TORONTO

STAFF REPORT
INFORMATION ONLY

Canadian Council of Ministers of the Environment Recognize Toronto's Climate Change Mitigation Efforts

Date:	September 3, 2009
To:	Parks and Environment Committee
From:	Lawson Oates, Director, Toronto Environment Office
Wards:	All
Reference Number:	P:\2009\Cluster B\TEO\PE09009

SUMMARY

On June 16, 2009 the City of Toronto and Exhibition Place received national recognition from the Canadian Council of Ministers of the Environment (CCME) for their efforts in addressing climate change and reducing greenhouse gas emissions.

The CCME comprises the fourteen environment ministers from federal, provincial and territorial governments in Canada. These ministers meet to coordinate action on interjurisdictional issues such as climate change, waste management, air pollution and toxic chemicals. Since 1997, the CCME has been sponsoring its annual Pollution Prevention Awards to give national recognition to companies and organizations with cutting-edge accomplishments and leadership in pollution prevention.

For 2009, the City of Toronto was given the award in the category of greenhouse gas reductions, in recognition of the actions being taken by City Council through its Climate Change, Clean Air and Sustainable Energy Action Plan and the fact that emissions from the City's corporate operations have been reduced by over 40% against 1990 levels.

Exhibition Place received an honourable mention in the same category for their ongoing implementation of various energy efficiency initiatives and their utilization of leading edge green technologies.

Financial Impact

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

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

ISSUE BACKGROUND

The CCME works to promote co-operative and co-ordinated responses to interjurisdictional issues such as climate change, waste management, air pollution and toxic chemicals.

Since 1997, the CCME has been sponsoring its annual Pollution Prevention Awards to give national recognition to companies and organizations with cutting-edge accomplishments and leadership in pollution prevention. Awards are given out in the categories of Small Business, Medium Business, Large Business, Organization or Institution, Innovations and Greenhouse Gas Reductions. Award winners are selected by an independent panel of judges from government, business and environmental non-governmental organizations.

In early 2009, the City of Toronto and Exhibition Place both submitted award applications in the category of greenhouse gas reductions.

COMMENTS

The Toronto Environment Office coordinated the preparation of a proposal to have the City of Toronto recognized for its efforts in the category of Greenhouse Gas Reduction. Toronto's award application (please see Attachment One) highlighted the commitment of City Council to mitigate climate change by providing an overview of the aggressive targets and actions contained in the Climate Change, Clean Air and Sustainable Energy Action Plan and discussing in greater detail four key initiatives of the City that have resulted in significant greenhouse gas reductions in City operations. The four programs highlighted were:

1) The Energy Retrofit Program for the City's 1,500 buildings;
2) The Green Fleet Plan for the City's 4,000 vehicles;
3) The Conversion of over 1,900 Traffic Lights to LED lights; and
4) The Landfill Gas Management systems at City closed landfill sites.

These initiatives, in combination with a number of other efforts have resulted in the City of Toronto reducing the greenhouse gas emissions from its corporate operations by over 40% below 1990 levels.

Based on this application, the CCME recognized the City of Toronto with the award for Greenhouse Gas Reduction. The CCME in recognizing the City of Toronto stated,

> *The City of Toronto demonstrates its commitment to ensuring the City's environment is clean, green and healthy, through aggressive greenhouse gas emission reduction targets. Along with aggressive targets over 100 actions are highlighted in the City's Climate Change, Clean Air and Sustainable Energy Action Plan. Overall the City's projects have achieved emissions reductions of 40% below 1990 levels. The City's efforts to reduce its corporate emissions represent a bold step towards preventing pollution at its source. By curtailing harmful greenhouse gas emissions through innovative energy conservation (with the Energy Retrofit Program and Traffic Light Conversion to LED), material reuse (with Landfill Gas Management), and responsible procurement practices (with the Green Fleet Plan) the City is setting an example for other businesses in Toronto to follow suit and for other municipalities to learn best practices.*

Toronto received further recognition for its efforts when the CCME decided to also recognize the efforts of Exhibition Place by presenting it with an Honourable Mention in the category of greenhouse gas emission reduction. Exhibition Place submitted an award application profiling its many innovative and progressive energy efficiency developments, such as its solar photovoltaic system and geothermal system. The CCME in recognizing Exhibition Place stated,

