood Community Centre.
- Ground-source heating system is being incorporated into new childcare centre at 5176 Yonge Street.

### *2.2.2 Future Directions*

In addition to continuing the current activities outlined above, the following new or renewable technology initiatives will be investigated:

- Fuel Cell Technologies: EWMO will investigate the possibilities of participating in a fuel cell demonstration project at a City facility.
- Wind Energy: Future activities will be dictated by the success of the Toronto Hydro wind turbine installation at Exhibition Place.
- Cogeneration: Cogen system opportunities will be investigated on a stand-alone basis, as well as part of more comprehensive energy retrofit programs.
- Deep Lake Water Cooling: Liaise with Enwave to review possibilities for further district heating and cooling opportunities in City facilities.
- Photovoltaic, Solar and Green Roofing: Investigate the wider application of these technologies in City facilities.

## **2.3 Energy Efficiency Guidelines for the Construction of New Buildings**

The Ontario Building Code provides for only very basic energy efficiency requirements. There are many additional opportunities to improve the energy efficiency in buildings through application of energy efficient design criteria and up-to-date technologies. Many of the improvements can be incorporated without any additional cost, or will pay for themselves over a short period of time.

### *2.3.1 Current Operational Initiatives*

The EWMO has developed draft ‘Energy Efficiency Guidelines for Construction of New Buildings’, (refer to web link) to provide direction, information and/or minimum requirements in the design of new City of Toronto buildings or in the upgrading of existing buildings. These guidelines have been based on ASHRAE 90.1 and the Model National Energy Code and will achieve an optimum energy efficiency without reducing the building performance or occupant comfort. The guidelines address the building envelope, HVAC, mechanical systems, and electrical system. The guidelines have been distributed to Project Managers and outside consultants and designers to use as a guide during the design stage.

### *2.3.2 Future Directions*

The following initiatives are proposed:

- The EWMO will continue to provide guidance in the building design and construction process and to encourage all City departments to incorporate energy efficiency features in building designs. The Guidelines will be updated annually to include new technologies and new or revised incentive programs that are applicable in designing energy-efficient buildings.
- Work in partnership with the Energy Efficiency Office in WES to update the guidelines.
- Consult with all Departments prior to more firmly establishing the guidelines as the City’s best practices document.

Offer training sessions to staff who are involved in building design and construction in order to encourage adherence to the guidelines and be aware of the incentive programs available.

## **2.4 Training, Education and Communications**

### *2.4.1 Current Operational Initiatives*

It is suggested by the energy industry that training in the energy efficient operation of systems can realize savings of between three and five per cent of energy use. However, there has been a minimal amount of direct energy management training for City operational staff to date.

There has been more activity on the education and communications side of things, highlighting energy reduction through corporate emails and newsletter articles, and using environmental events like Earth Day to bring resource conservation reminders to City staff.

### *2.4.2 Future Recommendations*

#### Training

It is accepted that building operators, building & project managers need to keep up to date on the operation and maintenance of today's complex buildings and on the latest energy-saving technologies. Therefore, it is recommended that training, as a significant component of the EMP, be implemented as follows:

(i) As part of a specific energy retrofit project:

It is critical to include specific and detailed training to operating staff to ensure optimal operation and maximize savings, as mechanical, electrical and plumbing systems are upgraded or replaced with more efficient equipment during an energy retrofit. For example, as part of the retrofit program proposed for Parks & Recreation, the EWMO will carry out a training program for facility managers and operators in order to ensure maximum payback and energy savings from the retrofit.

(ii) As a City-wide Energy Management Training Program:

Energy Management Training Programs will be coordinated by the EWMO and designed to reflect the different needs of the City's building operators and managers responsible for operating energy efficient facilities. Each training program must include:

- Buy-in from building managers on the importance of the Training Program for their building operating staff.



- A needs assessment component (the training needs of building operators).
- A customized training plan, including workshops and manuals, based on these needs.
- A certificate awarded by the EWMO at the successful completion of the program.

