THE CITY OF Edmonton

# Corporate Greenhouse Gas Emissions Reduction Action Plan

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*Environment is our Foundation*

# EXECUTIVE SUMMARY

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# EXECUTIVE SUMMARY

## PURPOSE

The purpose of this document is to review the 2003 Greenhouse Gas Emissions (GHG) inventory from City Operations and examine the progress the City of Edmonton has made in achieving it's objectives set out in the 1999 City Operations Greenhouse Gas (GHG) Emissions Reduction Strategy Plan. Recommended actions from this report will be used to assist in decision making and provide a stepping stone for the next GHG Emissions Reduction Plan.

## BACKGROUND

In 1995, the City of Edmonton committed to both the Federation of Canadian Municipalities (FCM) Program Partners for Climate Protection (PCP) and the Voluntary Challenge & Registry (VCR). These programs require submission of action plans detailing how specific GHG emissions targets will be met and how progress will be measured. The 1997 Kyoto Protocol calls for a 6% reduction in GHG emissions globally. Canada was a signatory to the Kyoto protocol in 1997 and ratified participation in 2002. The protocol will now come into force with the ratification by Russia in November 2004. Edmonton is one of more than 70 Canadian municipalities that have signed on to the FCM PCP program's 20% GHG reduction target (i.e. 20% below 1990 levels). Additionally:

- Several federally initiated working Tables provided input to Canada's national climate change strategy. The *Climate Change Plan for Canada* was released in 2002.
- The Alberta government also released its strategy in 2002, *Albertans & Climate Change: Taking Action*.
- There has been some change in trends of energy use from non-renewable to renewable energy (e.g. wind, solar power).
- There is an awareness of the advantages of energy efficiency and cost-effectiveness that accompany reduced GHG emissions.

In 1998, a task force comprised of representatives from the City Administration, ATCO Gas and EPCOR was established to develop a GHG emissions reduction plan for City Operations. ATCO Gas and EPCOR have a strong interest in GHG reductions and their business plans demonstrate their commitment to work towards reduction. Since that time, the City has undertaken a number of initiatives to reduce GHG emissions from City Operations. Plans for emissions reduction on the community-wide level have also been developed by the City's $CO_2$RE (Carbon Dioxide Reduction Edmonton) team, which represents all sectors of Edmonton's community. The $CO_2$RE strategy was approved in the fall of 2001 and the business plan was approved in the fall of 2002. Currently the $CO_2$RE strategy is at the implementation stage.

## WHAT'S NEW

This report continues with the examination of the initiatives currently in place and planned for 2004, along with an analysis of the 2003 GHG inventory for city operations. There will also be a second part of the GHG inventory that will include related operational areas. This category consists of areas identified as potentially impacting a GHG inventory but either the methodology hasn't been developed to include it in the inventory or the area is not completely under the management of the City. Examples of such areas are rented space, carbon credit for green space, and fertilizer.

Presentation of inventory information will be changed to follow the VCR (Voluntary Challenge and Registry) model since the mandatory GHG emissions reporting Alberta Environment is considering will resemble the VCR model. This will include the identification of indirect and direct emissions, and the inventory breakdown of GHG gas type ($CO_2$, $CH_4$, $N_2O$) for direct emissions. A representative from the City of Edmonton has taken part in the development of the technical reporting structure of Alberta Environment's mandatory GHG emissions reporting and any changes from Alberta Environment will be reflected in future reports.

## POLICY BACKGROUND

Climate change and energy efficiency is referenced specifically in Plan Edmonton Strategies 4.3.5, 4.4.3 and 4.4.8 and in the City's Environmental Strategic Plan strategic direction 2.1 and 2.6. In keeping with the Environmental Strategic Plan Policy Document (approved by City Council July 20, 1999), four parallel strategies for reducing GHG emissions from City operations through the individual operating areas are:

- encourage reduction of overall energy use from current sources (particularly through purchasing requirements);
- develop and implement strategies to mitigate impacts of GHG emissions;
- increase staff awareness and training regarding need for and ways to reduce GHG emissions; and,
- develop and maintain a GHG emissions inventory.