> *Since 2004, Exhibition Place has undertaken an environmental stewardship initiative, which includes the promotion of sustainable development and leading edge green technologies and practices across the site. Several energy efficiency projects were completed which resulted in a significant reduction in greenhouse gas emissions. Some of the results included a reduction of their contribution to "smog days"; their assistance to the province with its plan to shut down coal fired electrical plants; a demonstration of emerging green technologies in major public buildings; and an increased awareness regarding environmental issues.*

The CCME awards were presented on June 16, 2009 in Charlottetown, Prince Edward Island (PEI). Unfortunately, due to prior commitments neither the Mayor or Deputy Mayor were able to attend the event. In their place, the undersigned (Lawson Oates, Director of the Toronto Environment Office) attended and received the awards on behalf of the City of Toronto and Exhibition Place. Travel and accommodation expenses for Mr. Oates were paid for by the CCME.

The awards were presented by the Ontario Minister of the Environment, John Gerretsen (CCME President) and the PEI Minister of the Environment, Energy and Forestry, Richard Brown.

CONCLUSION

The projects in the award applications submitted for the City of Toronto and Exhibition Place are only a sample of the many innovative and progressive actions being taken in Toronto to address climate change. The Canadian Council of Ministers of the Environment by recoginizing the City of Toronto and Exhibition Place for their efforts has highlighted the leadership being shown by City Council, the Toronto Public Service and the City's Agencies, Boards and Commissions in taking action on reducing greenhouse gas emissions.

CONTACT

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Lawson Oates, Director, Toronto Environment Office

ATTACHMENT

Attachment One: CCME Pollution Prevention Award Application – City of Toronto

CCME Pollution Prevention Awards

City of Toronto

Climate Change, Clean Air and Sustainable Energy Action Plan – Corporate Actions

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Category Applying For: **Greenhouse Gases Reduction**

EXECUTIVE SUMMARY

The City of Toronto is Canada's largest city providing services to over 2.6 million people with a staff of over 40,000. The City is committed to ensuring Toronto's environment is clean, green and healthy; and one bold way the City is demonstrating its commitment is through aggressive greenhouse gas emission reduction targets. In July 2007, Toronto City Council set a goal of reducing greenhouse gas emissions below 1990 levels by:

- 6% by 2012;
- 30% by 2020; and
- 80% by 2050.

Along with these aggressive targets were over 100 actions highlighted in the City's Climate Change, Clean Air and Sustainable Energy Action Plan. These actions include outreach activities to the community and activities to reduce corporate emissions. The focus of this application is on the major strategies to reduce corporate greenhouse gas emissions. Four programs in particular will be highlighted including: the Energy Retrofit Program, Landfill Gas Management, the Green Fleet Plan and Traffic Signal conversion to LED. In addition to these projects, other corporate projects are underway that also contribute to reducing the City's emissions including updating the City's Green Procurement Policy, and these projects will be briefly highlighted.

Overall the City's projects have achieved emissions reductions of 40% below 1990 levels.

The City's efforts to reduce its corporate emissions represent a bold step towards preventing pollution at its source. By curtailing harmful greenhouse gas emissions through innovative energy conservation (with the Energy Retrofit Program and Traffic Light Conversion to LED), material reuse (with Landfill Gas Management), and responsible procurement practices (with the Green Fleet Plan) the City is setting an example for other businesses in Toronto to follow suit and for other municipalities to learn best practices. The results of these programs speak for themselves, garnering huge cost savings for the City while contributing to a better environment for all Torontonians and creating the capacity and opportunities for more green jobs in Toronto.

DESCRIPTION OF ORGANIZATION – CITY OF TORONTO

The City of Toronto is Canada's largest city and sixth largest government. It employs over 40,000 people and is home to a diverse population of about 2.6 million people. It is the economic engine of Canada and one of the greenest and most creative cities in North America. In the past three years, Toronto has won more than 70 awards for quality, innovation and efficiency in delivering public services. Toronto's government is dedicated to prosperity, opportunity and environmental sustainability for all its residents. The City has shown leadership in many ways including:

- Facilitating construction of the first wind turbine in an urban area;
- Hosting the largest deep lake water cooling system in the world; and
- Creating the largest solar photovoltaic installation in Canada.