#### Education and Communications

Education and communications will become the cornerstones of the proposed strategies. Staff needs to know that the City is serious about reducing its CO2 emissions from its facilities

In order to bring energy conservation at work front of mind with City staff, it is proposed to:

- Liaise with Corporate Communications to broadcast energy reduction messages across the corporation to support new programs.
- Create posters, flyers and other marketing tools to promote the program.
- Use environmental events such as Earth Day/Week, Clean Air Commute, Bike to Work Week, Waste Reduction Week, etc., to heighten awareness about energy reduction issues.
- Incorporate energy reduction messages into division-wide Smog Alert messages sent out by us.
- Set up an Energy-Network so City staff can exchange ideas and experiences in energy conservation programs; give staff a forum where suggestions for energy conservation will be considered seriously and implemented where feasible.
- Work closely with other divisions and departments, such as Energy Efficiency Office (WES) and Information & Technology Division (CS) to communicate corporation-wide workplace energy reduction initiatives.
- Develop special program-related communications to draw attention to specific energy reduction actions (i.e., around retrofitting buildings)
- Develop an employee suggestion program for workplace energy efficiency ideas.

### **3.0 Energy Information Tracking and Monitoring**

The Goal of the City's Environmental Plan related to energy information infrastructure is to ensure that the city's accounting system allows energy use to be tracked. This goal is addressed with specific Energy Information initiatives related to (1) an enhanced energy information system, and (2) an expanded information system.

The EWMO collects, organizes, tracks, analyzes and reports energy consumption and costs for all City-owned facilities. Tracking and monitoring plays a vital role in the

energy management program. It is an important measurement tool to realize the full economic potential of energy management.

### **3.1 Enhanced Energy Information System**

#### *3.1.1 Current Operational Initiative*

Since the mid-80s, the EWMO has been using an energy accounting program called FASER™ to track and monitor the City's energy consumption and costs in facilities. The program tracks utility billing information on a monthly basis for over 5,000 utility meters/accounts and serves as a 'data warehouse'. Energy reports are produced annually showing the total energy consumption and costs in the current year in comparison to a base year for various operating units of the City. The reports may also include an explanation of variances, energy cost projections, energy savings from previous energy retrofits projects, potential energy savings opportunities and energy use indices, e.g., Kwh/m2 .

#### *3.1.2 Future Directions*

As the City is faced with increasing complexity and choice in utility purchasing and energy management, energy information becomes more important. The FASER™ program is a valuable tool to the EWMO and provides much-needed energy decision information. Unfortunately, the program, owned by Enron, is no longer being supported by Enron.

Energy supply depends on well-maintained data and accurate profiles to make strategic purchase decisions and to negotiate the best value for the energy required. The EWMO prepares both natural gas and electricity profiles for all City energy requirements, which assists the City to better understand its energy usage and to more effectively implement its energy efficiency goals.

EWMO is addressing these challenges by the following initiatives :

- Obtaining or developing an enhanced Utility Management System that will combine the benefits of the existing program with the capability of providing access through the corporate Intranet. It will link energy information with the City's financial accounting and billing systems.
- Acquiring a new profiling software program to track and monitor hourly energy consumption data and provide supply management reports. (Currently, EWMO is using spreadsheet program to do profiling, which has significant limitations and is not the most efficient use of staff time).

## 3.2 Expanded Information System

### 3.2.1 *Current Operational Initiative*

In addition to monitoring and reporting on energy consumption and costs, the EWMO uses the energy database to provide a number of services to client ABC&Ds, such as:

- verifying utility bills and troubleshooting billing errors.
- utility sub-meter billing.
- utility budgeting.
- energy rate analysis.
- assessing energy efficient projects and contracts.
- measure performance of energy efficiency projects.
- quantify CO<sub>2</sub> emissions (for future emission trading credits).
- assisting with other technical issues relating to energy and utility management.

### 3.2.2 *Future Directions*

By expanding the tracking and monitoring program to include the rest of the ABCs, (specifically TTC, MTHA and TPA) a complete energy database will be established and will assist the City to monitor all its energy activities. The EWMO will invite the rest of ABCs to be part of the expansion program. It will collect the facility and operational data from the ABCs and contact the Local Distribution Companies (LDCs) for the energy data. The facility and metering information will be uploaded and maintained by EWMO.

In addition to compiling a complete energy picture for the City, the expanded program will also provide client departments with a number of benefits including:

- Working closely with LDC in resolving billing problems.
- Pinpointing problematic facilities that have a high performance index (i.e., \$/m<sup>2</sup>).
- Providing energy reports more frequently- either bi-annually or quarterly for large facilities.
- Providing access to energy information through the Corporate Intranet.
- Coordinating consolidated billing to share financial and energy information.
- Enhancing the utility budget process to provide up to date budget variance reports.
- Coordinating the financial accounting of utility expenditures and recoveries.

