CHANGE IS IN THE AIR

TORONTO'S COMMITMENT TO AN ENVIRONMENTALLY SUSTAINABLE FUTURE

Framework for Public Review
and Engagement

March 2007

TORONTO

"As Canada's biggest city we have an opportunity to lead by tremendous example. Reducing greenhouse gases is THE issue of our time. Maybe of all time."

Mayor David Miller, Inaugural Address, December 2006

Message from the Mayor

During the recent municipal election, the citizens of Toronto gave an overwhelming endorsement to my call to action to fight climate change and reduce smog.

As you know, Toronto has long been recognized as a leader on environmental issues, particularly climate change. In 2005, the Suzuki Foundation named Toronto the North American leader in reducing greenhouse gas emissions and Business Week magazine listed Toronto among the world's top five low-carbon cities.

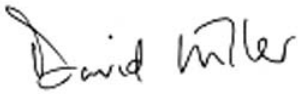
We're determined to consolidate and expand that leadership by committing to new targets of a 30 percent cut in greenhouse gas emissions from the Toronto urban area by 2020, based on 1990 levels, and an 80 percent reduction by 2050 and, of course, meeting Kyoto targets. These targets are consistent with recently announced European Union goals and proposals from the Canadian Big City Mayors' Caucus. We're also committed to reducing levels of smog-causing pollutants 20 percent by 2012.

This document – Change is in the Air - is an invitation to you, the citizens of Toronto, to get involved in developing and implementing the city's new Climate Change and Clean Air Action Plan. It's not a draft plan, but rather a framework for meeting our greenhouse gas and air pollution reduction targets.

An inventory of the major sources of greenhouse gases and air pollutant in Toronto has been completed. This framework provides some ideas on the types of strategies, policies, programs and projects we need to put in place to meet our reduction goals. We hope that they will stimulate your own thinking about individual and collective actions that will help us to reach our emissions reduction targets

Everyone has a part to play in helping Toronto to fight climate change and improve air quality. I'm looking forward to hearing your suggestions for actions and partnerships that will reduce emissions in Toronto.

Sincerely,



Mayor David Miller

CHANGE IS IN THE AIR: TORONTO'S COMMITMENT TO AN ENVIRONMENTALLY SUSTAINABLE FUTURE

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INTRODUCTION

A Time for Action: Crisis and Opportunity

This document is designed to provoke you to give us your best thinking about what should be included in Toronto's Climate Change and Clean Air Action Plan. This is not the Action Plan, rather it's a framework for determining what we will do and how we will do it. Our starting point is that we need to take action on climate change, on air quality and on adapting to a changing climate.

Fossil fuels – coal, oil and natural gas – have been used to drive economic growth since the late Eighteenth Century. Our dependence on them has resulted in the release of historical levels of climate-changing greenhouse gases and has been largely responsible for air pollution and the associated negative impact on public health.

We use fossil fuels to power our cars and industries, heat and cool our homes and buildings, and generate electricity. However, that use comes with environmental and social costs that go well beyond the immediate financial ones.

What follows is the City of Toronto's proposed framework for a Climate Change and Clean Air Action Plan. Please review it and give us your input on how best to reduce greenhouse gas emissions and emissions of smog-causing air pollutants.

This framework sets the following greenhouse gas reduction targets for the Toronto urban area, based on a 1990 baseline:

6% by 2012
30% by 2020
80% by 2050

Setting Toronto's Action Plan

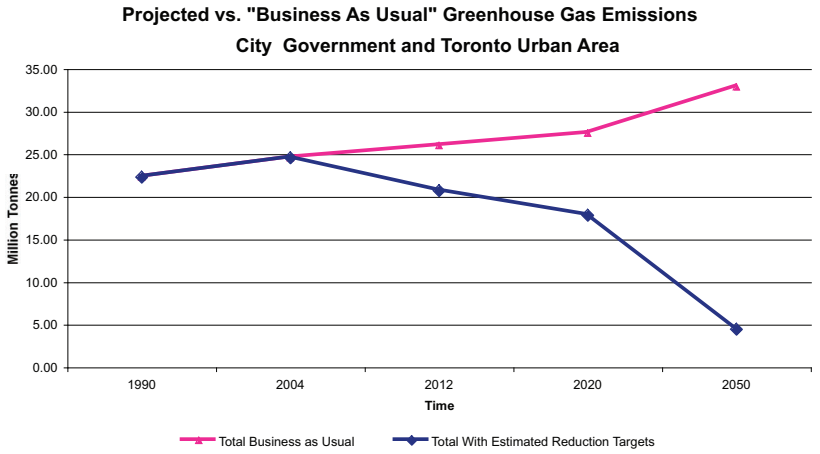
This framework sets the following greenhouse gas reduction targets for the Toronto urban area, based on a 1990 baseline:

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

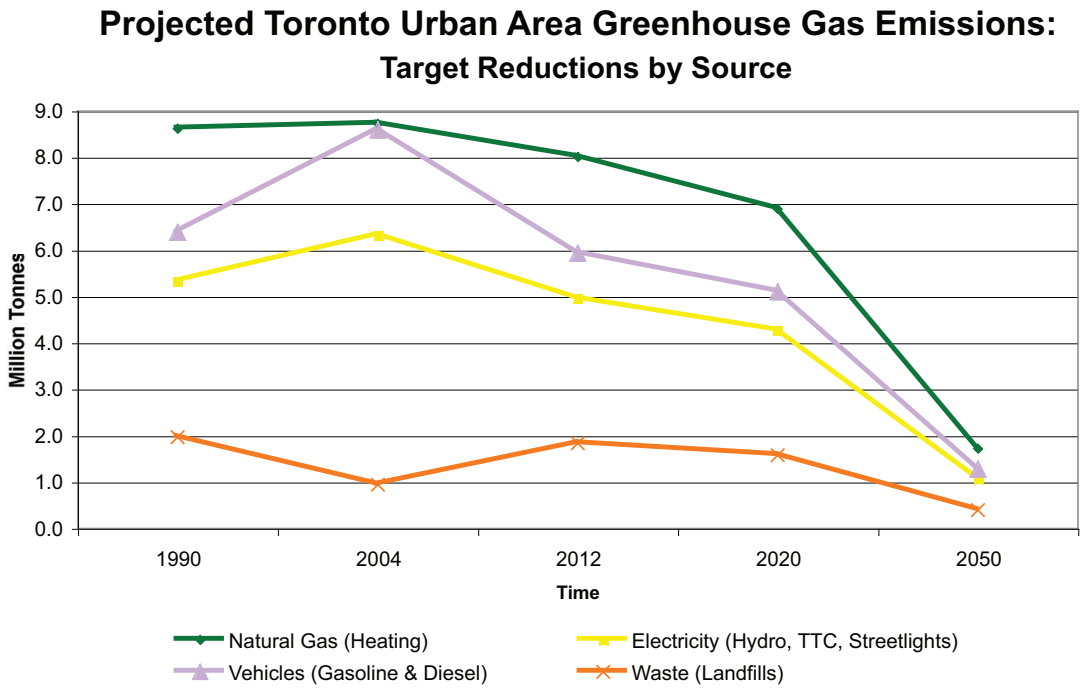
These targets are consistent with those set by the European Union and with targets suggested by the Federation of Canadian Municipalities' Big City Mayors' Caucus.