The Toronto Environment Office (TEO) within the City of Toronto serves the community and corporation by co-ordinating decision-making on substantive environmental issues and concerns. The TEO accomplishes this though research, collaborative planning and the development of sound policy recommendations that emphasize sustainable development and pollution prevention.

PROJECT DESCRIPTION

Project Objectives

The City of Toronto has been proactive in initiating corporate environmental policies, programs and activities for several decades. The Climate Change, Clean Air and Sustainable Energy Action plan that was approved by Council in July 2007, brought many of these initiatives that specifically work to reduce greenhouse gas (GHG) emissions together and set more aggressive targets for them. An inventory of GHG emissions performed by the City revealed that City operations contribute 6% of all GHG emissions produced by Toronto with the community contributing the other 94% of emissions. However, by pursuing aggressive targets to reduce the City's corporate emissions the City sets an example that residents and businesses can follow and help the City meet its overall GHG reduction targets. The goal is to:

- Reduce GHG emissions by 6% below 1990 levels by 2012;
- 30% by 2020; and
- 80% by 2050.

Four programs of particular interest in the City's plan to reach the above targets are the Energy Retrofit Program, Landfill Gas Management, the Green Fleet Plan and Traffic Signal Conversion to LED. These along with several other projects are setting an example that it is possible to find ways to reduce emissions while maintaining a high standard of service.

Energy Retrofit Program – The City owns 1,500 buildings across Toronto and the goal is to retrofit all of them so they operate in a more energy efficient manner. By undertaking these retrofits the City will benefit from the expanded use of upgraded systems, energy savings in the long run and the opportunity to educate employees working in these buildings about the importance of energy efficiency to their health and well being.

Landfill Gas Management – Since the City's largest three closed landfills still produce a large amount of methane, the goal of this project is to reduce the effects of the release of methane from these landfills and utilize that gas to create energy. By reusing the gas as a source of energy the City is able to help serve a growing energy need while at the same time eliminating the harmful effects of methane release from the three closed landfills.

Green Fleet Plan – This plan was created to help reduce GHG emissions associated with the operation of the City's 4,000 vehicles. Sustainability is a key driver in this initiative with the objective being to pursue the purchase of the most environmentally friendly vehicles available, to help save money and provide for better health and well being and improved air quality for citizens through reduced emissions.

Traffic Light Conversion to LED – This project aimed to reduce energy costs associated with the use of incandescent lights in almost 2,000 traffic lights across Toronto by replacing the bulbs with more energy efficient and longer lasting LED lights.

Other Key Projects - A number of other projects that have also contributed to reducing corporate GHG emissions include:

- Environmentally Responsible Procurement Policy and Local Food Procurement;
- Green Development Standard required in all new City buildings;
- Green Roofs required in all new City buildings; and
- Green Energy Procurement.

All of these projects have decreased operational costs and decreased the City's environmental impact through GHG and smog reductions, pilot testing and testing of alternative technology, and the creation of economic incentives or opportunities through new technology. An important social benefit of these projects is the creation of green jobs to manage these improvements.

Project Characteristics

The City created the Climate Change, Clean Air and Sustainable Energy Action Plan in response to the Mayor's re-election platform and residents who were asking the City to help them go green. The City also used this opportunity to consolidate and better direct its own operations to help reduce costs and be more efficient while working to reduce GHG emissions.

Energy Retrofit Program – The Energy Retrofit Program resulted in lower energy use in City facilities. Through the co-operation of the energy consultants and facilities managers, better energy saving practices were adopted and employees were educated on how best they can contribute to the energy reduction efforts. Through working groups and internal discussions, plans of action were taken and results were achieved. Types of retrofits completed include: lighting retrofits, lighting controls, installation of variable frequency drives, power factor improvements, building automation systems (BAS) and envelope sealing. Renewable energy systems, such as solar pools and solar walls were also built into the retrofits on some of the buildings.

Landfill Gas Management – Capturing methane and redirecting it to generate energy has resulted in improved air quality and reduced costs for the City by eliminating the methane flaring process while at the same time it has generated a source of income since the City sells the energy created to Ontario Hydro. This project involved the creation of a working group which included engineers and project managers working together to try to make the project a success. Methane from three closed City landfills is currently being captured. Eastern Power limited utilizes the gas at the Keele Valley and Brock West landfills while E.S. Fox Limited utilizes the gas at the Beare Road landfill.