## **Summary and Recommendations**

The above EMP will assist the City to meet Council's energy-related goals as outlined in the Environmental Plan. It will also support the directions laid out in the City's Strategic Plan relating to stewardship of the City's resources and assets.

The City is a large energy user and has significant energy expenditures. The EWMO can help reduce energy use and costs by implementing effective energy supply strategies, by managing energy retrofits, by monitoring and tracking the City's energy use and by introducing energy training/awareness programs to relevant staff.

The Federal Government has publicly stated its intent to ratify the Kyoto agreement. Ratification will require all levels of government, business and residents to be more active in reducing energy use in order to meet the Kyoto targets. The EMP will assist the City in meeting CO<sub>2</sub> emission targets and will show the City's leadership in sustainability objectives.

However, increased challenges require increases in budget and staffing. Without these increases, the EWMO will be hindered in its ability to meet its strategy goals and targets.

APPENDIX

LIST OF CHARTS & TABLES

**Chart 1 – 2001 Corporation Energy Consumption & Costs.....A**

**Chart 2 – Details of Electricity Cost by Department & ABCs .....A**

**Chart 3 – Details of Natural Gas Cost by Department & ABCs .....B**

**Chart 4 – Energy & Waste Management Office Staffing .....C**

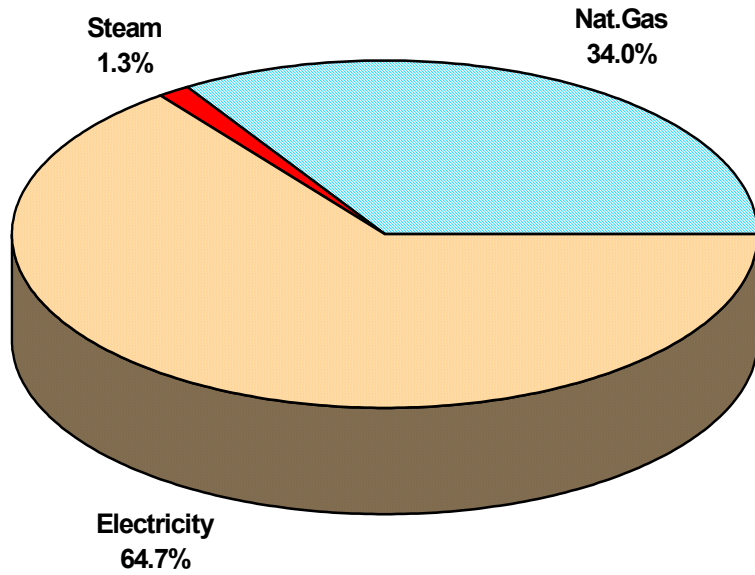
**Chart 5 – Daily Natural Gas Spot Price at AECO Trading Hub in Alberta.....D**

**Table 1 – Examples of F&RE Energy Retrofit Projects .....E**

**Table 2 – Examples of Planned Energy Retrofit Projects..... F**

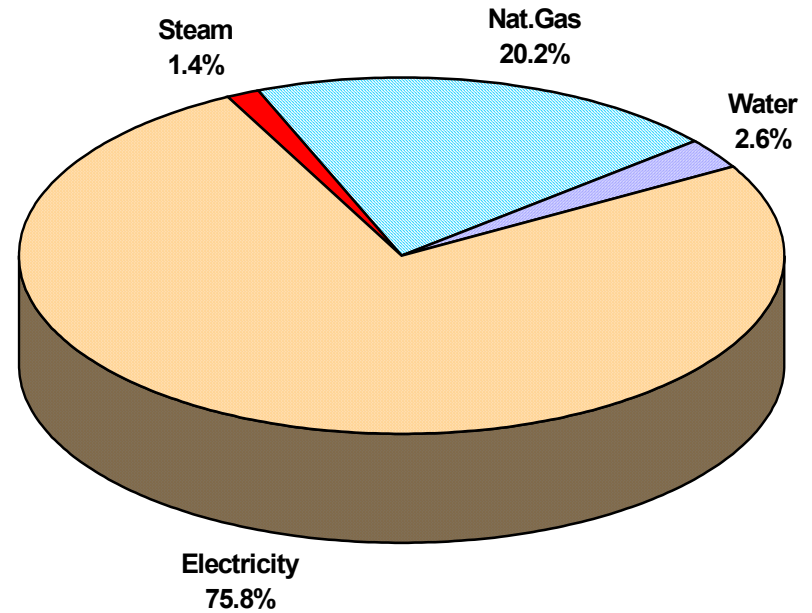
Chart 1 – City of Toronto 2001 Corporation Energy Consumption & Costs