## GREENHOUSE GAS EMISSIONS INVENTORY

In the mid 1990s, Edmonton's rate of GHG emissions was approximately 24 tonnes per capita annually. Alberta's average was 60 tonnes per capita, the nation's average was 17 tonnes per capita and the world average was 4 tonnes per capita. Edmonton's relatively high rate is due largely to our lifestyle, the cold climate, use of coal for a majority of electricity generation and industry. Alberta's high emissions are due primarily to oil and gas production combined with coal fired power generation. In 1990, total GHG emissions from within Edmonton's boundary were in the order of 13

million tonnes of $CO_2$ equivalence per annum. By 1997 this figure had increased to approximately 15 million tonnes and again to 20 million tonnes for 2002.

Edmonton's city operations represent only a small proportion (approximately 3 to 4%) of GHG emissions from within the municipal boundaries, but they do provide a target over which the City has control and can demonstrate leadership by example. The accounting of GHG emissions is primarily through the use of electrical power, natural gas, and fuel (for transportation). The 2003 GHG inventory for City operations has been broken into five main areas consisting of: City Buildings (47%), City Fleets (20%), Street Lighting (20%), Wastewater Treatment (8%), Contracted-Out-Services (5%). In 1990, City operations accounted for 343,000 tonnes of $CO_2$ equivalence emissions per annum, which has increased steadily due mainly to growth in City services to accommodate population growth.

GHG emissions from the management of waste is addressed under the community-wide plan in order to deal more thoroughly with a number of issues including waste reduction initiatives such as recycling, landfill gas emissions from City owned and private landfills, and potential allocation of carbon credits.

## TARGETS AND PROJECTIONS

The Kyoto Protocol has a target of 6% reduction in GHG emissions during the budget period 2008 to 2012. To achieve this, GHG emissions from City operations should be reduced to 323,000 tonnes per annum by 2008 - and continue to be reduced in subsequent years to address likely continued growth of services. Similarly, to meet the FCM Cities for Climate Protection target of 20% reduction below the 1990 levels, GHG emissions from City operations should be reduced to 278,000 tonnes per annum.

In keeping with this Strategic Plan, planned expenditure by City operations is forecast to reduce annual GHG emissions level to 323,000 tonnes by 2008. Several of these GHG emission reduction measures will also provide a positive cost benefit.

Although City Operations GHG emissions have increased over the past year, there have some progress in certain areas. Emissions contributed to wastewater treatment have been reduced by approximately 7% and emissions contributed to Transit services have been reduced by approximately 2.6%. This illustrates reducing GHG emissions can be done when strategically applied. Also, 2001 to 2003 population growth has exceeded what was initially projected thus a second projection on the chart below.

## STRATEGY FOR REDUCING GHG EMISSIONS FROM CITY OPERATIONS

A range of levels of GHG emissions is shown in Table 1. Levels II and III(a) are additional projects and piloting initiatives required to achieve the FCM 20% target:

- The Business As Usual (BAU) projection contains the growth rates provided by each operational area and illustrates the potential City Operations GHG emissions based on operational practices devoid of GHG reduction measures.
- Level I (already planned or implemented expenditure) projects yield GHG reductions of 88,000 tonnes, and are due largely in part to building retrofits and new energy efficient designs.
- Level II are recommended initiatives with one project applying for $5M over the next 3 years of funding through the EMRF (Energy Management Revolving Fund). Additional GHG emissions reduction expected from implementation of these initiatives are in the order of 10,000 tonnes of $CO_2$ and a corresponding operational savings of $6.2M over 9 years.
- Level III (test pilot initiatives) provides the potential, if fully implemented, for an additional 34,000 tonnes of $CO_2$ reduction and would be required (in addition to Level I and II) to sustain the full 20% target till 2020.
  - Level III(a) – piloting of new technologies to enable Kyoto's 6% below 1990 levels;
  - Level III(b) – implementation of new technologies based on Level III(a) results to reach FCM's 20% reduction target and to constrain GHG emissions increase beyond 2008.