Green Fleet Plan – By switching to hybrid technology, fuel efficient technology and right-sizing vehicles the City has reduced the release of harmful GHG emissions from the City activities and has realized cost savings. Pursuing the development of a comprehensive vehicle replacement and procurement plan was necessary and the long term cost savings by going green helped propel the project forward. The creation of the plan and its implementation has involved a Fleet working group involving all relevant divisions within the City. This working group organized itself to define the issues of importance in greening Toronto's fleet and prepared a plan that addressed these issues.

Traffic Light Conversion to LED – The main pollution prevention practice used in this pilot project was energy use reduction. The City pursued this project for cost savings but also for the potential environmental and social benefits. Beginning in 2002, the Transportation Services Division received from the Board of Directors of the Toronto Atmospheric Fund (TAF) a grant in the amount of $100,000 to support the LED Conversion Pilot Project for traffic signals. Based on the results obtained from the 2003 LED Conversion Pilot Project, the estimated cost to complete the city-wide LED Conversion Program for all existing traffic signals within the City of Toronto was $17,700,000.

Project Dates

Project	Date Initiated	Date Completed	Maximum Benefits/ Reductions Achieved
Climate Change, Clean Air, Sustainable Energy – Corporate Emissions Reduction			
A) Energy Retrofit Program	2002	Ongoing implementation with 515 buildings expected to be completed by 2010.	2010 - At this time 515 buildings will have been retrofitted, accruing the most benefits and savings
B) Landfill Gas Management	1991	Ongoing.	2000 - Over 50 MW of power was generated from all three closed landfills
C) Green Fleet Plan	2004	2011	2011 – The full vehicle replacement and employee education plan would be in place, accruing the most benefits and savings
Note: The Green Fleet Transition Plan 2004 – 2007 covered a four year period. The Green Fleet Plan 2008 – 2011 is also a four year plan that began in 2008. The application period for the CCME spans both plans from 2004 – 2008.			
D) Traffic Light Conversion to LED	2002	2012	2012 – the full conversion would have taken place

Results Achieved

Energy Retrofit Program - So far, the energy retrofit program has resulted in a reduction of over 75 million equivalent kWh of energy, and has reduced GHG emissions (CO_2) by more than 17,000 tonnes. Attached in Appendix 1 is a table that indicates further details on the individual locations of this program. Aggregate statistics for the whole program are detailed below:

Project Cost and Annual Savings	Estimated Annual Energy Reduction
Total Floor Area (m^2): 1,253,342	Save kWh: 53,922,787
Retrofit Cost: $53,842,418	Save Nat. Gas (m^3): 2,224,354
Total $ Savings: $5,495,317	Save Steam (mlbs): 1,453
Total ekWh Savings: 76,926,811	Save Water (m^3): 39,014
Total CO^2 Savings (tonnes):17,705	
Payback (years): 9.8	**Total number of Buildings: 515**

As a result of the energy conservation efforts, social benefits that have accrued include improved indoor air quality, more use of day light thereby improving the light levels and improved building operations by better understanding energy use within the buildings. The large scale retrofits also made the installation of renewable energy systems, such as solar thermal pools, financially viable.

Landfill Gas Management – Methane collection at the City's three closed landfills amounts to a total of 24 Megawatts of power. Methane represents about 50% of landfill gas and although current technology cannot capture it all, it is about 85-90% efficient. In addition, methane is currently being flared at the new Green Lane landfill but the City is actively pursuing options for utilizing the gas for power. Appendix 2 attached has more detailed statistics on gas collection but below is a summary table providing further information on each closed landfill:

Initial Methane Collection Data

Site (year started collecting)	Landfill Gas Flow (cubic feet minute)	Quantity of Gas Collected (million m^3)	Methane %	Gross Power (Megawatts)
Keele Valley (1995)	8,275	44,194	50	19.7
Brock West (1991)	8,000	42,727	50	19.0
Beare Road (1996)	1,100	5,875	50	2.6

2008 Methane Collection Data

Site	Landfill Gas Flow (cubic feet minute)	Quantity of Gas Collected (million m^3)	Methane %	Gross Power (Megawatts)
Keele Valley	8,000	38,915	47	20
Brock West	1,800	9,614	40	2.4
Beare Road	700	3,739	50	1.6

Selling the electricity has garnered royalties for the City in excess of $15 million at Keele Valley, $10 million at Brock West and $360,000 at Beare Road which more than recovered the initial capital investments to install the gas collection systems in the landfills. To date approximately 1.5 billion m^3 of methane has been collected

Green Fleet Plan – The first phase of the plan ran from 2004 – 2007 and reduced GHGs by 5,088 tonnes. Emission reductions from green vehicles accounted for 226,000 kg with the bulk of the reductions (4,862 tonnes) coming from four clean fuels programs: biodiesel, ethanol (E10), clean dyed diesel and natural gas. Of the City's 4000 vehicles, 400 have been replaced so far with more fuel efficient or hybrid alternatives.

