

**The City of Whitehorse**

**Local Action Plan (LAP) to Reduce Energy  
and Greenhouse Gas Emissions  
for  
City Operations and the Community**

**February 2004**

## Executive Summary

### Background

In January 1995, the City of Whitehorse began the commitment to address climate change when a resolution in Council was passed to join the Partners for Climate Protection Program (PCP). In the fall of 2001, the City hired a Climate Change Coordinator to initiate the five-step PCP program.

The City has also shown a commitment to addressing climate change issues through:

- 2001-2003 Strategic Plan;
- 2002 Official Community Plan;
- Memorandum of Understanding (MOU) with Energy Solutions Centre (ESC) and YG to partner on energy-related projects (January 2002)
- Endorsing ratification of the Kyoto Protocol by the Federal Government (April 2002)
- Whitehorse Moves Community Transportation Workshop (October 2002);
- City-wide Transportation Study; and
- Transport Canada's Urban Transportation Showcase Program in May 2003.

The PCP program is organized through the Federation of Canadian Municipalities (FCM) to assist municipal governments in mitigating climate change. Presently, over 100 Canadian municipalities representing over 50% of the country's population are members of the PCP program. The five milestones of the program are:

- |              |   |
|--------------|---|
| Milestone 1. | Part A: Profile energy use and emissions from City and community-based sources              |
|              | Part B: Forecast energy use and emissions for the next 10 to 20 years                       |
| Milestone 2. | Establish reduction targets for City operations and the community                           |
| Milestone 3. | Develop and finalize a local action plan (LAP) that aims to reduce energy use and emissions |
| Milestone 4. | Implement the local action plan   |
| Milestone 5. | Monitor, verify, and report greenhouse gas emissions  |

The Local Action Plan (LAP) presented in this report is a step towards putting in action:

1. the City's goal of reducing greenhouse gas (GHG) emissions; as well as
2. fulfilling Milestones 1 to 3 of the five-step PCP Program.

The five milestones of the PCP program are described below.

### **Milestone 1 - Baseline Inventory and Forecasting**

The first milestone of the five-step PCP program is to conduct a baseline inventory and to forecast local emissions for 10 to 20 years into the future. A baseline inventory for City emissions was carried out using 1990 data. City inventories were also completed for 1996, 2000, and 2001. The community baseline inventory was conducted using 2001 data, which provided the only complete data set.

The results of the 2001 City inventory showed that the building sector is the highest greenhouse gas contributor (51%), followed by City vehicles (38%), water & sewage (9%), and waste (2%).

The 2001 community inventory showed that the transportation sector is the largest contributor and is responsible for 51.1% of all emissions while residential buildings, commercial/ institutional buildings, and waste contribute 26.2%, 20.8%, and 1.9% respectively.

Combining the City and community emissions gives the following distribution of Whitehorse's 2001 GHG emissions: transportation sector (excluding City vehicle fleet), is responsible for 50.1% of the emissions, with the remaining emissions coming from residential buildings (25.7%), commercial and institutional buildings (20.4%), waste (1.9%) and City operations (including City vehicle fleet) (1.9%).

Forecasting for 2013 was carried out for both the City and community emissions, using low (0.5%) and high (2.0%) population growth rates. Forecasts predict that City emissions will increase 15% and 44% in the next ten years for low and high population growth rates, respectively. For the community sector, GHG emission increases of 6% and 37% are predicted for low and high growth scenarios, respectively.

### **Milestone 2 - Target Setting**

The second milestone of the PCP program is to set reduction targets for emission levels for a future date.

The Federal Government currently does not have specific GHG reduction requirements for municipalities. While setting reduction targets is encouraged for their contribution to the national target, there are no penalties for failing to achieve these voluntary targets. The PCP (1999) *Protocol/Guidelines for Reporting* stipulates that targets can be refined by jurisdictions as their Local Action Plan is developed and refined. Currently, 14 municipalities have set reduction targets for City and community emissions.

Following the suggestion of FCM, reductions of 20% of 1990 levels for City emissions, and 6% of 2001 levels for community emissions, are proposed by the year 2013.

### **Milestone 3 - Action Plans**

The third milestone of the PCP program is to develop City and community action plans. These plans include initiatives for reducing GHG emissions, and evolved from consultation with an ad hoc volunteer Community Steering Committee, a City Steering Committee, and various City departments. As well, GHG reduction actions were generated from a review of programs developed or implemented in the City of Whitehorse, the Yukon, and other municipalities. The latter part of this report includes the full City and community action plans.

#### **Milestone 4 – Implementation of the LAP**

The fourth milestone of the PCP program is the implementation of the action plans. In anticipation of this, a Three-Year Plan was developed in which key actions were selected from the full City and Community Action Plans. The actions recommended for the Three-Year Plan are listed below. These actions are also highlighted in each of their respective sections within the full LAP report, along with the remaining actions, which are anticipated for implementation beyond three years. Immediate development of work plans for the three-year actions is recommended because there exists political will, or partnership or funding potential for their implementation. Some of these actions also have high potential to reduce GHG emissions in the short-term, while others have significant co-benefits.

The remaining actions in each of these sectors are not considered lower in priority; however, their feasibility has not been evaluated. Further analysis of GHG reduction potential and cost-benefit analyses is required prior to the implementation of these actions.

#### **City Actions**

City actions recommended as part of the Three-Year Plan are included under the City building sector (“CB”); vehicle fleet sector (“VF”); waste & sewage sector (“WS”); and monitoring and reporting (“M”). The numbers associated with each of the actions correspond to the action numbers assigned within the full LAP report.

**Section 2.2** of the full LAP report lists eight actions to reduce GHG emissions within the City building sector. Of the seven actions, two were chosen for the three-year plan, including:

- (CB.1) Conduct Energy Audit through Energy Solutions Centre (ESC)
- (CB.2) Continue With Lighting Upgrades as Recommended in the 1997 Energy Audit

In **section 2.3** of the full LAP report, the following two actions (of the four proposed to reduce emissions from the vehicle fleet sector) are recommended for the three-year plan:

- (VF.1) Develop and Implement Anti-Idling Campaign for City Employees
- (VF.4) Purchase Bicycle Fleet for Employees

From **section 2.4**, water & sewage sector, five of ten actions are recommended for the three-year plan, and include:

- (WS.1) Research Feasibility and Cost/Benefit of Residential Water Metering Program
- (WS.4) Prepare Utility Bill Notice asking residents to report suspected leaks in the water distribution system.
- (WS.6) Review Energy Efficient Options for New Water Treatment Plant
- (WS.7) Review SCADA as an Energy Management Tool
- (WS.9) Continue Upgrades to Water & Sewage Building Facilities

Of the five City monitoring and reporting actions described in **section 2.5**, four are recommended for the three-year plan, including:

- (M.1) Submit Local Action Plan to the Voluntary Challenge and Registry Inc.
- (M.2) Develop Central Energy Database
- (M.3) Track Vehicle Odometer Readings and Fuel Consumption
- (M.4) Document Reduction Initiatives

### **Community Actions**

The second component of the three-year plan is community-based actions highlighted from residential (“R”), institutional/commercial (“IC”), transportation (“T”), land use (“LU”), and waste (“W”) sectors.

The three-year plan includes three of fourteen actions proposed to reduce GHG emissions from the residential sector (**section 3.2**).

- (R.1. Step1) Facilitate Voluntary EnerGuide Audits
- (R.2) Increase Energy Efficiency Training for City Building Inspectors
- (R.8) Support Winterize Your Home Workshops “Winter Works Weekend” each fall

In **section 3.3**, five actions are proposed for reducing emissions from the institutional/commercial sector. Two of these are included in the three-year plan.

- (C.1) Evaluate Survey Results completed by Energy Solutions Centre and Research Feasibility of Implementing Energy Standards for Commercial Buildings
- (C.3) Develop Commercial Energy Watch Program

Not surprisingly, the most extensive list of actions is proposed for the transportation sector, which produces over 50% of overall emissions. Of the thirty-seven actions proposed in **section 3.4**, eight are recommended in the three-year plan.

- (T.14) Develop Trails - Phase I: Black Street Gulch and Airport Trail to Hillcrest
- (T.16) Organize Anti-idling Campaign
- (T.17) Hold Tire Pressure Clinics
- (T.21) Assist in the Organization of and Participate in the Annual Commuter Challenge
- (T.22) Organize Transit Challenge
- (T.27) Implement Transportation Demand Management Initiatives outlined in *City of Whitehorse 2002 City-Wide Transportation Study*
- (T.29) Implement Phase I of Carpooling / Vanpooling Program

- (T.36) Form Citizen Advisory Committee on Transit/ Alternative Transportation that would advise the City on Transportation Initiatives

In **section 3.5**, twelve actions are proposed for reducing GHG emissions derived from the land use sector. Four of these are included in the three-year plan.

- (LU.1) Change Zoning Bylaws to Encourage Residential Development in Mixed Use Residential/ Commercial Areas
- (LU.4) Remove Disincentives for Developing Secondary Suites in Existing Homes
- (LU.5) Provide Financial Support for the Development of Neighbourhood Strategic Plans
- (LU.8) Institute Landscape Award for Non-Residential Properties

Three actions are proposed to reduce emissions in the waste sector, in **section 3.6**. One of these actions is recommended for the three-year plan.

- (W.3) Phase I, Review Operation of the Free Store at the Landfill to Improve Salvaging Opportunities

### **Public Outreach Program**

Key to the success of the Three-Year Plan, as well as realizing the full potential of the LAP report, is to effectively publicize the plan. Making the plan available to the public for comments will provide the City with valuable insight into what actions are likely to succeed. Public review may also identify new partnerships, and funding opportunities. Early on in the implementation process, the Three-Year Plan should be made available for public review through the distribution of hard copies of the plan to key stakeholders, and by making electronic copies available through the City website.

### **Implementation of City Actions**

As part of the development of this LAP report, an outline for a City Strategic Plan (CSP) was created. The goal of the City Strategic Plan is to ensure that least cost actions are pursued, key stakeholders are engaged, funding opportunities are identified and taken advantage of, and City ownership and awareness of the LAP increased.

The outline for the CSP is as follows:

- Continue the City Steering Committee

Continue the City steering committee and expand the membership by inviting members of the City's Green Team, a representative from the Energy Solutions Centre and from Yukon Government Energy, Mines & Resources.

- Develop Work Plans for Actions Selected for the Three-Year Plan

With assistance from the City steering committee, the Engineering and Environmental Services Department will develop work plans for actions in the Three-Year Plan, as part of Milestone 4 of the PCP program.

- Update Local Action Plan

The Local Action Plan should be continually updated as funding opportunities and partnerships emerge, and as new technologies are developed or become cost-effective.

### **Implementation of Community Actions**

A Community Strategic Plan was also created in anticipation of Milestone 4 of the PCP program - Implementation of the LAP. The goal of the Community Strategic Plan is to ensure effective communication with participating levels of government, stakeholders, and the public, to maximize existing resources, including research, educational tools, and funding opportunities. The preliminary design for the Community Strategic Plan is as follows:

- Develop Steering Committee:
  - Led by Environmental Coordinator
  - Publish notice in newspaper to invite participants to submit letter of interest to join committee
  - Invite representatives from the following organizations: Northern Climate Exchange, YG Energy Mines & Resources, YG Environment Department, Environment Canada, Energy Solutions Centre
  - Hold monthly meetings
- Proposed Activities for Steering Committee:
  - Develop work plans for LAP actions recommended in the Three-Year Plan
  - Identify appropriate funding opportunities
  - Design LAP community consultation activities
  - Review feasibility of actions that were not recommended in the Three-Year Plan
  - Research and select appropriate monitoring techniques (Milestone 5 of PCP program)
  - Outline methods for reporting and information-sharing
  - Update and revise Local Action Plan

### **Recommendations**

To continue the City's commitment to work towards the goal of reducing GHG emissions and energy use, it is recommended that the City:

1. Accept reduction targets for City emissions of 20% below 1990 levels and for community emissions of 6% below 2001 levels by the year 2013 as reduction goals; and
2. Receive the Local Action Plan as a guiding document to mitigate climate change.

## **Acknowledgements**

Generous funding from the Federation of Canadian Municipalities (FCM) through the Green Municipal Enabling Funds and from Human Resources Development Canada contributed to the financing of a 21-month staff position at the City of Whitehorse. The views expressed in this report are the views of the authors; as such the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

During the development of the City and Community Action Plans, members of the City steering committee, the community steering committee, and resource people, were invaluable in providing guidance and expertise.

Russ Haycock from FCM conducted half-day workshops on two separate occasions during the development of this Local Action Plan, one on the development of the inventory and the other on the development of the action plan.

### **City Steering Committee Members**

Greg Brown	City of Whitehorse, Climate Change Coordinator
Brian Crist	City of Whitehorse, Public Works Manager
Doug Hnatiuk	City of Whitehorse, Parks/Arena Supervisor
Sabine Schweiger	City of Whitehorse, Environmental Coordinator
Wayne Tuck	City of Whitehorse, Engineering & Environmental Services Manager
Jen Turner	City of Whitehorse, Environmental Coordinator
George White	City of Whitehorse, Maintenance & Safety Services Manager

### **Community Steering Committee Members**

Paul Davis  
Jen Ellis  
Judi Johnny  
Jenny Trapnell  
Bob Van Dijken

### **Resource People**

Marvin Brooks	City of Whitehorse, Building Inspections Manager
Lesley Cabott	City of Whitehorse, Planning Services Manager
Cathy Cottrell-Tribes	Energy Solutions Centre
Stan Dueck	Yukon Government, Community Service Building Inspections
Don Flinn	Energy Solutions Centre



Local Action Plan (LAP) Report

Mike Gau	City of Whitehorse, Senior Planner
Russ Haycock	FCM, Partners for Climate Protection
Janne Hicklin	Energy Solutions Centre
Tony Lomas	City of Whitehorse, Human Resources Manager
Jason McDiarmid	City of Whitehorse, Utilities Supervisor
Jim McLeod	City of Whitehorse, Public Works Technologist
Dave Muir	City of Whitehorse, Transit Manager
Aynslie Ogden	Northern Climate Exchange
Craig Olsen	Energy Solutions Centre
Mark Perreault	Yukon Housing Corporation
John Spicer	Yukon Government, Energy Mines and Resources
Tony Zedda	Kobayashi & Zedda Design Group

## Glossary

ACT	Affordability and Choice Today
AYC	Association of Yukon Communities
CAG	Cycling Advisory Group
CH <sub>4</sub>	Methane
CMHC	Canada Mortgage and Housing Corporation
CO <sub>2</sub>	Carbon Dioxide
CBIP	Commercial Building Incentive Program
DUGS	Downtown Urban Gardeners Society
EAP	Emissions Accounting Protocol
eCO <sub>2</sub>	Carbon Dioxide Equivalent
e-coeff	electrical emission coefficient
ESC	Energy Solutions Centre
FCM	Federation of Canadian Municipalities
GHG	Greenhouse Gases
GJ	Gigajoules
HFCs	Hydrofluorocarbons
ICLEI	The International Council for Local Environmental Initiatives
kt	Kilotonnes
kWh	Kilowatt hour
LAP	Local Action Plan
Mt	Megatonnes
MOU	Memorandum of Understanding
MNECB	Model National Energy Code for Building
MSY	Main Street Yukon Society
N <sub>2</sub> O	Nitrous Oxide
NCE	Northern Climate Exchange
OCP	Official Community Plan
PCP	Partners for Climate Protection Program
PFCs	Perfluorocarbons
REDI	Renewable Energy Deployment Initiative
RPAY	Recreation and Parks Association Yukon
SCADA	Supervisory Control and Data Acquisition
TDM	Transportation Demand Management
YDC	Yukon Development Corporation
YHC	Yukon Housing Corporation
YG	Yukon Territory Government
WAF Grid	Whitehorse-Aishihik-Faro Electrical Grid
WETT	Wood Energy Technology Transfer Inc.