The target for reducing smog-causing pollutants is 20 percent by 2012, based on a 2004 baseline.

These targets are for all of Toronto. City government is part of the problem and will be part of the solution. The City urban area, comprising small and large business, trucking companies, people driving cars and heating and cooling their homes are part of the problem and will want to join and become part of the solution.



CLIMATE CHANGE TARGETS



Projected Toronto Urban Area Greenhouse Gas Emissions: Target Reductions by Source

Greenhouse Gas Emissions (Million Tonnes)	Current Greenhouse Gas Emissions	Estimated Target in Million Tonnes (Reduction)		
	2004	2012 (6% Reduction of 1990)	2020 (30% Reduction of 1990)	2050 (80% Reduction of 1990)
Natural Gas (Heating)	8.7	-	-	-
Electricity (Hydro, TTC, Streetlights)	6.2	-	-	-
Vehicles (Gasoline & Diesel)	8.6	-	-	-
Waste (Landfills)	0.9	-	-	-
Total With Estimated Reduction Targets	24.4	22.9	17.8	4.5

AIR QUALITY AND SMOG TARGETS

Projected Toronto Urban Area Criteria Air Contaminant (CAC)* Emissions: Target Reductions by Source

Criteria Air Contaminant Emissions (Thousand Tonnes)	Current Criteria Air Contaminant Emissions	Estimated Target (Reduction)		
	2004	2012 (6% Reduction of 2004)	2020 (30% Reduction of 2004)	2050 (80% Reduction of 2004)
Natural Gas (Heating)				
NOx	6.68	-	-	-
PM10	0.53	-	-	-
Vehicles (Gasoline & Diesel)				
NOx	27.43	-	-	-
PM10	7.43	-	-	-
Industrial Smoke Stacks				
NOx	1.75	-	-	-
PM10	0.47	-	-	-
Other Area Sources				
NOx	3.74	-	-	-
PM10	10.85	10.09	7.59	2.17

Footnote:

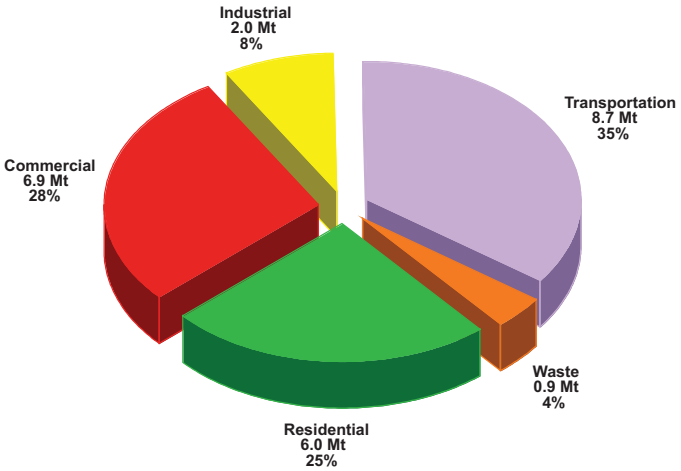
Nitrogen Oxides (NOx) - are formed when fossil fuels are burnt in the presence of air - as with fuels burnt to produce power in vehicles, heating from natural gas, and products in several industrial processes

Particulate Matter (PM10) - Fine particulate matter includes nitrates and sulphates formed as part of fossil fuel combustion processes (PM2.5 is a subset of PM10) but also includes the fine dust created by the wearing down of vehicle's rubber tires, brake pads and the surface of the roads they run on - as well as dust from construction activities.

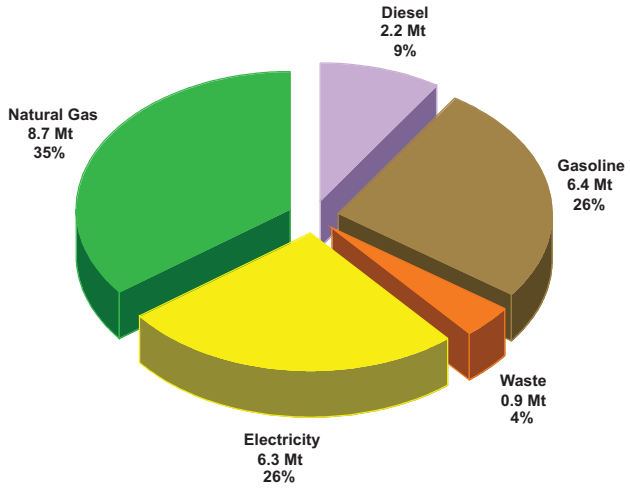
***Criteria Air Contaminant (CAC)** - include NOx, SOx, VOC, CO, PM10, PM2.5 &O3