### Energy Consumption



**Total 1.73 billion equivalent kilowatt-hours**

### Energy Cost

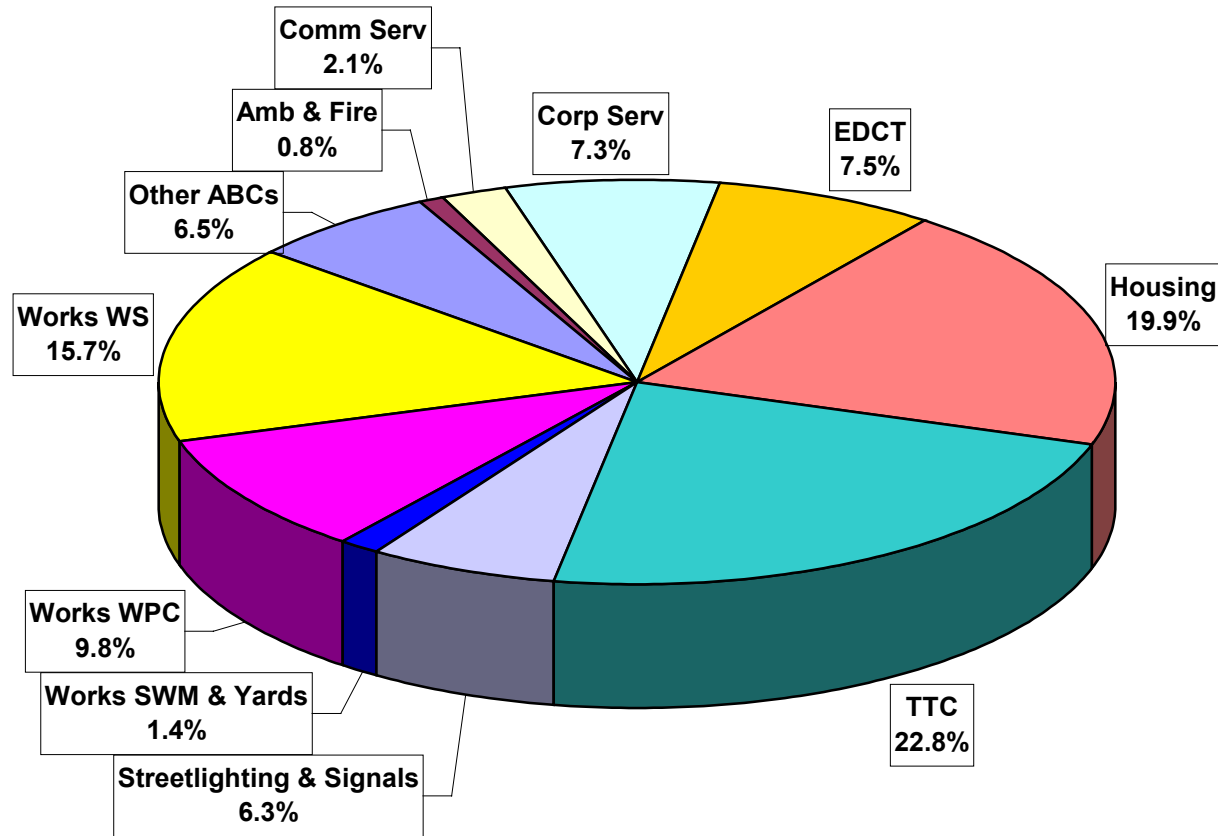


**Total \$118.3 million**

NOTE: Steam includes a small amount of heating oil. Energy figures include all ABCs except Housing, TTC and Parking Authority.