## Table of Contents

<b>Executive Summary</b> .....	<b>i</b>
<b>Acknowledgements</b> .....	<b>vii</b>
<b>Glossary</b> .....	<b>ix</b>
List of Figures.....	xi
List of Tables.....	xi
List of Appendices .....	xi
<b>1.0 DEVELOPMENT OF THE LOCAL ACTION PLAN</b> .....	<b>1</b>
1.1 Background.....	1
1.1.1 Purpose of the Local Action Plan (LAP) .....	2
1.1.2 Benefits of Implementing a Local Action Plan .....	2
1.1.3 Climate Change is a Multi-jurisdictional Process .....	3
1.1.4 Control and Influence on Whitehorse’s Emissions.....	4
1.2 Whitehorse’s Baseline Inventories .....	5
1.2.1 Baseline Inventory Data.....	6
1.2.2 City Inventory.....	7
1.2.3 Community Inventory .....	11
1.3 Emission Forecasting.....	13
1.3.1 Forecasting Methodology.....	13
1.3.2 Forecasting Estimates .....	14
1.4 Emission Targets .....	16
1.5 Action Plan Organization.....	18
1.6 Three-Year Local Action Plan .....	18
1.7 Public Outreach Program.....	19
<b>2.0 CITY ACTION PLAN</b> .....	<b>20</b>
2.1 Background.....	20
2.2 City Buildings.....	20
2.2.1 Ideas for Actions .....	21
2.2.2 Recommendations – City Buildings.....	22
2.3 Vehicle Fleet.....	23
2.3.1 Ideas for Action.....	23
2.3.2 Recommendations- Vehicle Fleet .....	24
2.4 Water & Sewage.....	24
2.4.1 Ideas for Actions .....	24
2.4.2 Recommendation – Water & Sewage .....	26
2.5 City Monitoring and Reporting.....	26
2.5.1 Ideas for Actions .....	27
2.5.2 Recommendations – Monitoring and Reporting .....	27
2.6 Implementation of the City Action Plan.....	28
<b>3.0 COMMUNITY ACTION PLAN</b> .....	<b>29</b>
3.1 Background.....	29
3.2 Residential Buildings.....	30
3.2.1 Ideas for Action.....	31
3.2.2 Recommendations – Residential Buildings .....	35
3.3 Institutional and Commercial Buildings.....	35
3.3.1 Ideas for Action.....	36
3.3.2 Recommendations – Institutional and Commercial Buildings .....	38
3.4 Transportation.....	38
3.4.1 Ideas for Action.....	39

3.4.2	Recommendations - Transportation .....	49
3.5	Land Use Sector .....	49
3.5.1	Ideas for Action .....	49
3.5.2	Recommendations – Land Use .....	53
3.6	Waste .....	53
3.6.1	Ideas for Action .....	54
3.6.2	Recommendations – Waste .....	55
3.7	Monitoring and Baseline Data Improvements.....	55
3.8	Implementation of the Community Action Plan.....	55
<b>4.0</b>	<b>RECOMMENDATIONS.....</b>	<b>56</b>
<b>5.0</b>	<b>REFERENCES.....</b>	<b>57</b>

**List of Figures**

Figure 1.	2001 City and Community GHG Emissions
Figure 2.	2001 City and Community GHG Emissions by Source
Figure 3.	2001 City GHG Emissions
Figure 4.	2001 City Building Energy Use
Figure 5.	2001 City Vehicle Fleet Emissions
Figure 6.	2001 Water & Sewage Energy Use
Figure 7.	2001 Community GHG Emissions
Figure 8.	2001 Community Transportation Emissions
Figure 9.	City Operations Energy Use and GHG Emissions 1990 – 2013
Figure 10.	Community Energy Use and GHG Emission 2001 - 2013

**List of Tables**

Table 1.	City and Community Baseline Inventories
Table 2.	Growth Rate Data For Forecasting Estimates
Table 3.	City Operations Forecasting Estimates for 2013 (business as usual scenario)
Table 4.	Community Forecasting Estimates for 2013 (business as usual scenario)
Table 5.	Examples of Emission Targets Set by Canadian Municipalities
Table 6.	City of Whitehorse Emission Reduction Targets

**List of Appendices**

Appendix A.	Partners for Climate Protection Program – 1995 Council Resolution
Appendix B.	Climate Change Related Policies from 2002 Official Community Plan
Appendix C.	MOU – Yukon Municipal Energy Solutions Partnership
Appendix D.	April 2003 Municipal Leaders’ Resolution on Climate Change
Appendix E.	City and Community Emissions Inventory Data
Appendix F.	Emissions Accounting Protocol (EAP)
Appendix G.	Potential Funding Sources
Appendix H.	Actions to Consider Further

## 1.0 DEVELOPMENT OF THE LOCAL ACTION PLAN

Climate change is one of the most significant environmental challenges the world has ever faced (Environment Canada, 2003). The Intergovernmental Panel on Climate Change has concluded that the rapid increase in the concentration of greenhouse gas (GHG) emissions in our atmosphere is expected to increase the earth's temperature, change our climate, alter our environment and endanger our health (Government of Canada, 2002).

The intensity of climate change is predicted to be the greatest in high latitude regions of the Northern Hemisphere, where temperatures may rise by 5°C to 7°C (NCE, 2003a). In the Yukon, specific projections include higher year round temperatures, more snow in the winter, and greater frequency and intensity of storms. These effects may have significant short and long-term impacts on northern municipalities, including impacts on health of citizens, facilities and infrastructure, water supply, land, and natural resources.

The City of Whitehorse has responded to this global challenge by identifying the mitigation of climate change as a priority in the 2001-2003 Strategic Plan (Focus Area 2: Community and Public Safety). This report is a Local Action Plan (LAP) that has been prepared for the City of Whitehorse and describes City and community initiatives aimed at the reduction of greenhouse gas emissions.

### 1.1 Background

In January 1995, the City of Whitehorse began the commitment to address climate change when a resolution in Council was passed to join the Partners for Climate Protection Program (PCP). A copy of this resolution is included in **Appendix A**. In the fall of 2001, the City hired a Climate Change Coordinator to initiate the five-step PCP program.

The PCP program is organized through the Federation of Canadian Municipalities (FCM) to assist municipal governments in mitigating climate change. The program provides Canadian municipalities with the tools to reduce locally produced emissions. Presently, over 100 Canadian municipalities representing over 50% of the country's population are members of the PCP program. The five milestones of the program are:

- Milestone 1. Part A: Profile energy use and emissions from City and community-based sources  
Part B: Forecast energy use and emissions for the next 10 to 20 years
- Milestone 2. Establish reduction targets for City operations and the community
- Milestone 3. Develop and finalize a Local Action Plan that aims to reduce energy use and emissions
- Milestone 4. Implement the LAP
- Milestone 5. Monitor, verify, and report greenhouse gas emissions

In April 2002, the City reinforced its support for action on climate change when it carried a motion, proposed by the FCM, to endorse the ratification of the Kyoto Protocol by the Federal Government.

In addition to the development of the LAP, the City has undertaken other initiatives to address climate change. The City developed and adopted the 2002 Official Community Plan, which includes policy statements that will lead to the reduction of GHG emissions within the City of Whitehorse. The OCP policies relevant to climate change were developed with broad public consultation and are included in **Appendix B**.

As well, the City has undertaken specific transportation-related initiatives including participating in the 2002 and 2003 Commuter Challenge, hosting the Whitehorse Moves Community Transportation Workshop in October 2002, updating the City-wide Transportation Study, and submitting an application for funding to Transport Canada's Urban Transportation Showcase Program (UTSP) in May 2003. Many of the initiatives in the UTSP are endorsed in this action plan.

### **1.1.1 Purpose of the Local Action Plan (LAP)**

The purpose of Whitehorse's Local Action Plan (LAP) is to present baseline emission levels of locally produced GHGs derived from (1) City operations and (2) community-wide activities, and to set a course for action to manage these levels in the future.

The LAP is a step towards putting in action,

1. the City's goal of the reducing greenhouse gas emissions; as well as
2. fulfilling Milestones 1 to 3 of the Partners for Climate Protection Program

The report can be considered a work in progress, or an "evergreen" document, which will be updated as the action plan is implemented. This report will require updating to reflect changes in public perception, energy efficient technology, grants and funding opportunities, new legislation, new infrastructure, land use zoning, industry, among others. This report is intended for the City of Whitehorse and its citizens. It was written by the Engineering and Environmental Services Department of the City of Whitehorse and was developed in collaboration with other City departments, and a volunteer ad hoc citizen steering committee.

### **1.1.2 Benefits of Implementing a Local Action Plan**

The City of Whitehorse will benefit in a number of ways through the implementation of a Local Action Plan. Although interrelated, these benefits are listed below under two categories: (1) economic, and (2) social, health, and political.

Economic benefits are the most tangible and therefore may have the greatest influence when implementing the Local Action Plan. They include the following:

- Improve energy efficiency of city buildings, water & sewage systems, and vehicle fleet can reduce energy costs
- Implement new technologies and improve existing infrastructure will create jobs and local economic development

- Reduce demand on services can reduce the need for capital expansion and costs for operations and maintenance, e.g., when peak vehicle traffic is reduced, road expansion is not required
- Preserve a viable downtown can improve local economy by encouraging tourism

The social, health, and political benefits are equally important, but are usually less tangible. They include the following:

- Demonstrate community leadership
- Assist in the implementation of the City's OCP
- Develop a more liveable community
- Reduce traffic congestion and increase mobility
- Preserve green spaces
- Revitalize older neighbourhoods
- Increase public awareness of climate change
- Improve air quality
- Improve health of citizenry
- Contribute to sustainable community development

### **1.1.3 Climate Change is a Multi-jurisdictional Process**

Climate change is both a local and global concern that requires the co-operation of all levels of government in countries around the world.

#### **International**

The Kyoto Protocol was developed to direct industrial countries to reduce greenhouse gas emissions. This reduction is a first step in an international effort aimed at stabilizing CO<sub>2</sub> levels. As of April 30, 2003, ratification by the Russian Federation was needed in order for the convention to come into force (NCE, 2003b).

#### **National**

In 1990, Canada was responsible for 601 Megatonnes (Mt) of carbon dioxide equivalent (eCO<sub>2</sub>) emissions, which represents 1.8% of global emissions (Environment Canada, 1999).

As part of the Kyoto Protocol, Canada's target is to reduce emissions to 6% below 1990 levels by 2008 – 2012. In November 2002, the Canadian Government released its "Climate Change Plan for Canada", and in December 2002, Kyoto was ratified in parliament. In the February 2003 federal budget, two billion dollars were allocated for climate change initiatives. Complete details of the proposed spending have not been released, but are anticipated within the next year.

Also included in the national plan is a challenge to individual Canadians to reduce emissions by one tonne.

## **Territorial**

Yukon's 1990 emissions are estimated at 0.524 Mt or 0.087% of Canada's emissions (Yukon Government, 2002). The Yukon Government (YG) is currently working on a climate change strategy (rather than a detailed action plan) that is due for completion in the near future. A City of Whitehorse representative participated in a steering committee for the YG strategy during the spring of 2002.

In April 2003, the Yukon Government was recognized as a national leader in energy efficiency for the third straight year when they were awarded top marks on the latest National Report Card issued by the Canadian Energy Efficiency Alliance. The report noted that the Yukon has exemplified best practices with regards to energy efficiency in buildings and renewable energy production through the introduction of a range of new or expanded programs. Key to the success of these programs has been the development of partnerships among government, industry, commercial, and residential sectors.

## **Municipal**

Whitehorse's 2001 emissions are estimated at 0.176 Mt (or approximately one-third of Yukon emissions). As Yukon's most populated municipality, Whitehorse plays an important role in contributing to the reduction of Territory emissions. Through the City's Official Community Plan (OCP), and established partnerships with other levels of government, as well as non-governmental organizations, the City can effect significant change in GHG emissions from the transportation, residential, institutional, commercial, waste, and land use sectors.

In January 2002, the City, as a member of the Association of Yukon Communities (AYC), signed a Memorandum of Understanding (MOU) with Energy Solutions Centre (ESC) and YG to signify the start of a partnership to collaborate on energy related projects and to leverage federal funds. The MOU is included in **Appendix C**.

In April 2003, municipal leaders from across the county met to make recommendations on the implementation of the Kyoto Protocol. The recommendations are included as **Appendix D**. Many of these recommendations coincide with actions that are presented within this LAP.

### **1.1.4 Control and Influence on Whitehorse's Emissions**

There are three types of factors that influence greenhouse gas emission levels in the City of Whitehorse. The City has direct control in some cases, and is influential in others. A number of external factors that the City has no control or influence on also affect GHG emission levels.

#### **Direct Control of GHGs**

In the course of delivering municipal services to the citizens of Whitehorse, the City consumes energy. In the planning, construction and management of city operated buildings, facilities and infrastructure, and in the procurement and operation of our vehicle fleet, the City has control over these activities and their associated emissions.



## **Influence of GHGs**

Activities that consume energy within the geographical boundaries of Whitehorse are influenced by numerous factors, including: land use patterns, infrastructure, provision of services, and design and operation of building stock (commercial, institutional, and residential buildings). The City can influence the behaviour of residents through these factors, and in particular through the OCP and land use decisions, bylaws, building permitting process, development charges and review processes, development and delivery of a transportation network and transit system, solid waste handling services, and communication with local businesses and residents.

## **External Factors Affecting GHGs**

The major external factor influencing GHGs in the City of Whitehorse is the source of energy for electrical production. Electricity generation for the City of Whitehorse is predominantly derived from hydroelectric and wind sources, both of which are emissions free. As the demand for electricity surpasses the supply of these clean energy sources, the Yukon Energy Corporation (YECL) uses diesel generators to fill the demand. Both the demand of electricity and the supply of clean energy vary. The level of industrial activity has a large influence on the demand, while the water levels of the Yukon River and Aishihik Lake influence the supply of clean energy. The annual ratio of hydro, wind, and diesel energy is used to determine an average *electrical emission coefficient* (“e-coeff”) that is used to calculate the rate of emissions associated with electrical consumption. As the amount of diesel generated electricity increases, so do emission levels.

Other factors that affect GHGs are the level of economic activity and climate.

## **1.2 Whitehorse’s Baseline Inventories**

Baseline emission inventories for the City and community sectors were developed to form a picture of the City’s current greenhouse gas emission levels, to set reduction targets, and to determine priorities for action.

For baseline inventories, FCM recommends using 1990 data to correspond with baseline data in the Kyoto Protocol or 1994 data to correspond with year that the PCP program was initiated. When these data are not available, FCM recommends choosing baseline years based on the availability of data such that the inventories can be documented with enough detail to provide a good basis for planning GHG reduction initiatives (ICLEI, 2003). The disadvantage with using current baseline years is that GHG reduction initiatives implemented before the baseline year would not be counted towards the reduction target.

For the City inventory, 1990 data were available and were used for the baseline year. Data collection for 1990 required estimating energy use for about 5% of the City inventory. In addition, detailed City inventories for 1996, 2000, and 2001 have been completed.

For the community inventory, 2001 comprised the baseline year. Before 2001, not enough data were available to compile a sufficiently detailed inventory.

Software provided through the PCP program entitled “Cities for Climate Protection – Greenhouse Gas Emissions Software Version 3” (Torrie Smith Associates Inc., 1999) was used to compile the inventories. The results of these inventories are summarized in **sections 1.2.1 – 1.2.3**, with summary reports of the inventories included in **Appendix E**.