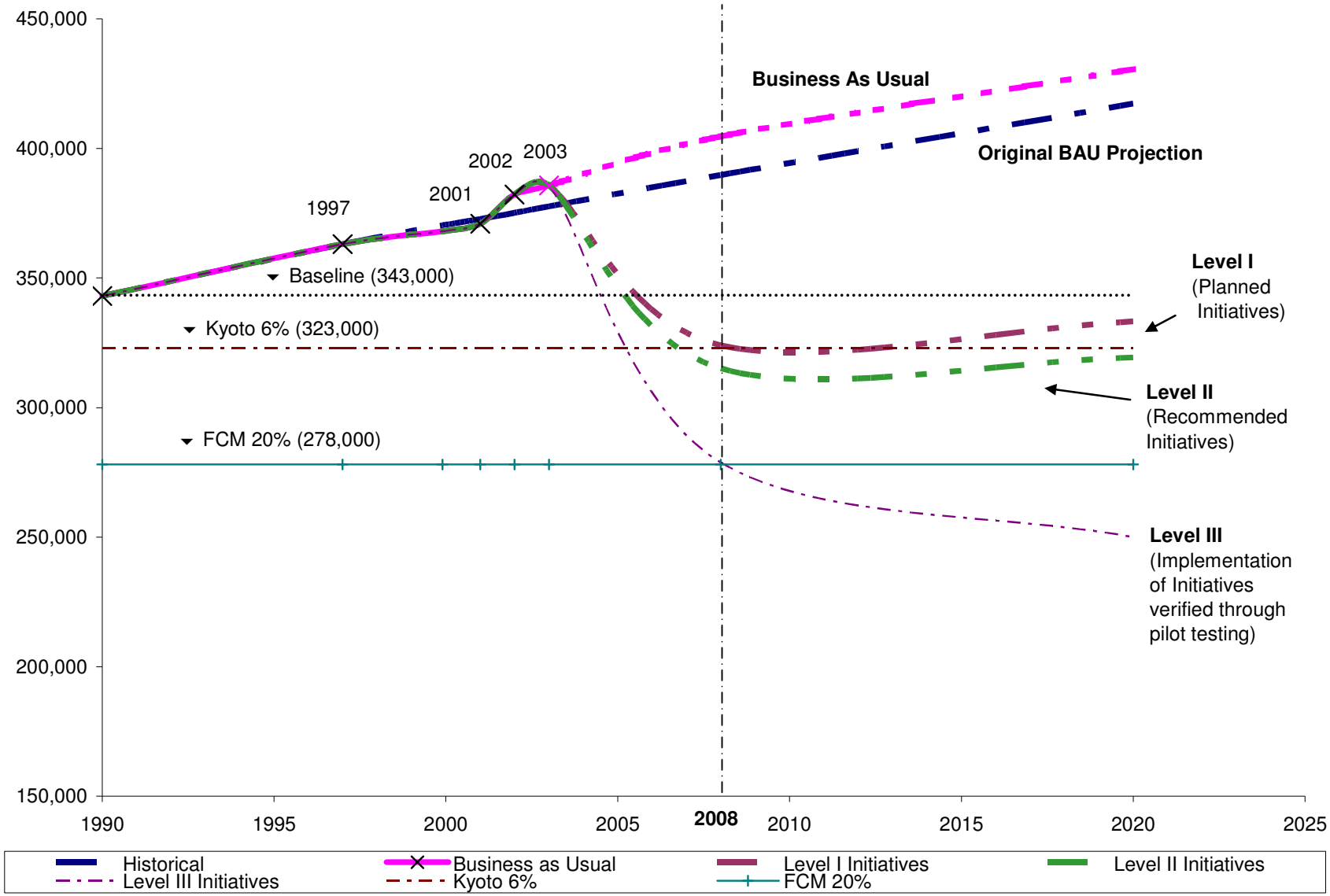
The strategy is illustrated graphically in Figure 1 and the details of the projects for all levels are provided in Table 2.