GREENHOUSE GAS EMISSIONS: BY SOURCE AND SECTOR

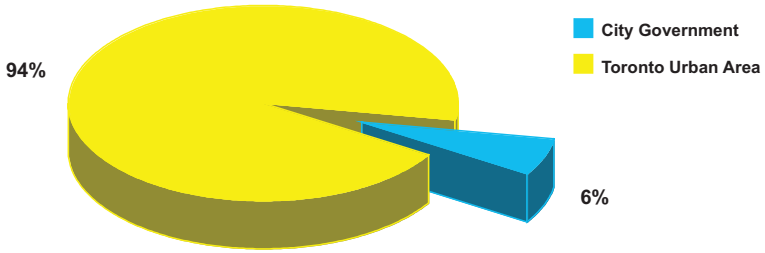
Toronto Urban Area
Greenhouse Gas Emissions (2004) by Sector



Toronto Urban Area
Greenhouse Gas Emissions (2004) by Source

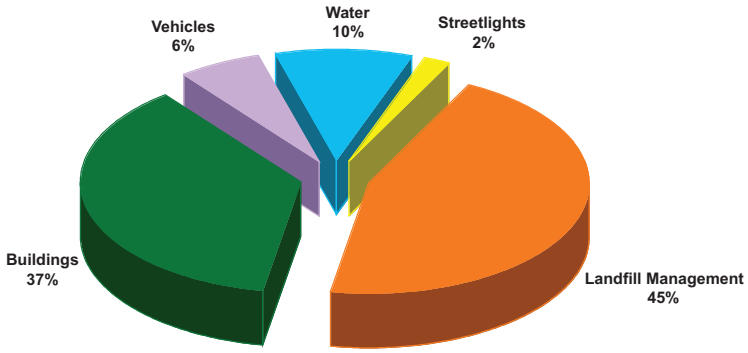


City Government and Toronto Urban Area % of Greenhouse Gas Emissions



City Government

1,590,736 tonnes Greenhouse Gas Emissions (2004)



Source: Toronto Environment Office and Toronto Atmospheric Fund GHG / Air Quality Inventory, based on 2004 data.

WHY ADDRESS CLIMATE CHANGE AND AIR QUALITY IN THE SAME PLAN?

This framework recommends an integrated approach to climate change and clean air for the following reasons:

- fossil fuels are responsible for the majority of both greenhouse gases and smog-causing pollutants;

- in general, measures to reduce greenhouse gas emissions will also reduce emissions of air pollutants
  - the main greenhouse gas pollutants that are of concern for climate change are carbon dioxide (from fuel combustion, as in vehicles and building heating/cooling) and methane (from the decay of waste in landfill)

  - the main air pollutants that are of concern for local air quality are oxides of nitrogen (from fuel combustion in vehicles and building heating/cooling) and fine particulate matter (from road dust, construction, and fuel combustion in vehicles and building heating/cooling, and in industrial processes)

- on a day-to-day basis, emissions of air pollutants in Toronto are largely from building chimneys and vehicle tailpipes; during smog events, these emissions are partially "trapped" near ground level, and add significantly to the existing pollution;

- methods and approaches developed for reducing greenhouse gas emissions across Toronto (e.g. energy efficiency, renewable energy sources) are particularly effective for reducing air pollution;

- the policy trend in Canada and internationally is toward an integrated and harmonized approach to cleaner air and lower greenhouse gas emissions; and

- a communication plan designed to raise individual and community consciousness and promote steps to reduce greenhouse gas emissions, improve air quality, and adapt to climate change will be assisted by a "one-window" integrated approach.

Throughout this framework, specific steps and recommended actions related to either climate change or improvement in local air quality can be included for both the public and private sectors. The integrated approach is not intended to diminish the actions that would be beneficial.

POTENTIAL ACTIONS: SUMMARY

Natural Gas

1. Retrofit 50% of single family homes and small businesses by 2020.
2. Develop financing mechanism for high-rise rental and condo energy efficiency retrofits.
3. Invite bids to develop renewable energy systems on city-owned properties.
4. Mandatory green building standards for new buildings, including businesses and residences, by no later than 2012.

Gasoline

5. Implement the Transit City Plan.
6. Annual parking or motor vehicle registration fee to fund retrofits and renewable energy.
7. Complete the bikeway network by 2012.
8. Cut small engine use by 50% by 2020.

Diesel

9. Identify opportunities to replace imports with locally produced goods and food.
10. Require all large food retailers to indicate the food kilometres (shipping distance) for 10 commonly used types of produce by 2012.
11. Convert all City fleet that runs on diesel, including Agencies, Boards and Commissions, to biodiesel (B50 in summer, B20 in winter) by 2015.
12. Require companies providing haulage service to the City to use biodiesel – B20.

Electricity

13. Expand and extend all Toronto Hydro programs that support energy conservation and renewable energy.
14. Eliminate use of incandescent bulbs in all City-owned buildings, including Agencies, Boards and Commissions, by 2012.
15. Complete conversion of street lighting to LED technology by 2020.
16. Reduce electricity used for pumping and treating water by reducing water consumption by 50% by 2020.
17. Aggressively expand deep lake water cooling to meet 90% of space cooling needs (to replace air conditioning) along the waterfront and in the downtown core by 2020.

Solid Waste

18. Install methane collection at Thackery Landfill by 2009.

Comprehensive Actions

19. Make City Hall a showcase of environmental sustainability with

energy efficiency retrofits, renewable energy, greenroof and environmental education.

20. Foster green economic development clusters such as a renewable energy cluster and/or sustainable design cluster.
21. Meet 25% of energy demand in the Toronto urban area from renewable sources by 2020.
22. Conserve 90 megawatts of electricity by 2012.
23. Promote pollution prevention through enhanced environmental reporting, including access to environmental information (also known as community right to know) and compliance with new health-based provincial standards.
24. Double the existing tree canopy to 34%.
25. Continue development at city centres and along major corridors and avenues, as outlined in the City of Toronto Official Plan.

Adaptation Strategy

26. Conduct vulnerability scans of City operations due to changing climate, and take action based on findings, as appropriate.
27. The City Manager, in collaboration with the Deputy City Manager (Cluster B) and the Toronto Environment Office will report yearly on achievements relating to the reduction of greenhouse gas emissions and smog-causing pollutants.

POTENTIAL ACTIONS: DETAILS

To show the link between cause and effect, the potential actions related to each energy source that contributes to greenhouse gas emissions and poor air quality, are clustered together.

The energy sources are:

- NATURAL GAS
- GASOLINE
- DIESEL
- ELECTRICITY

What follows are examples of initiatives that can be implemented to meet Toronto's reduction targets. They range from large, bold moves to small, but significant actions that will have great benefits if implemented collectively.