There were other emission impacts that are yet to be quantified. For example, by using biodiesel, NOx emissions were known to rise marginally. The introduction of new street sweepers in 2007 greatly reduced particulate matter (PM) emissions associated with street cleaning operations. Fuel cost savings with hybrid vehicles can be illustrated by comparing a 2009 Honda Civic with its

Hybrid Civic sister. According to Natural Resources Canada, based on 20,000 km of driving, the Hybrid Civic would save $400/year at 1/litre.

In addition, Toronto's green fleet initiatives have had far reaching social benefits. Through the Green Fleet Expo and other networking opportunities, Toronto's green fleet plans are helping to lead the development of similar plans by Brampton, Hamilton and Markham to name but three. The Idle Free training provided to staff will also reduce emissions in the community because driving behaviour has been altered through awareness training.

Traffic Light Conversion to LED – The annual savings of the completed city-wide LED Conversion Program will be approximately $2,050,000. These annual savings will be accrued in a reserve fund to offset the future costs associated with the LED traffic signal lamp replacement cycle.

Cumulative Traffic Lights to be Converted	Year	Cost	Savings (kilowatt-hours per day)	Carbon Dioxide Reductions (kilograms per day)
20	2002-2003 (Pilot years)	$100,000	250	69.9
City Wide Traffic Light Conversion				
110	2004	$1 million	1375	384.45
381	2005	$2.5 million	4762.5	1,331.60
652	2006	$2.5 million	8150	2,278.74
923	2007	$2.5 million	11,537.5	3,225.89
1194	2008	$2.5 million	14,925	4,173.03
1465	2009	$2.5 million	18,312.5	5,120.17
1765	2010	$2.5 million	22,062.5	6,168.68
1920	2011	$1.7 million	24,000	6,710.4
Total: 1,920	**2004-2012**	**$17.7**	**24,000**	**6,710.4**

In total, the pilot project achieved a reduction in energy consumption of an astounding 84%. Transportation services estimates the annual energy savings from implementing the City-wide conversion will reach approximately $1,825,000 and the estimated annual maintenance savings will reach approximately $225,000 for a combined total of $2,050,000 per year.

Commitment to Pollution Prevention

These core GHG reduction programs at the City have resulted in increased environmental awareness and involvement among staff in many areas. Through the Energy Efficiency Office the E3 at Work program encourages staff to turn off monitors and lights in rooms when they are not in use. It also encourages staff to only run appliances such as dish washers in kitchenette areas when they are full to save energy. All employees that drive vehicles are required to participate in a City training course run by Fleet Services which includes information on anti-idling, the importance of decreasing trips where possible, and carpooling for work related projects. Fleet Services also considers the environment in its use and disposal of oils and lubricants by implementing the 3 R's principle. By selecting synthetic transmission oil, the requirement to change oil more frequently is

REDUCED. Engine oil is derived from REUSED sources where possible and availability permits. Finally, all oils and lubricants are RECYCLED. Solid Waste Management services is going beyond expectations and provincial regulations by not just flaring methane gas but utilizing the gas at the three closed landfills for energy production and generating plans for the current Green Lane landfill to follow suit.

Staff are informed of ways they can contribute to corporate environmental efforts through an internal website. This website is also used as a forum to highlight achievements, awards and honours in the environment. There is also a forum held every year called the Learning Summit where staff can learn about initiatives happening within the City and ways to improve the City's service delivery and performance. This year the topic is on greening the City and staff across the corporation will be given presentations on the City's environmental work and opportunities to provide suggestions to help improve the City's delivery of environmental programs and general environmental performance.