**1.2.1 Baseline Inventory Data**

**Table 1** lists the baseline inventories for the City emissions in 1990 and 2001, and community emissions in 2001. These numbers will be used to compare future emission levels.

The three main GHGs are CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. Each has different potential to affect global warming based on their chemical construction. As a means to compile and calculate the impact these various gases have on global warming, a single unit of measurement was developed by the international scientific community. All emissions are converted and compiled to a *CO<sub>2</sub> equivalent* (eCO<sub>2</sub>). For example, if one tonne of CH<sub>4</sub> were emitted, it would produce 21 times the greenhouse gas impact of one tonne of CO<sub>2</sub> over a 100-year period. Therefore one tonne of CH<sub>4</sub> has an eCO<sub>2</sub> of 21. This is the conventional method for representing the emissions of various gases (Voluntary Challenge & Registry Inc., 1999).

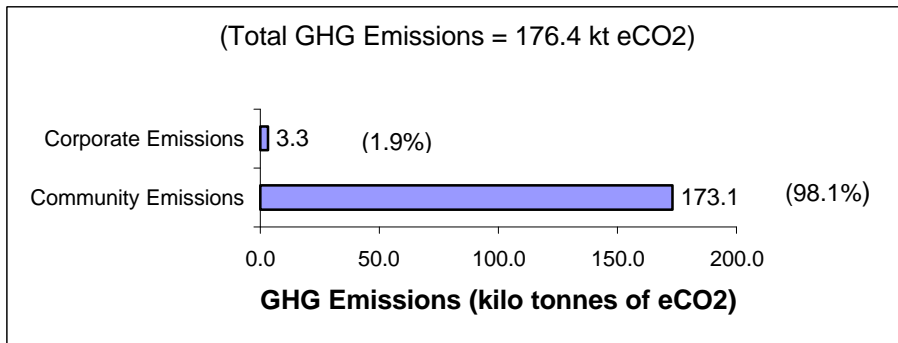
<b>Table 1. City and Community Baseline Inventories</b>			
<b>Inventory</b>	<b>Year</b>	<b>eCO<sub>2</sub> (kilo tonnes)</b>	<b>Energy (GJ)</b>
City	1990	3.6	76,900
City	2001	3.3	82,145
Community	2001	173.1	3,269,488

Source: City of Whitehorse, Engineering and Environmental Services Department

**Figure 1** shows the breakdown of greenhouse gas emissions in Whitehorse in 2001 into City and community emissions. The year 2001 was chosen because it is the only year that data are available for both City and community inventories. Combining the City and community emissions gives the following distribution of Whitehorse’s 2001 GHG emissions: transportation sector (excluding City vehicle fleet), is responsible for 50.1% of the emissions, with the remaining emissions coming from residential buildings (25.7%), commercial and institutional buildings (20.4%), waste (1.9%) and City operations (1.9%).

City operations include the City’s vehicle fleet, City buildings, water and sewage system, solid waste (generated from City buildings), and streetlights. Although transit vehicles are owned and operated by the City, they are included in the community transportation sector. The assumption is that transit initiatives would effect change in community automobile use, which is inventoried in the community emissions. Community-based emissions are derived from transportation, residential buildings, commercial/institutional buildings, and waste sectors and will be discussed in **Section 1.2.3**.

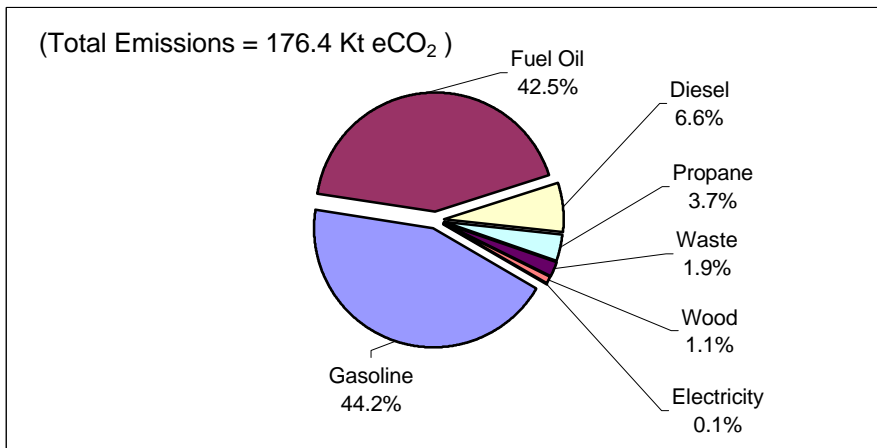
**Figure 1. 2001 City and Community GHG Emissions**



Source: City of Whitehorse, Engineering and Environmental Services Department

**Figure 2** shows the distribution of Whitehorse’s 2001 GHG emissions by energy source. Gasoline and heating fuel oil are responsible for 44.2% and 42.5%, respectively, of the emissions while the remaining emissions come from diesel, propane, waste, wood, and electricity. The GHG emissions from electricity usage are minimal because in 2001 the electrical emission coefficient was low with only hydro and wind sources being used for the energy source.

**Figure 2. 2001 City and Community GHG Emissions by Source**

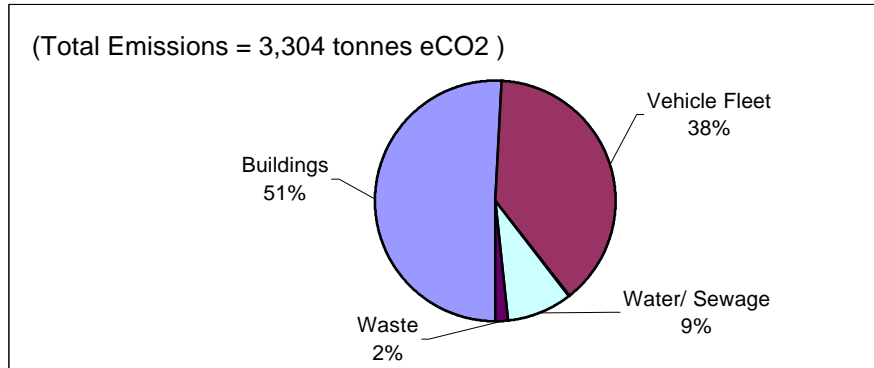


Source: City of Whitehorse, Engineering and Environmental Services Department

### 1.2.2 City Inventory

**Figure 3** shows further breakdown of Whitehorse’s 2001 City emissions. The buildings sector is the highest contributor (51%), followed by City vehicles (38%), water & sewage (9%), and waste (2%). Emissions for the streetlight sector are less than 0.05% and are omitted from the figure.

**Figure 3. 2001 City GHG Emissions**



Source: City of Whitehorse, Engineering & Environmental Services Department

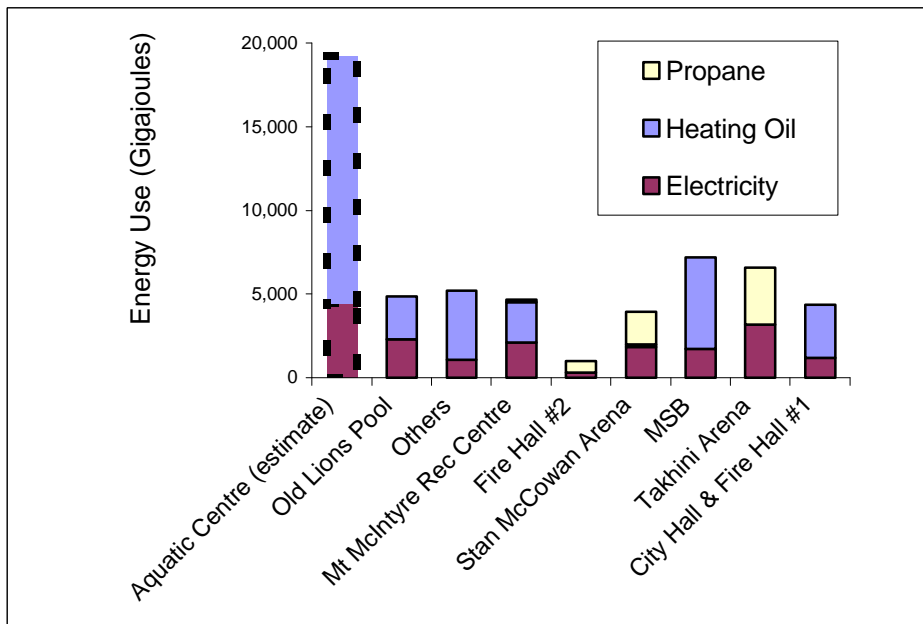
### City Buildings

As shown in **figure 3**, in 2001, the City building sector was responsible for 51% of City GHG emissions. **Figure 4** shows the distribution of energy use for City buildings that were owned and/or occupied in 2001. The “Others” category includes: 9043 and 9030 Quartz Road, Sport Yukon Building, Carpenter Sign Shop, New Animal Shelter Building, Freight Shed, Porter Creek Satellite Station, and Transit Garage.

Energy use rather than emissions, or eCO<sub>2</sub>, was plotted because of the variable e-coeff, which can make multi-year comparisons difficult, and can mask significant changes in energy consumption. However, **figure 4** does show the biggest emitters of GHG are the buildings that use oil and propane predominantly. The data show that energy use for our building stock is mostly for administration and recreational buildings with a smaller proportion of energy used in service and maintenance buildings. In 2001, our biggest (actual) energy user and GHG emitter was the Municipal Services Building (MSB) building, followed by Takhini Arena.

Also included in **figure 4** is the *estimated* energy use for the new Aquatic Centre, which was provided by the design team during the construction of the building (Ferguson Simek Clark Consulting Engineers, 2001). These estimates were compared to energy data available for the first seven months of operation (Oct. 2002 – April 2003), which show that actual energy use was 1% higher for electrical and 10% higher for oil heating.

**Figure 4. 2001 City Building Energy Use**



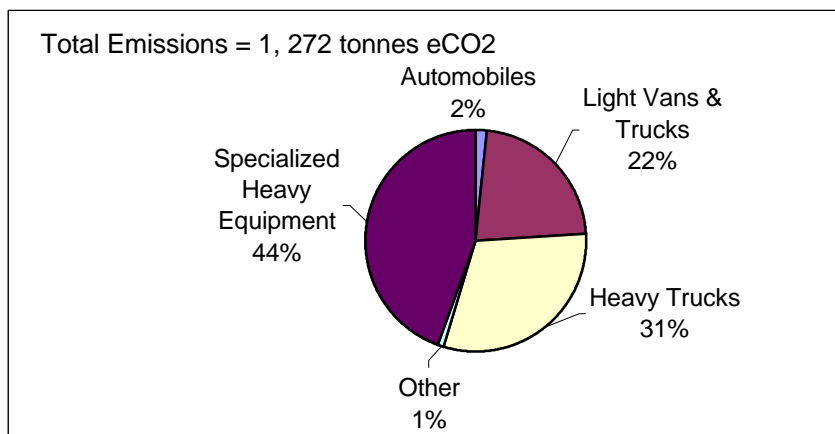
Source: City of Whitehorse, Engineering and Environmental Services Department; Ferguson Simek Clark Consulting Engineers, 2001

**Vehicle Fleet**

**Figure 5** shows the distribution of emissions within the City’s vehicle fleet. Specialized heavy equipment is the biggest emissions source at 44%, followed by heavy trucks (31%), light vans & trucks (22%), automobiles (2%) and other (1%). The “Other” category includes parks equipment, compressors, and other similar equipment.

Although vehicle fleet and water & sewage sectors have similar energy consumption, the vehicle fleet emits approximately five times the emissions because petroleum is the predominant energy source for vehicles, while hydro is for water & sewage systems.

**Figure 5. 2001 City Vehicle Fleet Emissions**

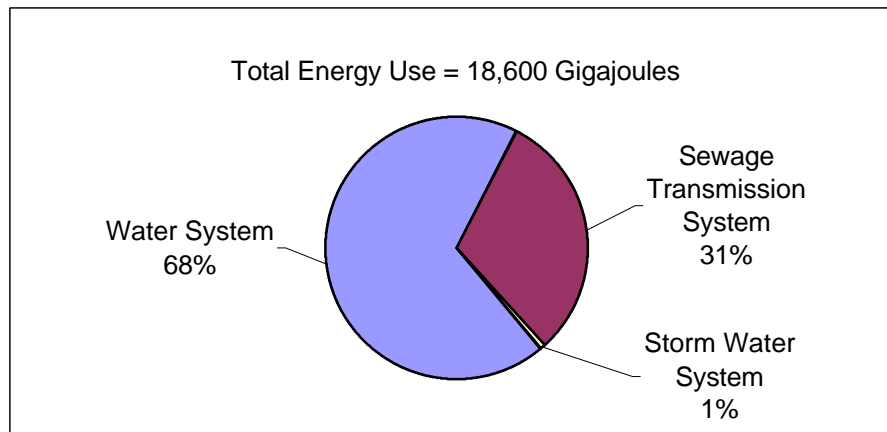


Source: City of Whitehorse, Engineering and Environmental Services Department

## Water & Sewage

**Figure 6** shows the distribution of energy use in the water & sewage sector. The water system uses 68% of the energy (and produces approximately 75% of total emissions from this sector), the sewage transmission system uses 31% (and 25% of emissions), and the storm water system uses the remaining 1%. The two energy sources for the water & sewage sector are electricity and oil. Not surprisingly, the water system uses approximately triple the oil compared to the sewage transmission system and also produces approximately triple the emissions.

**Figure 6. 2001 Water & Sewage Energy Use**



Source: City of Whitehorse, Engineering and Environmental Services Department

Between 1996 and 2001, there was a decreasing trend in energy and water use, with a 22% drop in total energy use and a 19% drop in total volume of water pumped. Although these decreases are, in part, due to population decreases, these changes can also be attributed to the work that has been completed by Public Works and Engineering Departments during this time, including:

- Reduction in water consumption:
  - Thermostatically Controlled Bleeder (TCB) Devices
  - Building bylaw limiting flushing capacity of toilets
  - Consumer education
- Improvements to reduce water losses from water distribution system and infiltration of ground water into sewage system
- Water Transmission System Upgrades
  - New pumps, station upgrades, implementation of cascade water filling between pressure zones, peak shaving, changes to cycle rate of pumps and reservoir draw down depths, and optimization of groundwater well operations
- Sewage Transmission System Upgrades
  - New pumps, station upgrades

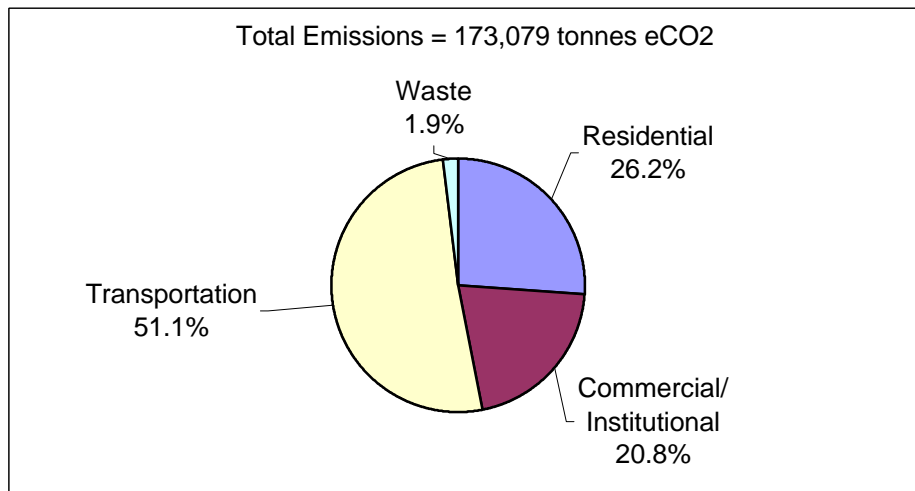
**Waste**

Approximately 2 percent of City emissions is derived from waste; however, no data are available for volume or weight of garbage that is generated at City buildings. Instead an estimate was made using the frequency of garbage collection and the number of garbage receptacles. The estimate for City waste was 313 tonnes, which was subtracted from the community waste total to prevent double counting of the City waste.