Natural Gas

Responsible for 8.7 megatonnes or 36% of eCO_2 emissions

The largest source of greenhouse gases in Toronto is natural gas to heat homes and other buildings. Most of these buildings were built before the climate crisis was understood and were not designed with energy conservation in mind. While it is possible to build to a much higher standard today, we need to get on with improving existing buildings. One federal program, EcoEnergy, provides some incentives for home energy retrofits but does not go far enough. The program is limited in the number of home retrofits it will support. Also, the incentives offered are not generous enough to appeal to many home owners. Finally, the program is not marketed aggressively.

1. Potential Action: Retrofit 50% of single family homes and small businesses by 2020

Supporting actions:

- Market federal EcoEnergy incentives to homeowners.
- Offer tax rebate for purchase of high efficiency boilers/furnaces.
- Provide green mortgages or "on bill" financing to support retrofits.
- Include information on green building standards with building permits for renovations.
- Provide financing incentive for green roofs.
- Evaluate renewable energy potential for each home and provide tools and incentives to make every home a hybrid home including the use of solar energy to heat water.

2. Potential Action: Develop financing mechanism for high rise rental and condo energy efficiency retrofits

Supporting Actions:

- Install combined heat and power generators to provide hot water and electricity in high rise condominiums.
- Provide low-cost energy efficiency kits to all renters called "energy green boxes."
- Partner with the institutional, commercial and industrial sector.

3. Potential Action: Invite bids to develop renewable energy systems on City-owned properties

4. Potential Action: Mandatory green building standards for new buildings including businesses and residences by no later than 2012

Gasoline

Responsible for 6.4 megatonnes or 27% of eCO_2 emissions

Gasoline-fuelled cars and light duty trucks are a major source of both greenhouse gas emissions and air pollutants such as nitrogen oxides, volatile organic carbons and fine particulate matter. Making alternatives to driving (such as walking, biking and public transit) more attractive is essential to reducing climate warming and polluting emissions.

Increasing gas mileage and reducing the number of vehicle trips means better air and less climate warming. Average fuel efficiency has declined recently due to the trend to heavier vehicles and more horsepower. This trend is countered by rising fuel prices and the opportunity to amend federal standards to achieve better fuel efficiency.

5. Potential Action: Implement transit city plan

6. Potential Action: Annual parking or motor vehicle registration fee to fund retrofits and renewable energy

- City to apply an annual parking fee per parking space to commercial parking, or motor vehicle registration fee, with the revenue pooled to establish a revolving fund to support retrofit and renewable energy programs.

7. Potential Action: Complete the bikeway network by 2012

8. Potential Action: Cut small engine use by 2020

Incentive program to promote use of alternatives to small engine yard equipment such as:

- purchase of push mowers
- collection and appropriate disposal of old gasoline powered mowers
- use of brooms over gas-powered or electric leaf blowers.

Diesel

Responsible for 2.2 megatonnes or 9% of eCO_2 emissions

Diesel is the primary fuel source for trucks that criss-cross Toronto moving and delivering people, services and goods from as far away as Mexico and California. Pollution from trucks powered by diesel is increasing and is a significant contributor to both greenhouse gas emissions and poor air quality.

9. Potential Action: Identify opportunities to replace imports with locally produced goods and food

10. Potential Action: Require all large food retailers to indicate the food kilometres (shipping distance) for 10 commonly used types of produce by 2012

11. Potential Action: Convert all City fleet that runs on diesel including agencies, boards and commissions, to biodiesel (B50 in summer, B50 in winter) by 2015

12. Potential Action: Require companies providing haulage service to the City to use biodiesel – B20 (minimum ratio 20% biodiesel to 80% petroleum diesel)

Electricity

Responsible for 5.7 megatonnes or 24% of eCO_2 emissions

We all use electricity in our daily lives. It powers our clock radios, boils the water for coffee, propels the subways and streetcars we take to work and runs our computers.

Nearly all of the electricity we use in Toronto is generated outside of our municipal boundaries at locations such as Niagara Falls through hydro-electric generation, Pickering through nuclear-fuelled power plants, and Nanticoke through coal-powered power plants. Our use of electricity, especially from coal-fired plants, releases 5.7 Mt of greenhouse gases every year and reduces air quality.

The addition of new condominiums, street car lines and computers will create new demand for electricity, but we can address new demand through better conservation of the electricity we currently use and through renewable energy resources.

13. Potential Action: Expand and extend Toronto Hydro programs that support energy conservation and the production of renewable energy

14. Potential Action: Eliminate use of incandescent bulbs in all City owned buildings including agencies, boards and commissions by 2008

15. Potential Action: Complete conversion of street lighting to LED technology by 2020

16. Potential Action: Reduce electricity used for pumping and treating water by reducing water consumption by 50% by 2020

17. Potential Action: Aggressively expand deep lake water cooling to meet 90% of space cooling needs along the waterfront and in the downtown core by 2020

Solid Waste

Responsible for 1 megatonne or 4% of eCO_2 emissions

In recent years Toronto has made significant strides by collecting methane gas generated in its landfills and using it as an energy source to produce electricity. Systems are in place at the following landfills: Keele Valley, Beare Road, and Brock West.

Toronto has an opportunity to expand its methane collection at closed landfills, such as the Thackery Landfill and introduce heat and power generation from methane at the Green Lane Landfill (the City's newly-purchased landfill near St. Thomas, Ontario).

The City can also expand its collection of organics through the extension of the Green Bin program to the multi-residential sector (condominiums and apartments). This expansion would significantly reduce the amount of organic material going to landfill and, in turn, reduce the methane gas generated in landfills from decaying organic material.

18. Potential Action: Install methane collection at Thackery Landfill by 2009

Proceed to capture methane at Green Lane Landfill for heat and electricity.

Comprehensive Actions

The City has many broad-based programs, policies and plans in place and under development that support air quality improvement and greenhouse gas reductions.

For example, the City is showing leadership by embarking on a new Energy Plan, a Renewable Energy Action Plan, a pending Green Economic Development Strategy and an Integrated Transportation Strategy. These important initiatives form key response mechanisms to reach the targets. The City has also undertaken work on adaptation to climate change and on protocols for reducing pollution including looking at ways to increase access to environmental information (sometimes referred to as "community right to know").