City staff also frequently attend conferences to give presentations to the general public on the City's GHG reduction work on City operations. The Toronto Environment Office also frequently gives presentations to a variety of businesses and school groups in the Toronto area explaining how the City's operations are leading to reduced emissions. The City's efforts do not go unnoticed as the Energy Efficiency Retrofit Program Arena project won the FCM/CH2M Hill award in 2008 and in 2007 received a Special Recognition from the Office of Energy Efficiency (part of NRCan) for the City's effort in improving energy efficiency and reducing GHG emissions. Also, the City was awarded a Gold Award of Excellence at the Ontario Public Sector Quality Fair in 2008 for its work on converting traffic lights to LED technology. Finally, in 1999 the City received the Solid Waste Association of North America Landfill Gas Control Excellence Gold Award for its work in landfill gas utilization.

Transferability

Many other Cities across Canada and the US have looked to Toronto for examples on how to green their own operations in an effort to reduce GHG emissions. The Energy Retrofit Program has served as a model for the Toronto Region Conservation Authority (TRCA) to set up a group building retrofit program for smaller municipalities in the area, based on the success of the large scale retrofit program that occurred in Toronto and the opportunities it opened for making renewable energy installations a viable part of the retrofit process. Energy retrofits and changes to the way facilities are managed are now being proposed in other divisions within the City including Shelter, Support and Housing. The program is part of the Mayor Megawatt Challenge hosted by TRCA, and participates in the development of the LEED-EB rating system and the NRCan pilot labeling program for buildings. Other cities including Montreal and some private sector operations in Halifax have used the successes of the City's methane utilization to see how they too could make better use of their landfill gas. Many cities in Ontario are looking to the City's Green Fleet Plan as a model to 'green' their own fleets. Finally, LED technology is being widely adopted and the City's Business Improvement Areas have also started to convert to using LED technology for lighting.

Innovation

Although many Cities are developing climate change plans to reduce GHG emissions, the City's strong commitment to the environment and reducing emissions in the past has paved the way for some very bold targets and allowed for the adoption of innovative technology to achieve those targets. The Energy Retrofit Program coupled large scale retrofits with renewable energy installations to make holistic changes to way buildings are managed by the City. Although other cities are pursuing the utilization of landfill gas for energy and LED traffic light conversions no other cities in Ontario are doing it on as large a scale as Toronto. Fleet Services is at the cutting edge of new technology and together with Environmental Technology Verification (ETV), searches out and tests new vehicles, products and fuels. For example, the City has entered into an agreement with Ford of Canada to test three hydrogen shuttle buses as part of a pilot project. As well, the Green Fleet Expo (GFX) is an opportunity for Toronto and Hamilton to showcase their work on greening fleet operations to a wider audience. Since its inception in 2006, the GFX has become the premier event for fleet managers looking to test new green vehicles and learn about emerging technologies.

Greenhouse Gas Reduction

The City of Toronto is committed to reducing corporate GHG emissions. Multiple areas of business operations have now incorporated greening efforts including:

- Green procurement and local food procurement requirements for City operations;
- Water facilities investments of approximately $50 million to upgrade lighting, electrical equipment, and replacing pumps and motors with high efficiency units;
- Green Development Standard mandatory requirements for new City Buildings; and
- Green Roof mandatory requirements for all new City Buildings.

Energy Use - Both the Energy Retrofit Program and the Traffic Light Conversion to LED projects represent energy conservation initiatives. The City is also using the Deep Lake Water Cooling system in City Hall and other downtown City buildings to replace conventional air conditioning with air that is cooled by cold water from Lake Ontario. This conversion represents huge cost and energy savings for all downtown Toronto buildings that have signed on to use the Deep Lake Water Cooling system. City Hall is also Bullfrog Powered which means that Bullfrog Power's generators inject green power onto the electricity grid to match the power used by City Hall.

Company Transportation Practices – As detailed, the City's Green Fleet Plan is making huge strides in reducing carbon emissions. The Green Fleet Transition Plan 2004 – 2007 reduced GHGs by 5,088 tonnes. The latest plan that covers 2008 – 2011 is expected to reduce GHGs by 15,000 tonnes and put Toronto on a path to meet its GHG reduction targets. The City also provides discounted monthly transit passes for City employees to encourage smarter commuting practices.