**1.2.3 Community Inventory**

As shown in **Figure 1**, the community is responsible for 98.1% of Whitehorse’s emissions. **Figure 7** shows the relative contributions within the community. The largest contributor from the community is the transportation sector, which is responsible for 51.1% of all emissions while residential buildings, commercial/ institutional buildings, and waste contribute 26.2%, 20.8%, and 1.9% respectively.

**Figure 7. 2001 Community GHG Emissions**



Source: City of Whitehorse, Engineering and Environmental Services Department

**Residential Building Sector**

As shown in **Figure 7**, 26.2% of community greenhouse gas emissions are based from heating sources for residences. The relative proportions of emissions per source, including electricity, oil, wood, and propane, were estimated from the City of Whitehorse 2002 Citizen Survey and were compared with 1999 Statistics Canada data for Whitehorse and for the Territory. These proportions were estimated at 89% oil; 7% propane; and 4% wood and wood pellets (City of Whitehorse Citizen Survey, 2002b). Although electricity accounts for 27% of energy use in the residential sector, there are no associated emissions because hydro and wind are the energy sources.

**Commercial/ Institutional Sector**

The commercial/institutional sector produced approximately 21% of Whitehorse’s 2001 community-based greenhouse gas emissions. Within this sector, 92% of emissions are from oil-based sources, and 8% from propane. Streetlights and sentinel lights run on

electricity with no emissions. Wood consumption in the commercial/institutional sector was not determined, and is expected to be relatively insignificant.

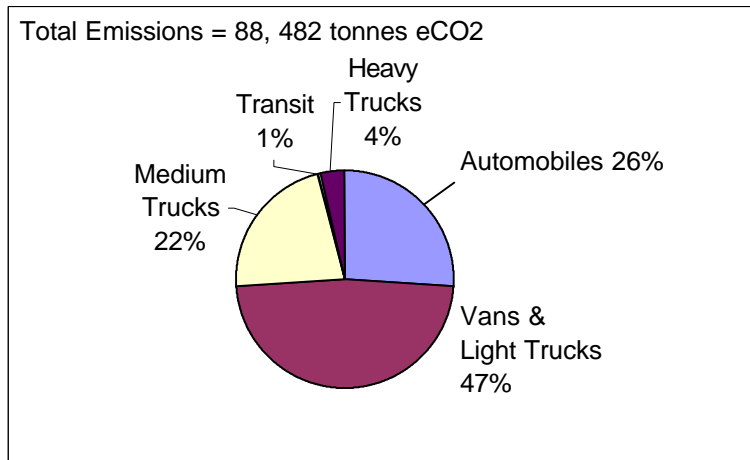
### Transportation

The community inventory includes data for automobiles, vans and light trucks, medium trucks, heavy trucks, non-transit buses, and transit buses.

Due to the relatively low numbers and difficulty in estimating usage and fuel consumption rates, the inventory omits off-highway vehicles (e.g., snowmobiles), motorcycles, non-registered vehicles and equipment (e.g., power boats, lawnmowers, chainsaws), vehicles registered outside of Whitehorse (that travel within City boundaries), and planes and helicopters. Transport trucks were also not included in the inventory.

As shown in **Figure 8**, vans and light trucks contribute the highest proportion of emissions at 48%, automobiles 26%, medium trucks 22%, heavy trucks (greater than 15 tonnes) 3.5%, and transit <1%.

**Figure 8. 2001 Community Transportation Emissions**



Source: City of Whitehorse, Engineering and Environmental Services Department

### Waste

Waste generated by the community (excluding waste produced in City buildings) comprises 1.9% of community greenhouse gas emissions, as shown in **Figure 7**. A total of 15,692 tonnes of material entered in the landfill in 2001. This total includes material deposited at War Eagle Landfill site, excluding the tires. Other material omitted from this inventory includes:

- Material deposited at Son of War Eagle Cell #2 Landing (White Goods);
- Clean fill into the landfill;
- Material Deposited at Son of War Eagle Compost Landing; and
- Recyclable material removed from the landfill.



### 1.3 Emission Forecasting

Emission forecasting is a projection of future emissions based on the business as usual scenario. This is an important step because in order to reach our reduction targets the Local Action Plan will need to reduce present day emissions as well as offset the future emissions.

Emission levels are not static. They are a function of a range of highly dynamic dependent and independent variables, including: development of new facilities, changes to existing facilities, population, demographics, electrical coefficient, availability and uptake of technology, energy market prices, land use decisions, climate, among others.

Despite these uncertainties, FCM recommends that municipalities undertake emission forecasting. To complete Milestone 1 of the PCP program, emission forecasting of the City and community inventories was completed using the methodology outlined in the Protocol/Guidelines for Reporting (PCP, 1999).

#### 1.3.1 Forecasting Methodology

The year 2013 was chosen to forecast because it is ten years from the development of the LAP. Ten years is a sufficient time frame to implement and evaluate the effectiveness of both short-term and long-term initiatives.

City operations energy growth estimates were based on the estimated growth of City services (water & sewage, lighting, and vehicle fleet) that would accompany a growth in population, as well as an estimation of building energy use based on the growth of the City building stock. Energy estimates for Phase II of the Multiplex were not included in the forecasting because the design has not been finalized. Therefore, the forecast underestimates future energy use, and, depending on final design of the new building, may underestimate future GHG emissions.

Energy estimates for the community sectors were based on population growth estimates with the exception of the residential sector, which was based on the estimated number of new homes.

Growth in population and new homes were cited from Whitehorse's 2002 OCP. The OCP gave three growth scenarios, low, medium and high. This report used two of these scenarios for energy growth: a low growth scenario and a high growth scenario.

An e-coeff was then applied to the energy growth scenarios. Since coefficients are highly variable, it is difficult to choose one e-coeff to apply to future energy forecasts. As discussed in **section 1.1.4**, the variance in e-coeff is due to the changing demand in electricity and the need for different energy sources (hydro, wind, and diesel). A graph in **Appendix F** shows the historical trend of the e-coeff between 1967 through 2002. Over this time period there has been substantial variation in emission coefficients, ranging from 0.0000 to 0.1959, with an average of 0.0517.

For the low growth scenario an e-coeff of 0.001 kg eCO<sub>2</sub> / kWh was selected. This corresponds to a scenario where almost 100% of the electricity is being generated from renewable energy.

For the high growth scenario an e-coeff of 0.075 kg eCO<sub>2</sub> / kWh was selected. This value is between the average and the historical maximum and corresponds to a period of

increased electrical demand that would result from moderate industrial activity and a 27% increase in Whitehorse's population.

### 1.3.2 Forecasting Estimates

**Table 2** includes the growth rate data and electrical emission coefficients that are used for low and high growth scenarios in the forecasting calculations. **Tables 3** and **4** give the forecasting estimates for energy and emissions in 2013 for City operations and the community.

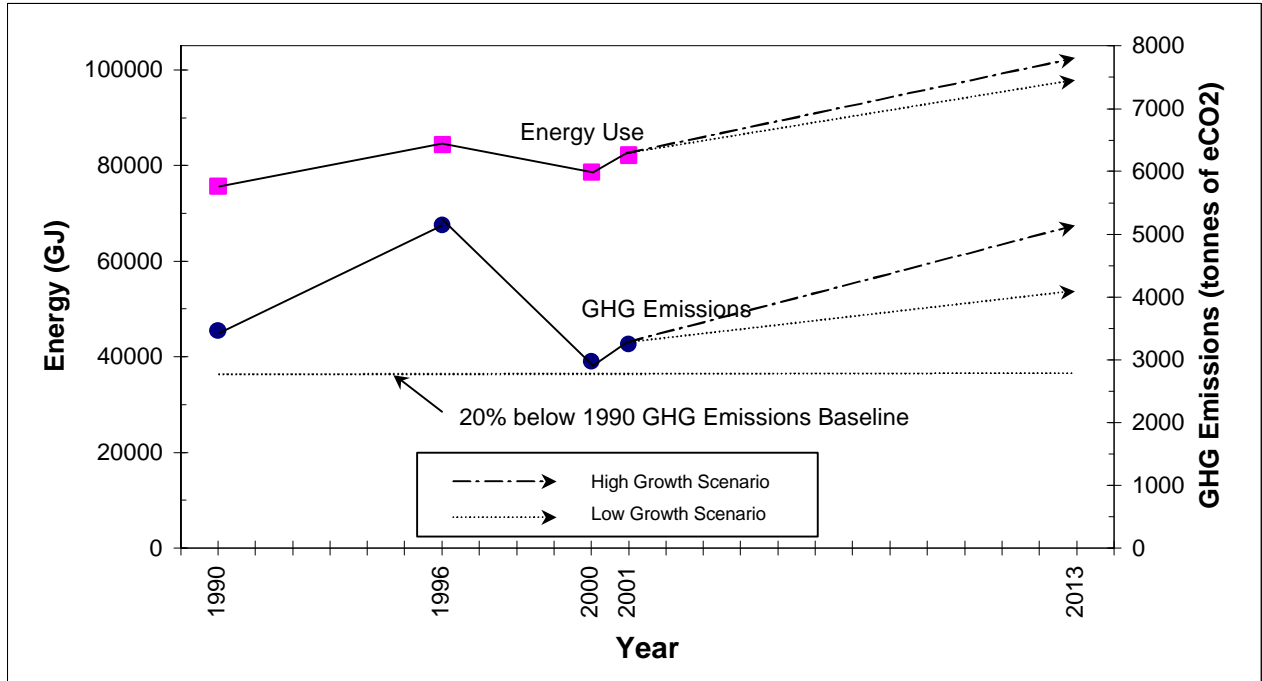
<b>Growth Rate Scenario</b>	<b>Population Growth Rate</b>	<b>Growth Rate of New Homes</b>	<b>Electrical Emission Coefficient (kg eCO<sub>2</sub> / kWh)</b>
Low Growth Rate	0.5% per year	40 per year	0.001
High Growth Rate	2.0% per year	200 per year	0.075

<b>Year</b>	<b>Energy Use (GJ)</b>	<b>Total GHG Emissions (t eCO<sub>2</sub>)</b>	<b>GHG Emissions Growth above 1990 Levels</b>
1990 (Baseline Year)	76,900	3,560	-
2013 (Low Growth Rate)	98,650	4,098	15%
2013 (High Growth Rate)	102,875	5,118	44%

<b>Year</b>	<b>Energy Use (GJ)</b>	<b>Total GHG Emissions (kt eCO<sub>2</sub>)</b>	<b>GHG Emissions Growth above 2001 Levels</b>
2001 (Baseline Year)	3,269,500	173.1	-
2013 (Low Growth Rate)	3,466,600	183.7	6%
2013 (High Growth Rate)	4,165,800	237.9	37%

The results from **Tables 3** and **4** are shown graphically in **Figures 9** and **10**. In **Figure 9**, historical data for 1990, 1996, 2000 and 2001 for the City inventory are included to compare with energy use and emissions forecasts.

**Figure 9. City Operations Energy Use and GHG Emissions 1990 - 2013**



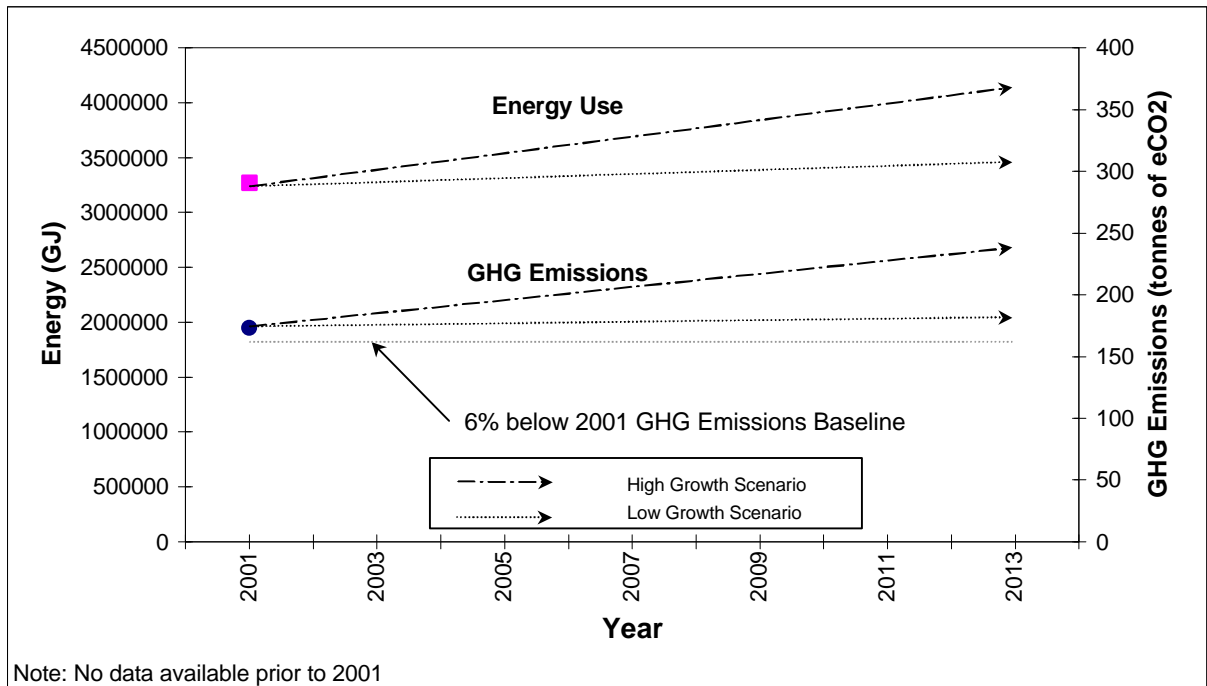
Source: City of Whitehorse, Engineering and Environmental Services Department

As shown in **figure 9**, energy use and emissions for City operations peaked in 1996. One possible explanation for the increase in energy use was a colder than average year (based on the number of heating degree days). This peak in energy use was then magnified by a high electrical coefficient (or greater use of GHG emitting energy sources to supplement hydroelectricity) resulting in a peak in City operations emissions. Although City emissions in 2001 were lower than in 1990, energy use has increased. The drop in emissions in this period is attributed to a lower electrical emission coefficient.

Also shown in **figure 9** are the forecasts for City operations energy use and emissions, which suggest that emissions will rise above the 1990 levels by 15% under the low growth scenario and 44% under the high growth scenario.

**Figure 10** shows the forecast for community energy use and emissions. The forecasts were based on the only available data, which were for 2001. Under the low growth (business as usual) scenario, community emissions are forecasted to increase by 6% from 2001 levels; and under the high growth (business as usual) scenario, community emissions are projected to rise by 37% from 2001 levels.

**Figure 10. Community Energy Use and GHG Emissions 2001 – 2013**



Source: City of Whitehorse, Engineering and Environmental Services Department

### 1.4 Emission Targets

Milestone 2 of the PCP program – Adoption of Emission Targets – is an important step in the development of a local action plan. Targets allow for the demonstration of leadership towards creating a sustainable community, the setting of benchmarks for monitoring success, the leveraging of funds from other levels of government, the expression of commitment to assist Canada in fulfilling its Kyoto commitments, and the distribution of municipal resources, among others.