**Table 1**: GHG Emissions Levels

| LEVEL | Description | Resulting (net) GHG Reduction (Tonnes) at 2008 | Total Annual GHG Emissions (Tonnes) | Net GHG Difference from 1990 level of 343,000 t |
|---|---|---|---|---|
| 0 | Business as Usual | N/A | 404,000 | +17% |
| I | Planned / approved expenditure that will also reduce GHG emissions | 87,000 | 317,000 | -6% |
| **II** | **Additional projects** | **3,000** | **312,000** | **-9%** |
| **III(a)** | **Piloting to enable Level III(b)** | **N/A** | **312,000** | **-9%** |
| **III(b)** | **Additional initiatives to meet 20% reduction** | **34,000** | **278,000** | **-20%** |

Notes: Contributions from the category of Contacted-out Services are relatively small and have therefore been excluded.
Calculation methods for contributions from Green Spaces & Sinks in the urban context are currently under development.

**Figure 1**: GHG Emissions Projections for City Operations



## HIGHLIGHTS OF KEY IMPLEMENTED INITIATIVES

Since the conception of the GHG Emission Reduction Strategy Plan, the City of Edmonton has implemented a number of initiatives that has set a foundation for the potential that exists to reduce GHG emissions. These initiatives demonstrate the potential for GHG reduction when funding and/or innovation is applied. The following table outlines key GHG reduction measures that the City is proud to have implemented.

**Table 2:** Highlights of key initiatives that have contributed to GHG reduction

| Initiative | Description | GHG Reduction tonnes of $CO_2$ (per year estimate) |
|---|---|---|
| Existing Buildings | 21 projects are identified in this GHG reduction projection with a payback period on average of 5 years. These projects are funded through the Energy Management Revolving Fund. | 18,000 |
| Transit | Implementing hybrid buses | |
| Wastewater Treatment | Conversion of Gold Bar's aeration system to Fine Bubble in 2001. | 6,000 |
| Municipal Fleet | In 2001, Edmonton launched the Fuel Sense Program. Drivers trained through the program typically achieve fuel savings of 15% | 500 |
| Traffic Signals | Retrofit all traffic signals to LEDs (presently 1/3 complete). | 800 |
| New Buildings | South Division Police Station exceeding federal guidelines of the Model National Energy Code for Buildings and using Leadership in Energy & Environmental Design (LEED) as an audit tool. A LEED “Silver” status was achieved. | 300 |

* Savings through Fuel Sense are dependent on fuel costs.

## PROPOSED SOURCES OF FUNDING FOR ADDITIONAL PROJECTS & PILOTING

| Level II Initiatives | Source of Funding |
|---|---|
| Transit Fleet:<br>▪ Limit idling time on buses during the summer | To be determined |
| Wastewater:<br>▪ test pilot microturbine with bio-gas at Gold Bar | Privately funded |

| Level III(a) Initiatives | Source of Funding |
|---|---|
| Buildings:<br>▪ Alternative energy savings measures | Operating budget (tax levy) |
| Transit Fleet:<br>▪ Test pilot alternative propulsion vehicles - hybrid | Capital budget (tax levy) |
| Municipal Fleet:<br>▪ Test pilot alternative fuel vehicles – hybrid/Biogas | Capital budget (tax levy) |
| Green Spaces & Sinks | Operating budget (tax levy) |

## NEXT STEPS

The next steps in the implementation of this plan will be:

- Preparatory work for staged implementation of reduction initiatives and budgetary approvals documented with each individual operating area.
- Analysis and inventory of Waste Management's composter to determine consumption and net benefit.
- Develop process for inventory updates to meet budget deadlines.
- The Environmental Policy Coordinating Committee will be responsible for ensuring implementation of the GHG Emissions Reduction Plan and the administration will report progress annually to the Transportation and Public Works Committee.