19. Potential Action: Make City Hall a showcase of environmental sustainability including energy efficiency retrofits, renewable energy, green roof and environmental education

Green Economic Development Strategy

The City's Green Economic Development Strategy is identifying opportunities that will result in competitive advantage in a fossil fuel-constrained future and foster strong economic growth, job retention and job creation.

20. Potential Action: Foster green economic clusters such as a renewable energy cluster and/or a sustainable design cluster.

Energy Planning

The current City Energy Plan is focused on reducing the overall demand for electricity through energy efficiency retrofits and increasing the quantity of renewable energy used to meet the demand for electricity.

Renewable energy is a source of energy that can be replenished in a short period of time. It is often referred to as "green" energy because unlike energy created from fossil fuels (coal, oil and gas), it will not run out. We obtain renewable energy from the sun (solar energy), from water (hydropower), from the wind (wind turbines), from the heat of the earth (geothermal), and biomass (crop residues, wood and green waste from our kitchens).

21. Potential Action: Meet 25% of the energy demand in the Toronto urban area from renewable energy sources by 2020.

22. On-going Action: Conserve 90 megawatts of electricity by 2012.

Pollution Prevention

23. Potential Action: Promote pollution prevention through enhanced environmental reporting, including access to environmental information (also referred to as community right to know) and compliance with new health-based provincial standards

Urban Forestry

Urban forests remove carbon-dioxide from the atmosphere during photosynthesis, storing carbon in their tissues. Toronto's urban forest extends along streets, in parks, greenbelts, on university and college campuses and on private property. Preserving and protecting these trees prevents CO_2 from being released and planting more trees helps remove CO_2 from the atmosphere.

Climate change is introducing new stresses on our forest: extended heat waves, extended droughts, and fewer winter freezes can result in the introduction of invasive insects and diseases. Planting and maintaining trees slows climate warming and assists with adaptation by providing shade and cooling to counter the urban heat island effect.

24. Potential Action: Double the existing tree canopy to 34% by 2020

Land Use Planning

Increased urban density is one of the most effective ways to increase energy efficiency. Multi-family and high rise office buildings use far less energy per occupant than their stand-alone counterparts. Public transportation is more frequent and cost effective in high density areas. As a result of Toronto's relatively high density, our per capita level of energy consumption is very low compared with the rest of the country.

25. On-going Action: Continue development on city centres and along major corridors and avenues, as outlined in the City of Toronto Official Plan

Adaptation Strategy

The previous actions steps contained in this framework focus on mitigating the emission of greenhouse gases through such actions as energy conservation. While implementing these actions steps will be beneficial and reduce our climate impact and improve local air quality, the long-term effects of greenhouse gases in the atmosphere means that the earth's climate will continue to change for centuries to come. We will experience more frequent extreme weather events such as rain storms and prolonged heat waves, even if rapid progress is made on the reduction of emissions.

To address this, Toronto must go beyond mitigation measures and initiate climate change adaptation measures. Our investments in adaptation will result in local benefits. By working to protect ourselves from storms, floods, droughts, heat waves, invasive pests, species, and diseases, people in Toronto will benefit. Our environment will be better, our health will be more protected, and our economy will be less vulnerable to damage and disruption.

The City needs to develop and implement a comprehensive strategy to ensure that climate impact scenarios are appropriately integrated into City policies, operations and services.

Work to Date

The Clean Air Partnership ("CAP") has published *A Scan of Climate Change Impacts on Toronto, 2006* (cap@cleanairpartnership.org). The scan is the first of a four-part project, *Adapting to Climate Change in Toronto*. CAP is working with the City to incorporate climate change into program planning and implementation to reduce the vulnerability of the city and its inhabitants to the impacts of climate change. Related reports include: Learning from Other Cities; Decision-Makers Workshop; and Adaptation Strategies.

26. Potential Action: Conduct vulnerability scans of City operations due to changing climate and take action as appropriate

Measure, Verify and Report on Progress

A critical part of Toronto's Climate Change and Clean Air Action Plan will be to measure progress in meeting the target reductions. This will be done through annual updates of Toronto's inventory of greenhouse gas emissions.

The other critical element is to monitor progress on each of the action items contained in the Plan. Through monitoring, timely program revisions and corrections can be made.

27. Potential Action: The City manager will provide a yearly report on greenhouse gas and air quality achievements. The first report will be no later than December 2008

Indicators of Progress

The following indicators are examples of the information that will be tracked to measure and report on progress on meeting the City's greenhouse gas and smog-causing pollutants.

Natural Gas

- Reduction in contribution of natural gas to Toronto's climate pollution levels via updates to the greenhouse gas inventory.
- Per capita natural gas use.

Gasoline

- Completion of a research study on the introduction of a commercial parking tax.
- Comparative analysis of car and light truck kilometres travelled in Toronto on an annual basis.
- Reduction in contribution of gasoline to Toronto's climate pollution levels via updates to the greenhouse gas inventory.
- Regular surveys to measure driver behaviour changes and levels of awareness.
- Adoption of strong climate policy frameworks at the regional, Provincial and Federal levels.
- The number of local citizens actively participating in energy conservation programs offered by other levels of government.
- Progress in increasing density will be measured by the percentage of people who live in pedestrian and transit oriented neighbourhoods

Diesel

- Tracking diesel emissions via regular updates to the community wide inventory of greenhouse gas emissions.
- Number of biofuel stations in Toronto.
- Litres of biodiesel sold (if data available).
- Number of City vehicles converted to biodiesel.

Electricity

- The key performance indicator is whether or not Toronto can meet the zero net greenhouse gas emissions target each year linked to its electricity consumption.
- The supporting performance indicator is per capita residential electric energy use in Toronto.