The Federal Government currently does not have specific GHG reduction requirements for municipalities, thus any local GHG emission reductions or reduction targets are voluntary and will be a contribution to the national target. The PCP (1999) *Protocol/Guidelines for Reporting* stipulates that targets can be refined by jurisdictions as their Local Action Plan is developed and refined.

As part of the PCP program, FCM suggests that municipalities adopt emission reduction targets of 20% below 1990 emission levels for City emissions and 6% below 1990 levels for community emissions within 10 years of joining the program. **Table 5** lists examples of reduction targets that have been set by other municipalities. All of the communities have adopted the 20% and 6% targets, with various target dates.

<b>Municipality</b>	<b>City Emissions Reduction Target</b>	<b>Community Emissions Reduction Targets</b>	<b>Status of Reductions</b>
Calgary (2002)		6% below 1990 by 2012	Not determined
Edmonton (2001)	20% below 1990 levels by 2008	6% below 1990 by 2010; 20% below 1990 levels by 2020	Not determined
Fort Smith (1997)	20% below 1990 by 2005		Not determined
Guelph	20% below 1994 by 2010	6% below 1994 by 2010	Not determined
Hamilton (1998)	20% below 1990 by 2005		Not determined
New Glasgow (1999)	20% below 1990 levels by 2008		Not determined
Ottawa	20% below 1990 by 2005 (Ottawa, 1995a)	20% below 1990 by 2005 (Ottawa, 1995b)	By 1998, 12% reduction below 1990 levels
Regina (2003)	20% below 1990 levels by 2005; 1% annual reductions until 2012.	6% below 1990 levels by 2012	12% reduction in City emissions below 1990

Following the suggestion of FCM, it is proposed that the City of Whitehorse aim to reduce City operations emissions by 20% of 1990 levels and community emissions by 6% of 2001 levels by the year 2013. **Table 6** shows the kilotonnes (kt) of emissions that would have to be reduced to meet these targets.

	<b>Target (% Reduction)</b>	<b>Reduction in Emissions</b>		<b>2013 Emissions Target</b>
City	20% below 1990 levels by 2013	Low Growth	1.3 kt	2.8 kt
		High Growth	2.3 kt	
Community	6% below 2001 levels by 2013	Low Growth	21 kt	162.7 kt
		High Growth	75.2 kt	

Where feasible, reduction potentials for each action will be developed as part of the individual work plans. Based on these reduction potentials, overall reduction rates of 6% and 20% for the City and community emissions may be adjusted.

### **1.5 Action Plan Organization**

The following sections include City and community action plans, which provide a broad range of emission reduction initiatives that are aimed at achieving Whitehorse's emission reduction targets. The initiatives are organized under the following headings and sectors.

#### **City**

- City Buildings
- Vehicle Fleet
- Water & Sewage

#### **Community**

- Residential Buildings
- Institutional and Commercial Buildings
- Transportation
- Land Use
- Waste

As well, initiatives have been suggested for monitoring and reporting of reduction initiatives and emissions for City and community.

### **1.6 Three-Year Local Action Plan**

Rather than provide a numerical ranking for each initiative, a number of actions, considered highly feasible to initiate in the next three years, are highlighted at the end of each sector. These actions were selected by the Steering Committees for a "Three-Year Plan" because of their high potential to reduce GHG emissions, high public acceptance, high chance of success, and encompassing of City and community targets. Although capital costs and payback period were not specifically determined for each action, the actions identified in the three-year plan have high potential for outside funding and partnerships, which would reduce costs and payback period, as well as increasing the likelihood of their success.

More comprehensive feasibility studies are recommended for the remaining actions in the City and Community Local Action Plans.

## **1.7 Public Outreach Program**

Key to the success of the three-year plan, as well as realizing the full potential of the LAP report as a whole, is to effectively publicize the plan. Making the plan available to the public for their comments will provide the City with valuable insight into what actions are likely to succeed. Public review may also identify new partnerships, and funding opportunities. Prior to implementation, the three-year plan is proposed for public review through the distribution of hard copies of the plan to key stakeholders, and by making electronic copies available through the City website.

## 2.0 CITY ACTION PLAN

### 2.1 Background

The City of Whitehorse Action Plan for City Operations was guided by the City Steering Committee, which was comprised of representatives from various city departments. A review of current initiatives from the Whitehorse, the Yukon and other municipalities was also completed.

Between April 2002 and December 2002, the City Steering Committee met several times to discuss the development of the City Action Plan. A representative from FCM attended two of the meetings. As well as the Steering Committee meetings, informal meetings were held with City staff from various departments including Public Works, Engineering and Environmental Services, Maintenance and Safety Services, Financial Service, Planning, and Parks & Recreation.

As shown in **figure 1**, approximately three kilotonnes (kt) of City eCO<sub>2</sub> emissions represent 1.9% of the community's total emissions. This proportion is comparable to the twelve municipalities whose inventories are summarized in the PCP Inventory Compilation & Analysis Report, where City operations emissions ranged from 0.4% to 4.7% of total emissions with the average being 2.4% (ICLEI Energy Services, 2000).

A review of City energy trends between 1996 and 2001 revealed water reduction and energy management initiatives for the water & sewage system coincided with a 22% drop in energy use for that sector. As well, energy management initiatives at Takhini Arena coincided with a 14% drop in energy consumption at that facility. Initiatives presented in this action plan have the potential to further decrease energy use, costs and emissions.

The actions have been organized under the following headings:

1. City Buildings
2. Vehicle Fleet
3. Water & Sewage
4. Monitoring and Reporting

A table is provided in each of the four sectors and includes the name and description of the initiative and the person/department that will lead the initiative. Partnerships and funding opportunities for initiatives have not been included with the actions and will be identified during the implementation of the action plan. **Appendix G** provides a preliminary list of potential funding sources.

Actions included in the tables are not listed in order of priority.

### 2.2 City Buildings

**Figure 3** in **section 1.2.2** shows that in 2001 the City building sector was responsible for 51% of City GHG emissions. This percentage will likely vary in the future because of changes to the City's building stock. Two projects that will alter our current building stock include:



- Fire Hall #2 replacement. Construction of a replacement building scheduled for 2004. The old building is being decommissioned.
- Construction of Multiplex Phase II. With the construction of Phase II of the Multiplex the future of Stan McCowan is uncertain after the 2007 Winter Games.

**2.2.1 Ideas for Actions**

The following table lists two strategies and their corresponding actions for energy use and GHG emission reductions for City buildings (CB).

Ref #	Action	Details	Lead (Person, Dept, Org.)
<b>STRATEGY I</b> Reduce energy use in existing buildings.			
<b>CB.1</b>	Conduct Energy Audit through Energy Solutions Centre (ESC)	<p>Conduct Energy Audit on the City’s main buildings. An audit was conducted in 1997; however, there have been significant changes in the City’s infrastructure since this audit. The buildings to be examined are Takhini Arena, Fire Hall #1, City Hall, Transit, Two Mile Hill Pump Station, Municipal Services Building, and Parks &amp; Recreation.</p> <p>There is no cost for the energy audit. The City pays ESC a fee if any of the recommendations from the audit are implemented and the fee is based on the amount of money saved from the implementations.</p> <p>For example, the audit would assess:</p> <ul style="list-style-type: none"> <li>• feasibility of installing dual heating systems in existing City buildings</li> <li>• insulating furnace room in MSB</li> </ul> <p>A cost-benefit assessment is currently underway for installing solar walls in Takhini Arena and Transit Building</p>	Eng & Env. Dept., Maintenance & Safety Dept.
<b>CB.2</b>	Continue With Lighting Upgrades	<p>As recommended in the 1997 Energy Audit, upgrade interior building lighting to more energy efficient models. Will need to complete survey of lights requiring upgrades since upgrades have been completed on a piecemeal basis.</p> <p>Review usage of sensor switches in seldom used areas (including bathrooms).</p>	Eng & Env. Dept., Maintenance & Safety Dept.
<b>CB.3</b>	Increase Preventative Maintenance on Heating Systems in City Buildings	<p>Implement regular testing of water / glycol mix of heating systems in all City buildings. Currently, there is a lack of staff resources to monitor on a regular basis.</p> <p>Dec 2003 update- regular checks are now being performed.</p>	Maintenance & Safety Dept.
<b>CB.4</b>	Implement Employee Energy Reduction Program	<p>Develop and implement an energy awareness campaign for employees within City Buildings. Examples include prompts for turning off lights and computers. Education efforts could be coordinated with initiatives to implement setback thermometers.</p>	Eng. & Env. Dept., Green Team

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Lead (Person, Dept, Org.)</b>
<b>CB.5</b>	Support Recommendations in Energy Audit for Phase II of Multiplex	Energy audit is in progress.	Eng. & Env. Dept.
<b>CB.6</b>	Adopt Energy Efficient Equipment Procurement Policy	Adopt a policy to purchase goods and office equipment for City buildings that meet the energy-efficient Energy Star® standard, <a href="http://www.energystar.gov/">www.energystar.gov/</a> . The Federal Government has adopted a similar policy.	Eng. & Env. Dept., Financial Services
<b>STRATEGY II</b>			
Reduce energy use in new City buildings.			
<b>CB.7</b>	Adopt Energy Standards for New Municipal Buildings	Consider the adoption of energy standards for all new City buildings. Buildings that are constructed to a standard that is 25% better than the Model National Energy Code for Buildings (MNECB) are eligible for funding through the Commercial Building Incentive Program (CBIP) to cover the extra design costs. Examples of other levels of government showing this leadership:  YG's Building Design Standards produces buildings that are 15-20% better than the (MNECB).  The Federal Government is committed to building all of its new facilities to a minimum standard that is 25% better than the existing MNECB.	Eng. & Env. Dept., Maintenance & Safety Dept.

### 2.2.2 Recommendations – City Buildings

The following key actions for City buildings are recommended for completion during the first three years of the implementation of the action plan. The energy audit will determine the feasibility and cost/benefit of particular energy saving initiatives. While the feasibility studies are anticipated to be straightforward, only those actions that are anticipated to be GHG-reducing and cost-effective will be submitted to the City's budget process.

CB.1 Conduct Energy Audit through Energy Solutions Centre (ESC)

CB.2 Continue With Lighting Upgrades as Recommended in the 1997 Energy Audit

## 2.3 Vehicle Fleet

**Figure 3** in **section 1.2.2** shows that in 2001, the vehicle fleet sector was responsible for 38% of the City GHG emissions.

### 2.3.1 Ideas for Action

The following table lists two strategies and their corresponding actions for reducing GHG emissions derived from the City vehicle fleet (VF).

Ref #	Action	Details	Lead (Person, Dept, Org.)
<b>STRATEGY I</b>			
Reduce emissions from fleet vehicles.			
<b>VF.1</b>	Develop Anti-Idling Campaign	Implement a vehicle fleet anti-idling education campaign for all City departments. Consider the implementation of a temperature dependent anti-idling policy for all City vehicles. Research the feasibility of installing a device in fleet vehicles that will turn the vehicle off after a certain amount of time idling or after the vehicle's engine block has reached a certain temperature.	Eng. & Env. Dept.
<b>VF.2</b>	Implement Driver Training Program	Implement a driver-training program for employees to improve driving habits in order to reduce fuel consumption and environmental emissions. Currently, the City does driver- <i>safety</i> training. Natural Resources Canada will be making available a curriculum program targeting Transit drivers. The program is based on the City of Edmonton's Fuel Sense program, which was implemented in March 2001 and resulted in fuel consumption savings of 10% to 20% for all vehicles types in the City's fleet. The first component of Edmonton's Fuel Sense program was a 4-hour voluntary driver-training program and on-road instruction. Program could be implemented in partnership with YG.	Maintenance & Safety Dept., Eng. & Env. Dept.
<b>VF.3</b>	Research Feasibility and Cost/Benefit of Alternative Fuels	Research the availability and feasibility of various alternative fuels including ethanol blended gasoline and diesel, bio-diesel, hydrogen, and propane. Pilot the use of viable alternatives.	Eng. & Env. Dept.
<b>STRATEGY II</b>			
Reduce the need for fleet vehicles.			
<b>VF.4</b>	Purchase Bicycle Fleet for Employees	Research the interest of a bicycle fleet for City employees. Determine what the needs of interested employees and determine the best style of bike. Include secure parking facilities, cycling accessories (bike helmet, lights, lock, outerwear) and incentive program.	Eng. & Env. Dept., Green Team

**2.3.2 Recommendations- Vehicle Fleet**

The following two actions, from the four listed above, are recommended for implementation as part of the three-year plan:

- VF.1 Develop Anti-Idling Campaign
- VF.4 Purchase Bicycle Fleet for Employees

These actions are generally low cost and can be implemented by the Engineering and Environmental Services Department in consultation with City employees.

**2.4 Water & Sewage**

**Figure 3** in **section 1.2.2** shows that in 2001 the water & sewage sector was responsible for 9% of City GHG emissions.

In the current 2003-2006 capital budget, a number of projects are listed that have the potential to reduce energy and/or reduce volume of water pumped. These projects include:

- Installation of Ground Temperature Monitoring Stations
- Rehabilitation of Warm Water Wells
- Lift Station Upgrades
- Pumphouse and Re-circulation Station Upgrades
- Watermain Improvements – City Wide
- Wet Well Upgrades

**2.4.1 Ideas for Actions**

The following table lists two strategies and their corresponding actions for energy and GHG emission reductions for the water & sewage systems (WS).

Ref #	Action	Details	Lead (Person, Dept, Org.)
<p><b>STRATEGY I</b> Reduce water &amp; sewage pumping volumes of potable water, storm water, and sewage systems. This strategy has multiple benefits including reducing energy consumption and reducing the supply requirements of a new infrastructure (e.g. water treatment facility).</p>			
WS.1	Research Feasibility and Cost/Benefit of Residential Water Metering Program	Investigate a citywide residential water-metering program. Metering infrastructure would be required because only portions of residential units in town are equipped with water meters. A user pay system would encourage the conservation of water.	Eng. & Env. Dept.

Local Action Plan (LAP) Report

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Lead (Person, Dept, Org.)</b>
<b>WS.2</b>	Expand Conservation Awareness Campaign	Expand water conservation education campaign for residential users.	Eng. & Env. Dept.
<b>WS.3</b>	Expand Leak Detection Work and Repairs on Water Distribution System	Provide additional human resources to Public Works Utilities division to perform a more comprehensive leak detection program while doing other monitoring and regular maintenance programs like uni-directional flushing program, hydrant flushing & winterization, sewer vactoring, and valve exercising.	Public Works Dept.
<b>WS.4</b>	Prepare Utility Bill Notice	Place notice in utility bill informing asking homeowners for their assistance in detecting leaks in the distribution system. This was done a few years ago and the City apparently had in an increase in service repairs as a result.	Eng. & Env. Dept.
<b>WS.5</b>	Identify Work Plans from 2002 Investigations	In 1995, the City of Whitehorse conducted manhole inspections and flow measurements to determine sewage main infiltration. In 2002, more detailed investigations using cameras were conducted on specific areas highlighted in the 1995 inspections.  Complete a thorough review of the camera footage work to identify specific leaks and plan for upgrades.	Public Works Dept., Eng. & Env. Dept.
<b>STRATEGY II</b>			
Increase energy efficiency of new and existing facilities.			
<b>WS.6</b>	Review Energy Efficient Options for New Water Treatment Plant	Explore low energy options for proposed water treatment plant. Apply to GMEF to complete a preliminary study on energy implications of various types of water supply / treatment options. Currently there are numerous Canadian municipalities evaluating energy efficient options for new water treatment plants.	Eng. & Env. Dept.
<b>WS.7</b>	Review SCADA as an Energy Management Tool	Six months after the SCADA (Supervisory Control and Data Acquisition) contract is complete, review and implement SCADA as an energy management tool. SCADA is already in effect in some pressure zones (e.g., Hamilton and Valley View), and feasibility of implementing in remaining zones, as well as SCADA's effectiveness in other applications, should be determined.	Public Works Dept., Eng. & Env. Dept.
<b>WS.8</b>	Investigate Feasibility of Installing Duty Pumps	Investigate the feasibility of installing duty pumps when upgrading lift stations and pump houses. Duty pumps are smaller pumps that run longer and consume less energy when supplying non-peak flows.	Public Works Dept., Eng. & Env. Dept.
<b>WS.9</b>	Continue Upgrades to Water & Sewage Building Facilities	Continue with the upgrade of building envelopes and heating systems. The 1999 Pumphouse and Lift Station Audit recommended upgrades to building envelopes and heating systems. Some of the recommendations have been implemented.	Public Works Dept.