Employee Programs - The City of Toronto is actively engaged in organizing the Smart Commute program's Downtown Transportation Management Area. As part of the program the City participates in the annual Clean Air Commute challenge hosted by Pollution Probe as well as

engages employees to participate in the City's own Smart Commute program. Participation involves employees signing up to agree to use alternative forms of transportation other than a single occupancy vehicle to commute to work. The City is also developing a tele-work and flex work week policy so that in its pilot stage, 800 employees can work from home, thereby reducing their commute time or eliminating it and saving for employees and the City.

Policy or other Initiatives - The City is a member of several international carbon reduction organizations including the C40 Cities – Climate Leadership Group, ICLEI (Local Governments for Sustainability) and the Clinton Climate Initiative. The City also frequently engages in pilot programs through grants offered by the arms length agency, the Toronto Atmospheric Fund. The City has been a leader in renewable energy, installing over 1,750 solar powered parking meters, 3 Solar Wall installations, 8 Solar Pool heating installations, 3 Solar hot water thermal installations, 3 Solar PV installations generating 105,900 kWh/year (including the largest solar PV system in Canada) and 42 solar PV lights at the Bloor West Village Business Improvement Area. City Hall is also on track to be a zero waste facility by the end of 2009. The City is constantly trying to improve its operations and is always looking for measures to implement that will help the City reach its GHG emission reduction targets.

Toronto's commitment to achieving its GHG reduction targets goes well beyond City operations. There are a large number of programs and policies in place and being developed to assist residents and businesses in reducing their emissions. Some programs include the Sustainable Energy Funds, Live Green Toronto and the Toronto Solar Neighbourhoods Initiative. More information on these and other programs is available online at: www.toronto.ca/environment.

APPENDIX 1

City of Toronto

An Inventory of Energy Efficiency Retrofitted Buildings - Summary

				Project Cost & Annual Savings					Estimated Annual Energy Reduction					
Project Name & Start Year	Completion Year	Num. of Bldgs	Total Floor Area (m2)	Retrofit Cost	Total $Savings	Total ekWh Savings	Total CO2 Savings (tonnes)	Payback	Save kWh	Save kW	Save Nat.Gas m3	Save Steam mlbs	Save Water m3	Save Other ekWh
Public Library 2002	2003	81	130,716	$3,200,000	$284,157	3,716,394	853	11.3	2,645,249	5,962	103,575	0	6,017	0
Central Main't Garage 2002	2002	2	8,770	$431,794	$74,084	2,425,294	481	5.8	215,441	0	213,684	0	0	0
Fire Hall 2003	2006	88	66,722	$2,611,319	$334,594	5,473,597	1,115	7.8	1,048,843	2,897	427,856	0	12,702	0
Arena 2004	2007	89	206,485	$9,932,267	$1,217,181	19,815,506	4,298	8.2	9,051,822	3,649	1,040,804	0	1,469	0
Civic Centers 2004	2006	13	253,804	$4,465,481	$567,973	7,260,336	1,797	7.9	6,112,271	4,268	110,972	1,453	0	0
Metro Hall DLWC 2005	2006	1	0	$2,900,000	$0	3,000,000	732	0.0	3,000,000	14,000	0	0	0	0
Ex Place 5 Building -2005	2007	6	70,051	$1,160,926	$173,654	2,793,045	608	6.7	1,324,524	348	142,000	0	0	0
DEC Lighting Retrofit -2005	2006	4	121,781	$890,113	$302,308	2,805,049	684	2.9	2,805,049	615	0	0	0	0
Ex Place Tri-gen 2005	2007	1	0	$4,400,000	$556,283	-4,168,263	-210	7.9	11,990,974	0	-1,562,532	0	0	0
Community Center 2006	2009	51	128,494	$6,021,021	$750,000	13,334,358	2,664	8.0	1,536,340	223	1,140,820	0	0	0
Police HQ 2007	2009	1	27,870	$400,965	$32,537	392,875	83	12.3	138,438	0	24,603	0	0	0
Police Station 2007	2009	21	73,283	$2,280,021	$285,003	3,459,456	792	8.0	2,417,933	2,257	100,711	0	17,759	0
St Lawrence Complex 2007	2009	2	14,356	$579,166	$63,340	1,021,410	221	9.1	459,659	1,114	54,319	0	0	0
Transfer Station 2007	2008	8	58,306	$2,742,345	$339,304	4,147,032	958	8.1	3,067,348	1,644	104,401	0	1,066	0
DLWC - City Hall 2008	2008	1	0	$1,987,000	$0	1,900,000	464	0.0	1,900,000	0	0	0	0	0
DLWC - Police HQ 2008	2008	1	0	$2,835,000	$0	1,360,000	332	0.0	1,360,000	0	0	0	0	0
Recreation Center Lighting 2008	2009	100	30,000	$1,750,000	$218,750	2,302,600	562	8.0	2,302,600	700	0	0	0	0
Animal Services 2008	2009	6	5,849	$500,000	$62,500	1,063,161	223	8.0	328,900	0	71,000	0	0	0
EMS Station 2008	2009	29	19,601	$600,000	$75,000	984,252	223	8.0	631,600	0	34,100	0	0	0
ChildCare Centres 2008	2009	8	4,692	$300,000	$37,500	595,808	128	8.0	256,600	0	32,800	0	0	0
DLWC - Old City Hall 2008	2010	1	32,562	$2,900,000	$0	960,000	234	0.0	960,000	0	0	0	0	0
Ex Place Boiler Upgrade 2008	2008	1	0	$955,000	$121,150	2,284,903	462	7.9	369,196	0	185,241	0	0	0
Total (22 projects)		**515**	**1,253,342**	**$53,842,418**	**$5,495,317**	**76,926,811**	**17,705**	**9.8**	**53,922,787**	**37,677**	**2,224,354**	**1,453**	**39,014**	**0**