Solid Waste

- Successful introduction of gas collection at the closed Thackery Landfill.
- Completion of efficiency analysis of landfill gas collection systems currently in operation.
- Successful utilization of landfill gas at the Green Lane Landfill for heat and power.
- Extension of the Green Bin program to the multi-residential sector:
  - Avoided greenhouse gas emissions from waste diversion
  - Baseline, progress reporting, annual update

Urban Forestry

- Percentage tree canopy

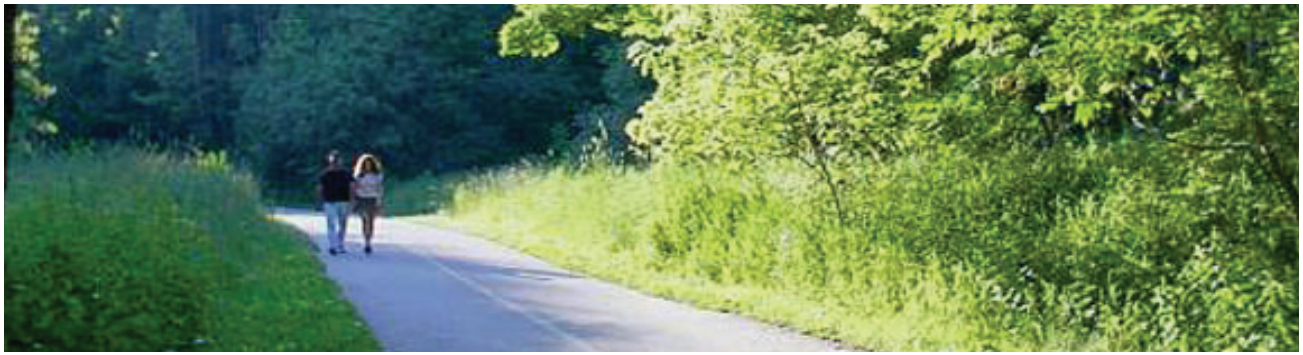
PUBLIC ENGAGEMENT

The City's operations contribute only 6 percent of the greenhouse gases emitted from Toronto every year. The remaining 94 percent originate from homes, apartments, commercial businesses, manufacturing plants, and cars and trucks. If Toronto is to achieve its greenhouse gas reduction targets and make significant improvements in local air quality, the larger Toronto community must be engaged and mobilized to take action.

The benefit of these efforts will be substantial reduction in greenhouse gas emissions, cleaner air, healthier residents and significant cost savings for residents and businesses through reduced energy consumption. We will also benefit from an engaged public and business sector that will press for climate protection policies and programs from other levels of government leading to broader success.

Here are some of the stakeholders with whom we are seeking to engage and build partnerships:

- Individual residents and employees
- Residents Associations



- Business community (large, medium and small and business associations – Board of Trade, Toronto Industry Network, Toronto Hydro Corporation, Enbridge, Toronto Association of Business Improvement Areas)
- Institutions (hospitals, universities, colleges and schools)
- Arts and design community – a source of innovation and progressive ideas and strategies
- Environmental organizations
- Builders and developers
- Trade unions
- Provincial and Federal agencies
- Municipal government associations
- Professional associations
- Architects and urban design planners
- Investors, entrepreneurs and the financial community
- Ethno-specific organizations
- Manufacturers of related goods and services
- Scientific community and technology providers.

Climate Action Teams

The City will form Climate Action Teams based on the areas of activity that directly effect climate change and air quality such as transportation, financing mechanisms for retrofits, renewable energy and many others. Each team will be tasked with undertaking research, preparing a detailed action plan for their energy sector with reduction targets and timetables, identifying the resources that will be needed and taking responsibility for ensuring the successful outcome of their action plan.

Climate Change Neighbourhood Action Plans

In order to extend the engagement of the community at the grassroots, the City will commit resources to form Climate Change Neighbourhood Action Plans that will be designed to educate and engage citizens at a local level about what they can do to help reduce our impact and undertake local climate change and air quality initiatives such as renewable energy projects and anti-idling campaigns.

Those leading neighbourhood-level climate change efforts will collaborate, as appropriate, with on-going neighbourhood action plans.

Grassroots participation can help citizens save energy, cool the climate, improve air quality and introduce green projects at the neighbourhood level across Toronto.

The City and its community partners will develop and launch a climate protection action-awareness campaign to help make residents, public institutions and businesses aware of the link between their every day energy use and their impact on the climate and our air quality. The campaign will employ a variety of media, including the City's website and utility bills, to help motivate positive actions by individuals and organizations.

Regional, Provincial, National and International Climate Change Partnerships

In order to achieve the best results possible, Toronto must engage and work in partnership with other levels of government to provide supportive policy positions and associated legislation, and resources and financial packages to support the City's greenhouse gas and smog reduction targets.

BACKGROUND INFORMATION

Why Has Climate Change Become an Issue, and What Affects our Air Quality?

Impacts of Greenhouse Gases: Climate Change

Greenhouse gases are produced when fossil fuels (i.e. oil, coal and natural gas) are burnt (or combusted) and utilized as power and heating sources. Agricultural practices also contribute significantly to greenhouse gases. Since the onset of the Industrial Revolution more than 250 years ago, the concentration of greenhouse gases – primarily carbon dioxide, methane and nitrous oxide – has steadily increased in the atmosphere. This new composition of gases act collectively to return more of the energy that would naturally escape from the earth – back to the earth. This is now known as the "greenhouse" effect.

Some of the well publicized impacts of greenhouse gases are rising ocean levels (due to melting of ice and the expansion of oceanic water), changes to ocean temperatures and currents, and an increase in major storm events, including floods, extreme heat waves, and extreme droughts. Changes in the pattern of global precipitation and evaporation

can affect the growth of vegetation and food crops around the world. These events and impacts have collectively become known as "climate change".

Solar radiation, clouds, ocean currents, and the atmospheric circulation of air masses weave together in a complex and chaotic way to produce our climate. Until recently, climate was assumed to change on a time scale that was much longer than our lifetimes. Evidence now exists that the release of greenhouse gases has the potential to increase temperatures at the earth's surface. The average temperature at the earth's surface rose by about 0.5°C over the past century.

It is estimated that a doubling of carbon dioxide (CO_2) in the atmosphere from its pre-industrial level of 280 parts per million (ppm) by volume, could lead to a rise in average global temperature between 1.5°C and 4.5°C. Even a rise of only 2°C would produce the warmest climate seen on Earth in 6000 years. A 4.5°C rise would see the world return to a climate that pre-dates humanity, called the age of the dinosaurs – a time between 251 and 65 million years ago.