Ref #	Action	Details	Lead (Person, Dept, Org.)
WS.10	Create Water & Sewage Energy Management Plan	Create a water & sewage system energy management plan for prioritization of capital funding for station modifications and upgrades. Track changes to monitor and verify energy savings.	Public Works Dept.

### 2.4.2 Recommendation – Water & Sewage

The following actions are recommended for completion during the first three years of the action plan implementation. Action WS.1 aims to develop a program to encourage residents to conserve water. WS.4 is a low-cost method of distributing water conservation tips. WS.6 and WS.7 suggest the review of energy conservation initiatives, and WS.9 recommends upgrades to existing infrastructure.

- WS.1 Research Feasibility and Cost/Benefit of Residential Water Metering Program
- WS.4 Prepare Utility Bill Notice
- WS.6 Review Energy Efficient Options for New Water Treatment Plant
- WS.7 Review SCADA as an Energy Management Tool
- WS.9 Continue Upgrades to Water & Sewage Building Facilities

### 2.5 City Monitoring and Reporting

Specific measures taken to reduce energy consumption are currently not well documented nor monitored to verify cost savings and energy reductions. Monitoring is an essential step in the success of implementing the LAP because it allows for the verification of emissions and energy reduction, and enables further prioritization of strategies as the implementation of the action plan evolves. As well, monitoring is necessary to evaluate if, and when City targets are met, and to verify cost savings.

Monitoring and verification of GHG emission levels and subsequent reductions require resources to collect and process data. The tracking of other important variables that influence emissions can be time consuming. Examples of variables include hours of operation of buildings and level of service provided to community. Sharing of resources and the collection of easily attainable information would allow for greater monitoring and verification.

Reporting is key to the LAP’s success because it generates awareness of the City’s actions to mitigate climate change and highlights the City’s environmental leadership. One method for publicizing the City’s LAP is through the free Challenge Registry, operated by Voluntary Challenge and Registry Inc (VCR).

The table below lists initiatives to improve City operations monitoring and reporting of GHG emissions and reduction initiatives.

**2.5.1 Ideas for Actions**

Ref #	Action	Details	Lead (Person, Dept, Org.)
<b>STRATEGY I</b>			
Improve the monitoring of energy data, indicators, and reduction initiatives.			
<b>M.1</b>	Submit Local Action Plan to the VCR	Submit the first Local Action Plan and subsequent updates of the Action plan to the Voluntary Challenge and Registry Inc (VCR) The VCR provides an inventory of actions planned and executed by the over 900 VCR participants, and will serve as an excellent tool to exchange information and share best practices.	Eng. & Env. Dept.
<b>M.2</b>	Develop Central Energy Database	Create a database that would be used to store and track City energy use. This database could involve information sharing with the current database used by ESC to monitor on the energy performance of YG Buildings. Summaries from this database could be produced quarterly, semi-annual, or annually, targeted for management and building operators and maintenance staff. To help monitor the energy performance of buildings the following indicators should be collected: hours of occupation of administration buildings, hours and weeks of operation for recreational facilities, climatic data (heating degree days).	Eng. & Env. Dept.
<b>M.3</b>	Track Vehicle Odometer Readings and Fuel Consumption	On a monthly or quarterly basis record kilometres or hour logged by City vehicles. The data would be used to monitor fuel consumption rates for individual fleet vehicles. Data summaries could be included in the Annual City Report, with target setting for the upcoming year.	Equipment Maintenance Supervisor
<b>M.4</b>	Document Reduction Initiatives	Develop a system to document energy and emission reducing initiatives. Include the following information: the contact lead for the initiative, when it was implemented, estimated cost saving and energy reductions, cost, and other relevant information.	Eng. & Env. Dept.
<b>M.5</b>	Create Revolving Retrofit Fund	With money saved from actions implemented that reduce energy costs create a revolving retrofit fund that could be used to finance future energy saving initiatives.	Financial Services

**2.5.2 Recommendations – Monitoring and Reporting**

During the three years of implementation of the action plan, actions M.1, M.2, and M.3 are recommended for initiation. Action M.4 should be completed after adoption of the LAP by Council.

M.1      Develop Central Energy Database

M.2      Track Vehicle Odometer Readings and Fuel Consumption

- M.3 Document Reduction Initiatives
- M.4 Submit Local Action Plan to the Voluntary Challenge and Registry Inc.(VCR)

## 2.6 Implementation of the City Action Plan

As part of the development of this LAP report, an outline for a City Strategic Plan was created. The goal of the City Strategic Plan is to ensure that least cost actions are pursued, key stakeholders are engaged, funding opportunities are identified and taken advantage of, and City ownership and awareness of the LAP increases.

The outline for the CSP is as follows:

- Continue the City Steering Committee

Continue the City steering committee and expand the membership by inviting members of the City's Green Team, a representative from the Energy Solutions Centre and a representative from Yukon Government Energy, Mines & Resources.

- Develop Work Plans for Actions Selected for the Three-Year Plan

With assistance from the City steering committee, the Engineering and Environmental Services Department will develop work plans for actions in the Three-Year Plan and identify next steps. The work plans will include identification of funding opportunities. **Appendix G** lists potential funding sources.

- Update Local Action Plan

The Local Action Plan should be continually updated as funding opportunities and partnerships emerge, and as new technologies are developed or become cost-effective.



## 3.0 COMMUNITY ACTION PLAN

### 3.1 Background

**Figure 1** in **section 1.2.1** shows that a significant percentage (98.1%) of GHG emission levels in the City of the Whitehorse are derived from community-based sources, with the remaining portion derived from City sources. It would follow then that the greatest reduction potential would be met through community-wide actions. As described in **section 1.1**, a committee was established to develop the Community Action Plan. This Committee:

- Identified issues and barriers to lowering GHG emissions
- Identified strategies and actions geared towards addressing issues and barriers to lowering GHG emissions
- Identified potential partnerships and funding opportunities

The tables in the following sections include actions that adequately meet the following criteria developed by the steering committee:

- City of Whitehorse Support
- Stakeholder Support
- Energy and GHG Reduction Potential
- Co-benefits Generating Potential
- Measurability of Energy / Emission Reduction
- Awareness Generating Potential
- Level of Innovation / Leadership

The Steering Committee classified the actions as educational; operational; or policy; which are defined by:

**Educational actions** create awareness in the public, stakeholders and/or government on the benefits of taking action to reduce GHG emissions. Two education examples are: tire inflation clinics and anti-idling campaigns.

**Operational actions** focus on on-the-ground practices and procedures including, transit schedules and routes, and snow-ploughing procedures. Examples of these procedures include: a web-based carpooling system and bikes or researching the feasibility of an institutional/commercial building retrofit program.

**Policy actions** change a City or other government policy, bylaw or procedure, such as a zoning bylaw. The 2002 Official Community Plan includes growth management policies that can be used as a guide for implementing LAP actions.

A benefit of classifying the actions under one or more of these headings was to assist in presenting actions of each type. Implementation of a variety of actions that may affect the planning process to community behaviour is key to bringing about the greatest reduction in GHG emissions at the community level.

Included in the action tables are partnership opportunities, such as the 2007 Winter Games, existing YG, YHC, and ESC programs, neighbourhood associations, among

others. Athlete accommodations during the Winter Games will be required, and the Games could provide an opportunity to build energy efficient housing units to be occupied by local residents after the Games. Another opportunity to implement proposed actions is through the Zoning Bylaw review, which is scheduled for this year.

Rather than provide a numerical ranking for each initiative, a number of actions, considered highly feasible to initiate in the next three years, are highlighted below. These actions were selected as part of a “Three-Year Plan” because of their high potential to reduce GHG emissions, high public acceptance, high chance of success, and encompassing of City and community targets. Although capital costs and payback period were not specifically determined for each action, the actions identified in the three-year plan have high potential for outside funding and partnerships, which would reduce costs and payback period, as well as increasing the likelihood of their success. Implementation of the LAP would be initiated by developing work plans for these actions.

More comprehensive feasibility studies are recommended for the remaining actions.

Actions are described in tables under the following sections:

- Section 3.2 Residential Buildings
- Section 3.3 Institutional/ Commercial Buildings
- Section 3.4 Transportation
- Section 3.5 Land Use
- Section 3.6 Waste

### **3.2 Residential Buildings**

The current climate in the City of Whitehorse towards accepting and implementing GHG emission reduction strategies is promising. The Yukon is equipped with well-trained builders that have been rated by Canadian Home Builders Association as the best in Canada, as well; R2000 is a mandatory part of Yukon College carpentry course. In Whitehorse alone, there are five trained energy advisors.

The City is staffed with Building Inspectors who provide an important front-line contact with builders and renovators, and they are receptive to alternative designs. This interest in climate change impacts, and co-benefits of reducing GHG emissions is also reflective of the City population as a whole. This is demonstrated by the number of successful residential programs that have operated or are now complete in the City and the Yukon, including:

- Northern Climate Exchange education programs and website
- Power Smart (YECL)
- House Calls – (YCS)
- Green Mortgages (YHC)
- Domestic Hot Water Timer Project (ESC)
- Residential Energy Management Program (YDC)
- EnerGuide for Houses (YHC)

- Home Retrofit Program (YHC)
- Consumer Training Courses (YHC)
- Heating Stove Haul out Program (YECL)
- Burn it Right Training Courses (ESC and City of Whitehorse)

As well as encouraging energy efficiency in new residences, there is a need to facilitate upgrading of old building stock in the City of Whitehorse. This could lead to significant savings in heating costs. Actions in the following table address both issues.

### 3.2.1 Ideas for Action

The following table lists three strategies and their corresponding actions for reducing GHG emissions derived from residential buildings. **Appendix H** lists additional actions that have been used in other communities; however, their feasibility in the City of Whitehorse is still to be determined.

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
<i>STRATEGY I</i>					
Increase use of renewable energy (e.g., wind, solar, passive solar, geothermal, bio-mass) and alternative design (e.g., straw bale construction, passive ventilation), and energy efficiency of new homes.					
R.1	Implement EnerGuide Program on all New Residential Buildings	<p>Voluntary EnerGuide Audits are the first step in a three-step process. The implementation of subsequent steps would depend on a thorough review of the success of Step 1.</p> <p><b>Step 1. Voluntary EnerGuide Audits</b></p> <p>Provide all building permit applicants with the services of a trained energy advisor</p> <p>Strive to have two stages of review (pre and post-construction)</p> <p>Provide information on funding opportunities for implementing retrofits (e.g., YHC Green Mortgage Program). <b>This phase is proposed to begin March, 2004.</b></p>	Step 1. E	Step 1. Building Inspection Dept.	YHC, YG, NRCan, local residential building contractors, local realtors

Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
R.1	Implement EnerGuide Program on all New Residential Buildings	<p><b>Step 2. Mandatory EnerGuide Audits</b>                      Similar process to Step 1 although success of Step 2 is dependent on strong partnership among stakeholders (e.g., industry, government, public)</p> <p><b>Step 3. Adopt Energy Standards for New Residential Buildings</b>                      Develop standards in collaboration with partners                      Examples of standards include:                      Minimum EnerGuide Rating                      MNECB (Model National Energy Code for Buildings)                      Provide education of benefits through implementation of Steps 1 and 2 with goal of creating desire for Standards                      Energy Standards would need to be passed at the territorial level through the Building Standards Act and administered Yukon-wide</p>	Step 2. E, P Step 3. P	Lead may change for Steps 2 and 3	YHC, YG, NRCan, local residential building contractors, local realtors
R.2	Increase Energy Efficiency Training for City Building Inspectors	<p>Through increased training, City Building Inspectors could provide more energy related and healthy home information to developers and home owners</p> <p>As front-line contact during the building process, there is the potential for this information to result in on-the-ground changes.</p>	E	Building Inspection Dept.	ESC
R.3	Create an Energy Advisor Position within Building Inspection Department	<p>Energy advisor would review building plans and make recommendations for energy saving opportunities</p> <p>YHC and NRCan are potential partners to finance this position.</p> <p><b>An in-house auditor will be available as of March, 2004.</b></p>	E/O	Building Inspection Dept.	YHC, ESC NRCan
R.4	Coordinate Tour of Existing Energy Efficient Homes	Highlight success stories of Yukon energy efficient homes by coordinating a tour of existing homes	E	Eng & Env Dept.	YHC, YECL, ESC

Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept., Org.)	Partners
R.5	Distribute Educational Material at City Offices	Display information material in pamphlet format of existing programs at front offices of Building Inspection, planning, and Bylaw offices. Most information is already available through Yukon Housing Corporation and Energy Solutions Centre; however, key documents could be made available in City offices, and requests for further information could be directed to YHC or ESC. <b>This is currently being done.</b>	E	Eng & Env Dept.	YHC, YECL, ESC
R.6	Implement Incentive Program for Home-builders who meet EnerGuide Standards	Reduce building permit costs for homes that meet standards. Research incentive opportunities.	P	Building Inspection Dept.	YHC
R.7	Participate in Analysis of the State of Energy Efficiency of New Houses Built by Contractors	Work with local building contractors to evaluate the energy efficiency of stock of new homes being built. EnerGuide for houses would be measurement tool.  This program is currently championed by YHC; the City is seen as a major stakeholder and would benefit through involvement in the program	E	Building Inspection Dept.	YHC NRCan, residential building contractors, realtors
<b>STRATEGY II</b>					
Increase energy efficiency of existing residential dwellings through innovative communication.					
R.8	Support a "Winter Works Weekend" each Fall	Promote the winterization of homes for winter one weekend every fall Work with home building centres to develop information displays and packages, promotional programs, sales and discounts ( <b>this will be done as part of YCS's 2004 Challenge competition</b> ) Could target specific neighbourhoods	E	Eng & Env Dept., NCE	YCS, Canadian Tire, Home Hardware etc.