Chart 2 – Details of Electricity Cost by Department & ABCs

## 2001 Electricity Cost by Dept & ABCs

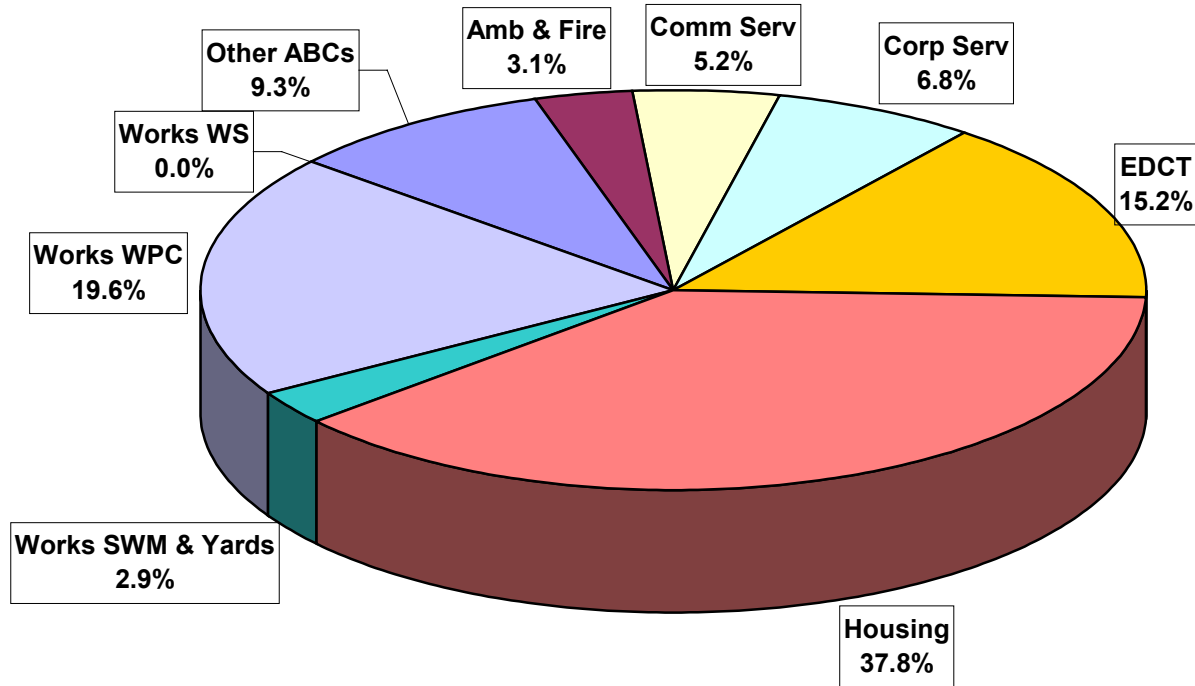


**Total electricity cost in 2001: \$150.2 million**

Note: Other ABCs includes the Arena Boards, AOCC, Exhibition Place, TPL, Parking Authority, TEDCO, Zoo and the 3 Performing Art Centres

Chart 3 – Details of Natural Gas Cost by Department & ABCs

### 2001 Natural Gas Cost by Dept & ABCs



**Total natural gas cost in 2001: \$39.3 million**

Note: Total cost includes all ABCs except former MTHC, TTC, TEDCO and Parking Authority