Intergovernmental Panel on Climate Change

The imperative for action on climate change is highlighted in the February 2007 report of the Intergovernmental Panel on Climate Change. In its report, entitled *Climate Change 2007: The Physical Science Basis*, the Panel concluded:

> "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level." (p. 4)

Recognizing the problem of potential global climate change, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. It is open to all members of the UN and WMO.

The role of the IPCC is to access on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the risk of human-induced climate change, its potential impacts and options for adaptation and mitigation.

The Kyoto Protocol

The Kyoto Protocol to the Framework Convention on Climate Change was adopted in Kyoto, Japan in December 1997 and entered into force in February 2005. The rules and requirements concerning the implementation of the Kyoto Protocol were developed through the Marrakesh Accords, formally adopted in Montreal in December 2005. Canada is a signatory of the Kyoto Protocol.

The Kyoto Protocol seeks to stabilize atmospheric concentrations of greenhouse gases at levels that will prevent unwanted impacts on the earth's climate. The Kyoto Protocol identifies greenhouse gas credit trading or grant programs as the mechanisms to be used by participants to meet set targets. Canada's commitment is a reduction in emissions to 6 percent below 1990 emission levels by 2012.

Canada's emissions are 27 percent higher now than in 1990. Toronto's emissions are only 10 percent higher now than in 1990. This reflects, in part, the actions taken to date in Toronto to reduce emissions, but it also means that the easily achievable results that remain in much of Canada – are less easy to achieve in Toronto, and greater effort will be needed to match future Canadian reduction targets.

General Air Quality and Smog

Air quality is about pollution in air, about the concentrations of contaminants that people are exposed to and breathe, about the year-round chronic health impacts that result and the acute exposures during smog events. Adverse air quality results from emissions of contaminants, but understanding emissions alone does not provide us with the information we need to understand air quality. People breathe contaminants in the air, not emissions. Emissions typically disperse and diffuse, but knowing where and when adverse concentrations result and who is exposed and how they are affected is the focus of air quality assessment and management.

General Air Quality is what we breathe on a normal daily basis – the harmful content of the air is predominantly a result of local emissions from fossil fuel combustion in vehicles and building heating. Smog is what we breathe on an abnormal basis – the harmful content of smog is also characterized by emissions from fuel combustion in vehicles and building heating, but also has a much higher industrial component and a much higher component of pollutants from the United States (known as "trans-boundary" pollutants.

Smog is caused by sunlight reacting with volatile organic compounds (VOCs) and oxides of nitrogen (NOx) to produce ground level ozone, which is harmful to humans, animals and plants.

In southern Ontario, smog affects suburbs and rural areas, as well as city centres. Its occurrences are often linked to atmospheric temperature inversions, high temperatures and calm winds.

The following are the conclusions from the Toronto Environment Office's analysis of air quality modeling and results.

General Air Quality in Toronto (i.e. non smog related air pollution found on a year round basis):

- In Toronto NOx and PM_{10} ("particulate matter") are problems – $PM_{2.5}$ less so, but SO_2 (sulphur dioxide) and CO (carbon monoxide) are not significant problems.

- Emissions from local sources are more significant than emissions from trans-boundary sources except on "smog days" when the reverse is true.
- Historically "targeted" sources, such as tall industrial smokestacks, are not the City's most problematic sources.
- We should now recognize that many small sources are more significant than fewer large sources in Toronto.
  - The significant many small sources are vehicles and residential natural gas furnaces.
  - The fewer big sources (e.g. commercial and industrial natural gas combustion) are less significant.

- Trans-boundary sources pollute our air-shed – but for all non-smog days in Toronto, trans-boundary sources essentially only pollute the air above our heads – not the air we breathe.

Smog

- The occurrence of smog is influenced by weather patterns that draw trans-boundary pollutants into southern Ontario from the U.S. but is characterized by concentrations of pollutants concentrations.

- Local contributions to summer smog are mostly from vehicles on 400 series highways and vehicle use in the downtown core.
- Local contributions to winter smog and winter smog-like events relate to NO_2, from combustion of Natural Gas for heating (e.g. residential basement furnaces), commercial boilers and non-smoke stack related industrial sources.

Direct Health Impacts of Climate Change and Air Pollution on Toronto

People living in Toronto are already affected by warmer summers and air pollution. Climate change is expected to result in hotter summers in Toronto and make the urban heat island impact worse. Current levels of air pollution are contributing to about 1,700 premature deaths and 6,000 hospitalizations in Toronto every year.

In addition, over the last 50 years Toronto has experienced an average of 120 heat-related deaths per year. Unless steps are taken to reduce impacts of climate change and air pollution, it is anticipated that air pollution and heat-related deaths in Toronto will increase – air pollution related mortality will increase by 20 percent in 2050 and 25 percent in 2080, largely because of increased ozone levels, and heat-related mortality will double by 2050 and triple by 2080.

It will also increase the number of emergency room visits, disability days and health-related expenditures. An increase in allergies and asthma symptoms are expected with an increase in pollen and micro organisms in the air. In addition, warmer lake temperatures may result in more pathogens in the lake and associated disease, and climate change is expected to increase the risk of vector-borne diseases (for example, West Nile virus and Lyme disease). Food-borne diseases may also increase.

For additional information on public health impacts linked to air pollution, visit www.toronto.ca/health/hphe/pubs.htm

WHAT YOU CAN DO NOW TO REDUCE GLOBAL WARMING AND IMPROVE AIR QUALITY

There is no single solution to the challenge of climate change. Instead, our success will depend on people taking small steps, every day, at home, at work, on the road and in our communities.

The solution begins with you. Here are steps you can take right now to reduce emissions and improve air quality to make a difference.