Notes:

1) CO2 emission factors as per Toronto Environment Office for year 2004: 1 kWh of electricity = 244 g eCO2; 1 cu-m of gas = 2007 g eCO2.

2) Deep Lake Water Cooling (DLWC) projects yields no utility cost savings but have some cost savings in maintenance and operation. The benefits are more on the greenhouse gas reduction as a result of not using electric chillers to cool buildings.

3) Total number of buildings and floor areas are actually less than stated since some buildings had multiple measures and implemented in different projects, ie. DLWC at Metro Hall and energy retrofit in Civic Centers project.

Prepared By: Facilities & Real Estate, Energy & Waste Management .....Date: 2009/Feb/17

APPENDIX 2

Data on the Methane Collected and Energy Generated at the City's Three Largest Closed Landfill Sites

Year	Landfill Sites									
	Keele Valley scfm @50%	Brock West scfm @50%	Beare Road	Keele Valley tonne of methane/yr	Brock West tonne of methane/yr	Beare Road				
1986		3000			16023					
1987		5800			30977					
1988	2,009	9000		10730	48068		GROSS MEGA WATTS			
1989	2,002	8145		10695	43502					
1990	2,775	8108		14819	43306		Keele Valley	Brock West	Beare Road	
1991	3,038	8000		16227	42727			19.0		
1992	6,004	7880		32066	42086			18.8		
1993	6,743	7906		36011	42225			18.8		
1994	7,845	6196		41901	33092			14.8		
1995	8,275	5456		44194	29140		19.7	13.0		
1996	10,435	6278	1100	55731	33530	5875	24.8	14.9	2.6	
1997	13,346	5716	1100	71281	30529	5875	31.8	13.6	2.6	
1998	13,770	5398	1100	73544	28830	5875	32.8	12.9	2.6	
1999	14,618	4696	1000	78073	25081	5341	34.8	11.2	2.4	
2000	15,260	4518	1000	81504	24130	5341	36.3	10.8	2.4	
2001	14,649	4168	900	78240	22261	4807	34.9	9.9	2.1	
2002	14,686	3960	900	78434	21150	4807	35.0	9.4	2.1	
2003	14,041	3400	800	74990	18159	4273	33.4	8.1	1.9	
2004	12,030	3200	800	64252	17091	4273	28.6	7.6	1.9	
2005	10,359	2578	800	55326	13769	4273	24.7	6.1	1.9	
2006	9,259	2220	700	49451	11857	3739	22.0	5.3	1.7	
2007	7,953	2000	700	42476	10682	3739	18.9	4.8	1.7	
2008	7,286	1800	700	38915	9614	3739	17.3	4.3	1.7	
			Totals:	1048859	637830	61955				

Totals:	1,462,843,715	889,581,898	86,408,163

sfcm = standard cubic feet per minute
Note: The methane content has been normalized to 50% as per industry standards