### Chart 4 – Energy & Waste Management Office Staffing

#### Facilities & Real Estate Division

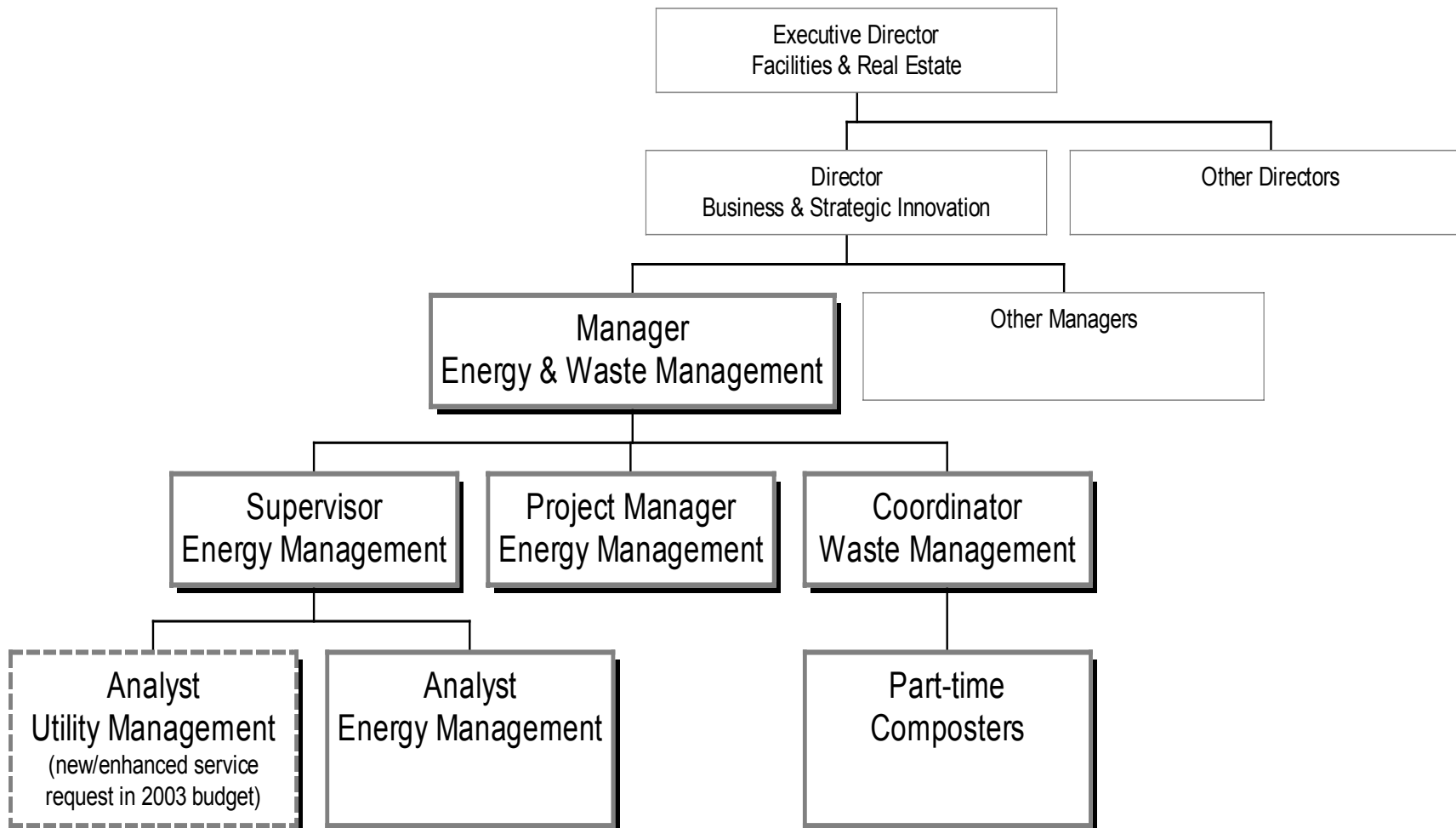


Chart 5 – Daily Natural Gas Spot Price at AECO Trading Hub in Alberta



**Table 1 – Examples of F&RE Energy Retrofit Projects**

Project Name	Year Implemented	Project Cost	Cost Savings	Payback (yrs)	ekWh Savings	Approximate %Energy Saving	CO <sub>2</sub> Savings
Ambulance Stations	1996	\$316,500	\$59,800	5.3	699,800	19.7%	170
City Hall	1997	\$4,000,000	\$567,000	7.1	4,901,000	12.7%	1,230
Exhibition Place	1996	\$1,812,000	\$230,000	7.9	3,061,400	12.9%	700
HFTA	1990/1996/1998	\$2,532,800	\$588,200	4.3	5,800,600	16.3%	1,600
North York Civic Ctr	1994	\$1,164,000	\$322,000	3.6	4,293,000	22.9%	1,070
Old City Hall	1994/1995	\$1,116,000	\$187,100	6.0	2,712,000	10.5%	660
Police Facilities	1993/1995/1996	\$3,707,000	\$571,800	6.5	12,625,900	21.0%	2,820
Reference Library	1995	\$1,851,000	\$272,000	6.8	561,700	5.3%	370
Toronto Zoo	1987/1990/1996	\$913,000	\$120,700	7.6	2,399,300	9.5%	540

**Table 2 – Planned Energy Retrofit Projects**

Project Name	Estimated Project Cost	Estimated Cost Savings	Projected Payback (yrs)	Projected ekWh Savings	Approximate %Energy Saving	Projected CO <sub>2</sub> Savings
EDCT Parks & Recreation						
- Phase 1 - Arenas	\$3,200,000	\$407,000	7.9	6,608,300	11.8%	1,400
- Phase 2 - Other	\$10,400,000	\$1,293,000	8.0	20,985,600	10.3%	4,450
Corporate Services, Civic Centers	\$3,500,000	\$500,000	7.0	8,120,600	11.1%	1,720
Corporate Services, Others	\$3,200,000	\$400,000	8.0	6,494,200	13.5%	1,380
WES Fire Stations	\$1,200,000	\$130,000	9.2	2,105,900	13.6%	450