Ways to Reduce Emissions at Home

Efficiently Heat Your Home

- Lower the settings in winter. Set your thermostat for heating back 1°C/2°F 24 hours a day and/or by 2°C/4°F at night
- Seal it and save energy. During the winter, to keep the heat in, close window coverings each night and open for the daylight hours on sunny days

- Sizzle with flare. Replace a low efficiency furnace with a high efficiency furnace

Be Smart About Cooling Your Home

- Raise the settings in the summer. Increase your thermostat settings 1°C/2°F higher 24 hours a day and/or by 2°C/4°F higher at night
- Seal it and save energy. During the summer, to keep the cool air in, close window coverings for the daylight hours on sunny days
- Be a Peaksaver. Join the Toronto Hydro program to save money in the summer. www.torontohydro.com/peaksaver

Care for Your Appliances

- Clean or replace when necessary.
  - Clean or replace your furnace filter at least once every 2 months
  - Clean the condenser coils on the back of your refrigerator by brushing off the dust
- Save energy and water.
  - Use your dishwasher only when full, use the energy saving or light wash cycle and select the air dry option
  - Use cold water instead of hot water every time you wash your clothes
  - Reduce the number of drying cycles by two by hanging your clothes or making sure your dryer is full

Reduce Energy Waste

- Turn radiators down and keep all air vents and doors to unused rooms closed when your furnace or air conditioner is operating
- Close the fireplace damper or air-tight fireplace door after each use of your fireplace
- Out with the old, in with the new. Replace an old refrigerator with a new energy efficient one

Look at Your Home in a Different Light

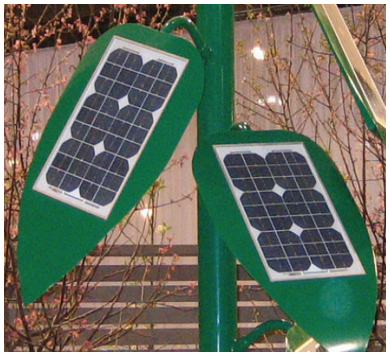
- Don't waste. Turn off lights, computers and TVs when not in use
- Be smart. Replace frequently used standard light bulbs with compact fluorescent bulbs
- Remember those outside lights. Replace frequently used outside lights with motion detecting lights and install timers for frequently used outdoor lights

Conserve Water

- Start with your bathroom. Install a low flow showerhead and faucet aerators
- Repair leaky faucets and showerheads throughout your house
- It's cool to keep it warm. Use a solar blanket to cover your swimming pool for each night of the summer season when the outside air temperature is cooler than the pool water
- Reduce your use. Lower your hot water tank temperature by 5°C/10°F and aim for the ideal energy savings temperature of 50°C/122°F
- Wise up on water. Install a condensing hot water heater
- Save money. Contact Toronto Water for rebates on toilet and washer replacement 416-392-7000

Protect your Home for the Long Term

- Insulate.
  - Upgrade attic insulation to R40 (about a foot in depth)
  - Upgrade basement insulation to R-18
  - Install double glaze low-e argon filled windows throughout your house
  - Permanently seal an unused fireplace
  - Place insulation around at least the first three feet of water pipes attached to your hot water heater
- Consider a home energy audit. The federal government will be giving money to help homeowners save energy.
- Consider renewable energy. Ontario is implementing the Standard Offer Program where you can receive money back for supplying energy to the grid: www.powerauthority.on.ca/sop/



Ways to Reduce Your Emissions on the Road

- Drive less.
  - Take public transit whenever possible for commuting to work, school sports events or other activities
  - Carpool instead of driving alone to work, school, sports events or other activities. Also, if you stop for more than 10 seconds, turn off your engine
  - Ride your bike or walk to work
  - Consider car sharing networks: www.autoshare.com and www.zip-car.com
  - Consider combining various activities into fewer more efficient trips
- Get a public transit tax break. Get a transit pass tax credit when you file your taxes.
- Get a refund from Ontario. If you are considering a vehicle purchase make it a hybrid or alternative fuel vehicle and get up to $2000 back. www.fin.gov.on.ca/english/tax/guides/rst/702.html

Ways to Reduce Your Emissions at Work

- Save energy.
  - Turn off office equipment including photocopiers, fax machines and printers when not in use
  - When in meetings turn off your monitor at your desk
  - Turn off lights when there is adequate daylight to light your room
  - Consider teleworking (working from home)
- Make your business climate friendly.
  - Consider energy efficiency retrofits through the Better Buildings Partnership: www.toronto.ca/bbp/programs.htm or the Better Buildings New Construction Program: www.toronto.ca/energy/bbncp.htm
  - Consider applying for a grant through the Toronto Atmospheric Fund: www.toronto.ca/taf/grants.htm
  - Natural Resources Canada is offering up to $60,000 for funding and assistance on building energy savings
  - Get back 30 cents for each litre of water saved per day. www.torontowater.ca/watereff/rebate_programs.htm
  - Get $300 back from Enbridge Gas for installing an air door this year, up to $2,000 for installing a Demand Control Kitchen Ventilation system, $0.05 per cubic metre of natural gas saved from monitoring and targeting to a maximum of $30,000, and $450 for installing a tankless water heater.
  - Get a pollution prevention assessment. The Ontario Centre for Environmental Technology Assessment will fund up to 50 percent to a maximum of $4,000 to offset the cost of an assessment. www.oceta.on.ca/TORSUS

Ways to Reduce Your Emissions in Your Community

- Do your part.
  - If you live in an apartment building, encourage your resident's association to come up with ways you can work with your landlord on climate change initiatives. Some examples include replacing washing machines with more energy efficient ones, having a community garden or green roof and having motion sensor hallway lights.
  - If you live in a condo, encourage your condo association to find ways to green your building including motion sensored lighting in exercise rooms and hallways, buying green powered electricity for your condo and setting up a carpool for your condo building.
  - Find out about car free tourism and encourage those visiting Toronto to consider green tourism options: www.greentourism.on.ca

- Toronto Water will fund projects between $1,000-$25,000 that implement the City's Wet Weather Flow Master Plan. These may include projects such as naturalization, stewardship activities and public outreach.

For more information on these and other ideas visit: www.toronto.ca/health/2020 or call 416-392-2020 or toll-free 1-866-583-2020.

For information on Toronto's environmental programs and initiatives, view the Green Guide at www.toronto.ca/greenguide/index.htm

For information on Federal and Provincial government programs visit: www.ec.gc.ca/climate/home-e.html

For information on potential grants and loans from the Toronto Atmospheric Fund visit: www.toronto.ca/taf/current_grants.htm and www.toronto.ca/taf/loans.htm

TORONTO ENVIRONMENT OFFICE