Local Action Plan (LAP) Report

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Type of Initiative</b>	<b>Lead (Person, Dept, Org.)</b>	<b>Partners</b>
<b>R.9</b>	Collect and Develop Information Pamphlets for City Utility Bills	Collect existing and develop additional information brochures to be included in the quarterly City utility bills. Examples of ideas include:  Green Mortgage program and EnerGuide for houses through YHC, alternative transportation ideas, water conservation ideas, simple ideas to reduce energy bills, oil furnace maintenance guide, wood burning best practices, fall winterization of homes	E	Eng & Env Dept.	YHC, ESC
<b>R.10</b>	Coordinate "Brown Bag" Information Series on Green Housing	Noon hour presentations and information sessions could highlight specific ideas and examples of green housing	E	Eng & Env Dept.	YHC, ESC
<b>R.11</b>	House Visits to Make On-site Improvements	Expand the reach of the successful House Calls program.  Program could use community-based social marketing techniques, i.e., prompts to promote behavior (e.g., decal on light switch to prompt that lights be turned off when room is vacant)	E	Eng & Env Dept.	YHC, ESC
<b>R.12</b>	Explore Expansion of Home Retrofit Funding Program	Current YHC programs - Home Repair and Green Mortgage support retrofits.  Natural Resources Canada has recently started an EnerGuide for Houses grant program.	P	Eng & Env Dept.; Building Inspection Dept.	YHC
<b>STRATEGY III</b>					
Encourage efficient, clean and safe burning of wood in existing and new homes.					
<b>R.13</b>	Provide "WETT Certified" Wood Stove Inspections	Providing WETT certificates would ease insurance costs for people who burn biomass.  City should encourage the proper burning of wood, through consistent messaging.  A number of City inspectors are WETT certified already.	E/O	Building Inspection Dept.	Eng. & Env. Dept

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
R.14	Provide Incentive to Remove Non-EPA Standard Stoves in Existing Homes	Restart wood stove haul out program that was originally carried out by YDC/ESC Goal is to remove stoves that have poor efficiency ratings and replace with EPA stoves, not oil Benefits include: increased safety, improved air quality, more efficient	P	Eng. & Env. Dept	YDC, ESC

### 3.2.2 Recommendations – Residential Buildings

The Steering Committee identified three actions out of the fourteen listed in the table above. These three actions are recommended for the Three-Year Plan, and are considered feasible for the City of Whitehorse to implement without conducting further analysis of GHG reduction potential and cost-benefit. The three actions were highlighted because they can be initiated in the short-term more effectively than the remaining proposed actions. In the case of R.1, R.2 and R.8, there have been informal commitments to form partnerships. The Steering Committee proposes developing work plans as an initiation step to implementing the LAP for the following actions:

- R.1 Step 1 of the EnerGuide Program for all new residential buildings is comprised of Voluntary EnerGuide audits. **(this is proposed to begin March 2004)**
- R.2 Increase Energy Efficiency Training for City Building Inspectors
- R.8 Support a “Winter Works Weekend” each Fall

### 3.3 Institutional and Commercial Buildings

#### Background

As discussed in **section 3.2**, there is a local building community of architects, engineers, and trades people that are knowledgeable of energy efficiency practices, and that are generally supportive of energy standards. However, there are limited examples of model buildings in the Yukon that reflect these energy efficiency principles, which include:

- Mayo School
- Yukon Energy Corporation (YEC)
- Yukon Honda
- Ricky’s Restaurant

There are a number of local, regional, and national programs that provide incentives for achieving higher energy efficiency levels. The Commercial Building Incentive Program (CBIP) is offered through NRCan’s Office of Energy Efficiency, and provides financial incentives to offset the increased costs of designing a more energy-efficient building. The

CBIP grant is awarded when there is a 25% or greater performance. Under the Climate Change Action Plan, the Federal Government for all new federal buildings has now adopted this CBIP standard. The Mayo School and YEC are both recipients of a CBIP grant, while Yukon Honda and Ricky's Restaurant are in the application process.

YG has adopted design standards for their facilities that when built are estimated to perform 15-20% more efficiently than if built to the Model National Energy Code for Building (MNECB) standards. Under the Climate Change Action Plan, the Federal Government for all new federal buildings has now adopted this CBIP standard.

ESC provides free commercial energy auditing services (replaced the Commercial Energy Management Program, CEMP) to evaluate significant retrofits. This service is funded by YEDC.

ESC coordinated a Green Building Competition in 2002, to build a "green" Visual Arts Centre. The competition raised awareness in the professional and general community about green design. The competition winners are currently exploring funding opportunities to construct their designs. Another program initiated and coordinated by ESC is the ground source heat pumps study that is looking to implement pilot projects at Vanier School and Yukon Honda.

The actions that are described in the following table came out of an examination of the issues and barriers that currently limit reducing GHG emission in the commercial sector. Some of these challenges are listed below:

- Commercial building owners have a limited appetite for long-term payback periods for energy efficient components / design and upgrades
- Franchise Operations that have National offices set standards for building design that are inappropriate for northern conditions, and local designers are excluded in the design process. Design Build Contracts, where builders have no incentive to consider life cycle analysis
- Commercial building development usually follows a boom/bust cycle, which can cause ad hoc planning and construction
- Building owners in the Tourism industry (e.g., hotels) are not eligible for bank financing for energy upgrades and retrofits despite clear financial benefits

The City is currently undertaking a Zoning Bylaw review to reflect the policies of the new OCP (2002a). As described in the actions below, there a number of opportunities where bylaw changes could encourage GHG emission reduction in this sector.

### 3.3.1 Ideas for Action

The following table describes actions that could reduce GHG emissions generated from institutional/commercial buildings. **Appendix H** includes actions that have been implemented in other communities; however, their feasibility in the City of Whitehorse is still to be determined.



Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
<b>STRATEGY I</b>					
Increase energy efficiency of new institutional/commercial (IC) buildings.					
C.1	Evaluate Survey Results and Research Feasibility of Implementing Energy Standards	<p>ESC recently completed a survey of energy performance of IC buildings constructed in the last 10 years. The survey compares energy performance of buildings to the MNECB.</p> <p>Work with ESC to review results of the survey and to consider energy standards for IC buildings. They would have to be set at the territorial level, potentially through the Building Standards Act. City of Whitehorse is an important partner because Building Inspections would be the enforcing body for buildings constructed in Whitehorse.</p>	P	Building Inspection Dept.	ESC, City Building Inspection Dept.
C.2	Implement Commissioning Requirement	<p>Before the occupancy permit is given, a certificate demonstrating that the building has been commissioned would need to be provided by the developer/ owner.</p> <p>Implement a requirement that owners must provide a building operating manual for building staff and/or occupants.</p>	P	Building Inspection Dept.	ESC, local architects
<b>STRATEGY II</b>					
Increase energy efficiency of existing IC buildings.					
C.3	Develop Commercial Energy Watch Program	<p>Promote good practices for maintenance and operation of IC buildings.</p> <p>Work with owners and staff in buildings; could identify an individual “Energy Watch” person at each building to liaise with.</p> <p>Develop information packages and promote the implementation of program with incentives. Include in package:</p> <ul style="list-style-type: none"> <li>List of annual checks</li> <li>Prompts for building users</li> <li>Educational material for building users</li> </ul>	E	Eng & Env Dept.	NEC
C.4	Organize Annual Tour of Good Practices and Good Design of IC Buildings	The Yukon Energy Corporation building, Yukon Honda, and Workers Compensation Board building are a few examples	E	Eng & Env Dept	ESC

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
C.5	Research Feasibility and Cost/Benefit of IC Building Retrofit Program	Research financing options that will offer incentives to building owners to undertake energy retrofits Currently ESC offers 100% for commercial energy audits through the Commercial Energy Auditing Services program	O	Eng & Env Dept	YG, City, Federal Govt., Financial Sector, AYC

### 3.3.2 Recommendations – Institutional and Commercial Buildings

The two actions proposed for the Three-Year Plan are:

- C.1 Evaluate Survey Results and Research Feasibility of Implementing Energy Standards
- C.3 Develop Commercial Energy Watch Program.

These actions are considered to be highly feasible, with identified partnerships, and, particularly in the case of Action C.3, have GHG reduction potential in the short-term. The remaining four actions are not lower in priority; however, they do require further study to identify cost-benefits, funding opportunities, and partnerships.

### 3.4 Transportation

The City of Whitehorse is the primary provider of local transportation services. These services include road maintenance, transit, and development of local road infrastructure. As well, the City controls land use planning through the OCP. As such, the City of Whitehorse is positioned to take the lead in the reduction of Whitehorse’s transportation emissions.

From a financial point of view, 25% of the 2002 citizen’s tax dollars was spent on transportation services. With this portion of the City’s budget being allocated to transportation, it is prudent to ensure that the citizens are getting the maximum benefit for the money spent.

#### Development of Transportation Initiatives

The GHG reduction actions included in this report were predominantly derived from the following recent planning processes:

- **2002 City-wide Transportation Study** – Being completed by UMA, this study looked at Whitehorse’s broad transportation network. Three open houses were held in conjunction with this study.
- **Whitehorse Moves Community Transportation Design Workshop** – Held in October 2002, this workshop brought together citizens, elected leaders, City staff, transportation and planning consultants, and business leaders to...

*...create transportation solutions for the downtown core that would lead toward a strong, stable, sustainable future, help reduce ambient air pollution and continue to encourage a thriving business centre*  
(City of Whitehorse, 2002)

- **Urban Transportation Showcase Program Proposal** – In March 2002, three workshops were held to generate ideas to include in the funding proposal to Transport Canada’s Urban Transportation Showcase Program. Discussions included infrastructure changes, the provision of services, and the education and outreach opportunities that would lead to a reduction in GHG emissions. A funding proposal was submitted to the Federal Government in May 2003.

There is a great deal of interest in using alternative fuels, such as fuel cells and bio-diesel, in particular for the Transit Fleet. However, feasibility studies conducted by ESC have determined that these fuels are currently not economical in the Yukon because of the lack of storage for hydrogen and the limited capacity to make bio-diesel.

### 3.4.1 Ideas for Action

The following table includes nine strategies with corresponding actions, derived from the three planning processes described above, as well as additional actions conceived by the Community Steering Committee. This transportation section has the most proposed actions, which is appropriate because of this sector’s significant GHG contribution. **Appendix H** lists further actions that require additional research to determine the feasibility of their application in the City of Whitehorse.

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
<b>STRATEGY I</b>					
Improve conditions for pedestrians and/or cyclists.					
T.1	Implement Alternative Modes Initiatives in <i>City of Whitehorse 2002 City-Wide Transportation Study</i>	Refer to Working Paper No.4 – Alternative Modes, Section 5.0 Bicycle Network Plan for the following initiatives:  <b>Creation of Bike Lanes on Downtown Streets</b> (4 <sup>th</sup> and 6 <sup>th</sup> Avenues)  <b>End-of-trip facilities for cyclists:</b> Secure parking for bikes, such as bike lockers on city property U-Lock Accepting Bike racks – targeted Sports & Recreation buildings Bike Locker Rentals in central downtown areas T1 continued on next page.	O	Eng & Env Dept	Cycling associations, RPAY

Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
T.1	Implement Alternative Modes Initiatives in <i>City of Whitehorse 2002 City-Wide Transportation Study</i>	Refer to Working Paper No.4 – Alternative Modes, Section 4.0 Pedestrian Network Plan <b>Targeted Sidewalk Development for:</b> Marwell 3 <sup>rd</sup> Ave. north of Strickland St. Black St. between 1 <sup>st</sup> & 8 <sup>th</sup> Ave Quartz Ave. Lewes Blvd. 6 <sup>th</sup> Ave.	O	Eng & Env Dept	Cycling associations, RPAY
T.2	Improve Robert Campbell Bridge	Improvements to the Bridge are suggested in the <i>City of Whitehorse 2002 City-Wide Transportation Study</i> Working Paper No.4 – Alternative Modes, Section 5.0 Bicycle Network Plan; however, more specific improvements are suggested here: Ensure snow windrows do not develop on right hand side of bridge lane Traffic calm bridge Review infrastructure changes for improving cycling facilities while avoiding cyclist / pedestrian conflicts and considering differing needs of cyclists (adult vs. children). Options include: A. Cantilever two bike lanes from existing bridge B. Implement “Do not pass bikes” zone along existing bridge lanes C. Move existing barrier towards middle of bridge to provide wider shared pedestrian / cyclist path	O	Eng & Env Dept	Cycling Assoc., RPAY
<b>STRATEGY II</b> Improvements to Transit Service - Better transit is a better community.					
T.3	Implement Transit Initiatives in <i>City of Whitehorse 2002 City-Wide Transportation Study</i>	<b>Subsidized transit passes</b> Secure funding revenue for the system, sell passes in bulk to employers Group Pass Purchases by Employers / Groups  T3 continued on next page.	O	Transit Dept., Eng & Env Dept	YG Tourism YG Dept. of Education Major Employers College Hospital Chamber of Commerce

Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
T.3	Implement Transit Initiatives in <i>City of Whitehorse 2002 City-Wide Transportation Study</i>	<p>Refer to Working Paper No.4 – Alternative Modes, Section 7.0 Recommendations for Alternative Modes</p> <p><b>Development of Bus Shelters</b></p> <p>Development of site / neighbourhood specific bus stops</p> <p>Bus shelters, possibly connected to buildings</p> <p>Simple wind breaks and/or bench could be used in some locations</p> <p>Refer to Working Paper No.4 – Alternative Modes, Section 6.1 Transit-Supportive Measures</p> <p><b>Partnership with School Board Administration</b></p> <p>Examine concept of using public transit to bus high school students.</p> <p>Refer to Working Paper No.4 – Alternative Modes, Section 6.1 Transit-Supportive Measures</p>	O	Transit Dept., Eng & Env Dept	<p>Community groups/city/ youth associations for bus shelter/ bench construction Skills Yukon/ high school carpentry shops, arts groups First Nations</p> <p>School Board YG Dept. of Education</p>
T.4	Establish a Heated Transfer Station	<p>Developing a Transfer Station is suggested in the <i>City of Whitehorse 2002 City-Wide Transportation Study</i></p> <p>Working Paper No.4 – Alternative Modes, Section 6.1 Transit-Supportive Measures; however, specific design characteristics are suggested here:</p> <p>Develop centralized, heated, well lit, serviced transfer point as part of existing commercial or public infrastructure</p>	O	Transit	Local businesses
T.5	Offer Incentives for Transit Pass Holders	Work with Downtown businesses (most likely those concerned with parking) and encourage them to offer discounts to transit pass holders	E	Transit	Chamber of Commerce, MSY (Main Street Yukon Society)

Local Action Plan (LAP) Report

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Type of Initiative</b>	<b>Lead (Person, Dept, Org.)</b>	<b>Partners</b>
<b>T.6</b>	Address Scheduling Anomalies and Provide Better Schedule Info	Orientation of first time riders Public consultation to provide input into scheduling Move from 35 min to 30 min increments Post route and schedules at the stops or in public areas Correlate public service that's appropriate to public need on the basis of geography Target high density areas Consider social and economic factors as well Bus stops outside youth centres	O	Transit Dept., Eng & Env Dept	Community Assoc., First Nations, Youth organizations
<b>T.7</b>	Combine Transit with Multiple Strategies	Integration between transit/biking Promote Bike/bus trips with bike racks on buses Ensure proper yearly maintenance of bike racks on the front of every bus Handi-bus options Taxi companies with wheel-chair accessible vehicles, subsidize retrofits	E/O	Transit Dept., Eng & Env Dept	Lions club or other service clubs, Health related (e.g. Diabetes) partnerships, cycling associations
<b>T.8</b>	Improve Downtown Trolley Service	Regulate trolley schedule Advertise trolley and develop route map and schedule that links the trolley with existing bus schedule Advertise trolley/bus schedules wherever tourist information is offered Research feasibility of tourist bus pass	O	Transit Dept., Eng & Env Dept	YG Tourism
<b>T.9</b>	Use Positive Testimonials	Promote use of transit and active transportation by highlighting success stories of local politicians and community leaders who choose sustainable transportation. Challenge others to follow.	E	Eng & Env Dept	City Council, YG Executive Office
<b>T.10</b>	Develop Trip Planning Website	Develop a website that would assist transit users in trip planning.	E	Information Systems Dept.	Transit Dept.

Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
T.11	Review Feasibility and Cost/Benefit of Smaller Buses	Review feasibility of acquiring smaller buses (i.e., cost savings, etc.)	O	Transit Dept.	Eng & Env Dept
T.12	Provide Free Transit for Clean Air Day	Provide free transit service for Clean Air Day (CAD). CAD occurs on first Wednesday of June, and coincides with the Commuter Challenge. CAD was proclaimed by the Government of Canada to increase public awareness and action on two key environmental priorities, clean air and climate change. Free transit was approved by City Council for Clean Air Day 2003 and resulted in a 25% increase in ridership on that day.	O	Transit Dept.	Eng & Env Dept, RPAY
T.13	Promote Transit through Ticket Give-aways	Promote use of transit by rewarding current users and encouraging new users through ticket give-away programs, e.g. free ticket with every 10 transfers	O	Transit Dept.	Eng & Env Dept
<b>STRATEGY III</b>					
Develop and maintain a trail network to connect neighbourhoods to each other and to downtown.					
T.14	Develop Trails	Trail links are suggested in the <i>City of Whitehorse 2002 City-Wide Transportation Study Working Paper No.4 – Alternative Modes, Section 7.0 Recommendations for Alternative Modes</i> ; however, additional trails are suggested here: As recommended in the Transportation Showcase (REF): <b>Phase I:</b> Black Street Gulch and Airport Trail to Hillcrest / Granger <b>Phase II:</b> Porter Creek and Takhini / College Takhini and Marwell	O	Parks & Rec Dept	Eng & Env Dept, Community Assoc., Airport, Escarpment Parks Society, Cycling associations

Local Action Plan (LAP) Report

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Type of Initiative</b>	<b>Lead (Person, Dept, Org.)</b>	<b>Partners</b>
<b>T.15</b>	Improve Trail Amenities and Safety Features	Provide benches and rest opportunities Maps and Signage Review lighting options for trails and paths with solar charged lighting Provide solar-charged 911 emergency cellular 'blue phones' as in Edmonton.	O	Parks & Rec Dept	Eng & Env Dept
<b>STRATEGY IV</b>					
Encourage safe alternative transportation through education and awareness activities. Information should be available in French, German, and use NEDA for education programming in YFN languages.					
<b>T.16</b>	Organize Anti-idling Campaign	Work with employers, schools, daycares and downtown property owners to establish anti-idling zones. Idling education for bus drivers. A good example in Yellowknife. Template of signs Pamphlets and scrapers are distributed by kids (Possible Canadian Tire Sponsorship) Distribute fake traffic violation tickets for idling vehicles. Neighbourhood Anti-idling Zones Work with neighbourhoods to develop anti-idling neighbourhoods where residents would be encouraged not to idle their vehicles Information could be mailed out, Public service announcements on TV, buses, reminders to Intranets	E	Eng & Env Dept.	City, YG, Federal Govt., Health related partnerships, NEC
<b>T.17</b>	Hold Tire Pressure Clinics	Post signs at gas stations prompting to check their tire pressure Supply tire gauges to organizations doing car washes Partner with auto-repair shops and tire shops Educational for both the vehicle owners and youth, gas station owners/staff, and suppliers	E	Eng & Env Dept	YG Env Dept, NCE, Youth, gas stations, car washes



Local Action Plan (LAP) Report

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Type of Initiative</b>	<b>Lead (Person, Dept, Org.)</b>	<b>Partners</b>
<b>T.18</b>	Develop Distribute Education Material for Cyclists	As trails, bike lanes, and other alternative transportation infrastructure is developed advertise through use of: Posters, small ads, pamphlets Cycling route maps Highlight high-risk areas and bicycle friendly corridors and facilities.	E	Parks & Rec Dept	City, local bicycle stores, Cycling Associations
<b>T.19</b>	Hold Pedestrian / Cyclist Workshops	Examples: Can Bike Course – Can. Cycling Association Winter Riding Workshop – early October, in partnership with private sector Easy repair on your bike Winter walking / dressing workshop	E	Parks & Rec Dept	Cycling Assoc., Local Bike Stores, RPAY
<b>T.20</b>	Improve Driver Education	Add into driver training publication or classes improved cyclist/pedestrian awareness Youth education is key to affecting habits later in life (i.e., break the habit early) Implement a voluntary driver-training program that will give drivers the skills to improve their driving habits in order to reduce fuel consumption and environmental emissions.	E	YG Motor Vehicles Branch	Eng & Env Dept, Driving Schools
<b>T.21</b>	Participate in the Commuter Challenge	Participate in, and provide financial support to coordinate the annual Commuter Challenge that is held during the first week of June. In 2003, Engineering and Environment provided \$1000 and in-kind resources to RPAY to assist in the organization of the City-wide Commuter challenge	E/P	RPAY	Northern/ Yukon media
<b>T.22</b>	Organize Transit Challenge	Coordinate a challenge for workplaces to encourage people to use the transit system. Run in November / December when there is less active transportation and greater likelihood of engine idling. Could track if there was an increase in revenue for the buses that week.	E	Eng & Env Dept	Transit Dept.
<b>T.23</b>	Organize Fuel Efficiency Awareness Campaign	Weighing station on weekends for large vehicles and truck/camper setups; distribute fuel economy calculators to general driving public	E	Eng & Env Dept	NCE

Local Action Plan (LAP) Report

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Type of Initiative</b>	<b>Lead (Person, Dept, Org.)</b>	<b>Partners</b>
<b>T.24</b>	Provide Incentives for Low/No Emission Vehicles	Advocate Federal Government	E	Eng & Env Dept	YCS
<b>T.25</b>	Research Feasibility and Cost/Benefit of Bio-diesel Fuel Project	Review Saskatoon's feasibility study on using bio-diesel. Explore long term economic feasibility of setting up local small-scale bio-diesel making plant. Possibly coordinate bio-diesel fuel making pilot project	E	Eng & Env Dept	Juneau AK project
<b>T.26</b>	Increase Frequency of Road Speed Signs	Increase frequency of "Your Speed is ___" campaigns in residential areas and downtown Ask YG to drop speed to 30km/h in built up areas Support police enforcement efforts	O	YG Motor Vehicles Branch	Community Assoc., RCMP
<b>STRATEGY V</b>					
Encourage ridesharing or minimizing trips.					
<b>T.27</b>	Implement Transportation Demand Management Initiatives in <i>City of Whitehorse 2002 City-Wide Transportation Study</i>	Refer to Working Paper No.4 – Alternative Modes, Refer to Section 7.6 Future Needs, which includes: City of Whitehorse Employee Trip Reduction Campaign Ride Matching service Incentive based program Guaranteed ride home Preferential parking for carpools Telecommuting Variable work hours, flexible dress Transportation allowances Parking management	E/O	Eng & Env Dept	Information Services Dept., major Employers and local businesses
<b>T.28</b>	Implement a Travel Smart Campaign	Implement a comprehensive trip reduction marketing campaign that uses established social marketing principles to decrease the use of single occupancy vehicles while promoting other transportation demand management (TDM) initiatives	E	Eng & Env Dept	Transit Dept.

Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
T.29	Implement a Phased Carpooling / Vanpooling Program	<p><b>Phase I:</b>                      Review YG study                      Target rural residential areas for carpooling                      Provide a web-based ride matching service and market car-pooling as an effective alternative to single occupancy vehicle use (local Intranets)                      Provide a column in one of or both of the papers listing interested car-pooling participants                      Educate employers on carpooling initiatives, including employer assistance in the program (preferred parking, flex-time, guaranteed ride home program, telecommuting)</p> <p><b>Phase II:</b>                      Assist community associations in piloting their own transportation (e.g., purchase of a community vehicle)                      Designate space (park 'n ride) for carpool parking (e.g. Carcross cutoff); coordinate with transit system                      Carpool shelters                      Carpooling initiatives targeted at sports groups (soccer, basketball, hockey, etc.) effect on team selections</p>	E/O	Eng & Env Dept	YG, local business, other City Depts., sports associations, youth associations
<p><b>STRATEGY VI</b>                      Encourage workplace-based initiatives.</p>					
T.30	Coordinate Downtown Business Bike Fleet	Coordinate the formation of a downtown businesses bike fleet. Bicycles recovered by RCMP could be used.	E	Chamber of Commerce, RPAY	City, local business, cycling associations, bicycle stores, RCMP
<p><b>STRATEGY VII</b>                      Economic Incentives to reduce individual car use.</p>					
T.31	Research Feasibility and Cost/Benefit of Transportation User Fee	Research the feasibility of a pilot project (Austin, Texas example), which includes a dedicated transportation tax and reduction for non-car users	P	YG	Walter and Duncan Gordon Foundation

Local Action Plan (LAP) Report

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Type of Initiative</b>	<b>Lead (Person, Dept, Org.)</b>	<b>Partners</b>
<b>STRATEGY VIII</b>					
Bylaw changes to change behaviour.					
<b>T.32</b>	Establish Anti-Idling Bylaw	Establish an anti-idling bylaw (time/temp. driven) for downtown or specific areas in downtown. Any vehicle found idling when the outside ambient temperature was greater than a set temperature, for example -20 degrees C, would be given a traffic fine or if found idling for more than 10 minutes	P	Bylaw Services Dept.	Eng & Env Dept
<b>T.33</b>	Require New Developments to Provide End Use Facilities	Require provision of secure bicycle parking facilities, showers, change areas/employer support Update zoning bylaw	O/P	Planning Dept.	Eng & Env Dept
<b>T.34</b>	Develop Flexible Parking Zoning Bylaw	Update parking zoning bylaw to allow for flexibility in parking requirements for new developments. Parking requirements should be based on site-specific demand studies that take into account local geographic and demographic factors, as well as access to public transportation network.	P	Planning Dept.	Eng & Env Dept
<b>STRATEGY IX</b>					
Development of a communication network.					
<b>T.35</b>	Form Cycling Advisory Group	Committee would work alongside engineering and operations on design, engineering and educational efforts to produce safer, cost-effective facilities for cyclists at a minimum cost.	E/O	Eng & Env Dept	N/a
<b>T.36</b>	Form Citizen Advisory Committee on Transit/ Alternative Transportation	Committee would advise transit department on the schedule changes and user needs Annual report with input from citizens on how city is increasing ridership, annual plan and targets	E/O	Transit, Dept. Eng & Env Dept	NoCuts
<b>T.37</b>	Coordinate Workshops, Speaker Series and Training Sessions	Increase the knowledge about traffic calming principles, road diets, affordable housing, smart growth principles, etc.	E	Eng & Env Dept	Yukon Science Institute

### 3.4.2 Recommendations - Transportation

Eight out of thirty-seven actions have been proposed for immediate implementation. As with the previous key actions, these were selected because of informal commitments to developing partnerships, funding opportunities, or immediate GHG reductions or co-benefits. The remaining thirty actions are not lower in priority; however, feasibility analyses are necessary prior to developing work plans. Work plans for the following eight actions should be developed as an initial step to implementing the LAP:

- T.14 Develop Trails - Phase I: Black Street Gulch and Airport Trail to Hillcrest
- T.16 Organize Anti-idling Campaign
- T.17 Hold Tire Pressure Clinics
- T.21 Participate in the Annual Commuter Challenge
- T.22 Organize Transit Challenge
- T.27 Implement Transportation Demand Management Initiatives outlined in *City of Whitehorse 2002 City-Wide Transportation Study*
- T.29 Implement Phase I of Carpooling / Vanpooling Program
- T.36 Form Citizen Advisory Committee on Transit/ Alternative Transportation to advise the City on Transportation Initiatives

### 3.5 Land Use Sector

Land use strategies were developed by the Steering Committee, using the 2002 Official Community Plan (OCP) growth management policies as a guide. Policies under the OCP goal of environmental sustainability encourage educational programs to assist in implementing natural energy alternatives for new development, as well as encouraging the implementation of GHG emission reduction and management strategies in general. These policies encourage redevelopment, infill, energy efficiency through building design, maintaining a vibrant downtown, and retrofitting existing buildings, and are reflected in the actions proposed below.

#### 3.5.1 Ideas for Action

This table includes six strategies and their associated actions that encompass multiple stakeholder groups, and as a result do not fit under the previous sections.

Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
<b>STRATEGY I</b>					
Encourage mixed-use development in downtown.					
LU.1	Change Zoning Bylaws to Encourage Residential Development	Currently, there are disincentives to develop residential units in Mixed Use Residential/ Commercial Areas in downtown  Reduce or remove setbacks limits for residential units, to allow developer to maximize footprint of the building	P	Planning Dept.	Affordability and Choice Today (ACT) Program
<b>STRATEGY II</b>					
Increase awareness of local sustainable development successes.					
LU.2	Develop Strategy to Conduct Public Education of "Smart Growth" Examples	Positive profiling, e.g. seniors housing developments,  Showcase local sustainable/multi-use/high density developments, e.g. North Takhini, Riverdale  Use local testimonials  Encourage dialogue between community associations  Highlight advantages of higher-density living	E	Planning Dept.	Community Associations
<b>STRATEGY III</b>					
Increase sustainability of existing neighbourhoods.					
LU.3	Encourage Higher Density	Emphasize multi-family developments in infill to increase density but minimize encroachment on green spaces  Consider the development of area specific design standards to complement existing neighbourhood character	P	Planning Dept.	Community Associations
LU.4	Remove Disincentives for Developing Secondary Suites in Existing Homes	Review zoning bylaws that restrict the development of secondary suites  Remove Development Cost Charge Fee (currently \$1,500) that is currently required to subdivide and create secondary suites	P	Planning Dept.	ACT, Community Associations

Local Action Plan (LAP) Report

<b>Ref #</b>	<b>Action</b>	<b>Details</b>	<b>Type of Initiative</b>	<b>Lead (Person, Dept, Org.)</b>	<b>Partners</b>
<b>LU.5</b>	Provide Financial Support for the Development of Neighbourhood Strategic Plans	<p>Guidelines for developing Neighbourhood Strategic Plans are in the 2002 OCP (Section 7.2 of the OCP)</p> <p>Neighbourhood strategic plans will provide residents with the organizational structure and planning framework to revitalize existing neighbourhoods.</p> <p>Revitalizing existing neighbourhoods will encourage homeowners to invest in energy retrofits for their properties instead of moving to new developments.</p> <p>Benefits include securing tax base, quality of life, diverse and safe neighbourhoods, affordable housing</p> <p>Evaluate impacts of new residential growth in existing neighbourhoods</p>	E/P	Planning Dept.	Community Associations
<b>LU.6</b>	Support District Heating System in Riverdale	<p>ESC is currently researching the resource potential of the Selkirk aquifer in the Riverdale neighbourhood</p> <p>City could prepare funding applications (e.g., FCM's Green Municipal Investment Fund)</p>	E	Eng & Env Dept	Planning Dept
<b>STRATEGY IV</b>					
Encourage sustainability of new neighbourhoods.					
<b>LU.7</b>	Include Energy Plans as part of Area Development Schemes	<p>Conduct analysis of density requirements and road network design that support economically sustainable transit route. (Practices for Sustainable Communities, CMHC, 2000)</p> <p>Carry out detailed analysis of lot layout and site planning to maximize solar gain.</p> <p>Evaluate feasibility of district energy systems.</p> <p>Ensure active transportation linkages between other neighbourhoods.</p> <p>Research alternative design standards to minimize costs associated with construction, operation, and maintenance of services.</p>	E/P	Planning Dept.	ESC

Local Action Plan (LAP) Report

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
<b>STRATEGY V</b>					
Increase community greening for the purposes of traffic calming, promoting community pride, improving aesthetics and air quality, providing summer shading and winter wind breaks, and carbon sequestration, among others.					
<b>LU.8</b>	Institute Landscape Award for Non-Residential Properties	New commercial and institutional properties are required to submit landscaping plans and refundable deposit as part of their development review process  Institute annual award to create awareness and incentives to meet and maintain landscape plans	O/E	Planning Dept.	Eng & Env Dept
<b>LU.9</b>	Review of Landscaping Standards	Ensure standards promote best practices for reducing GHG emissions, e.g., summer shading, winter wind breaks, green roofs, and increased infiltration of runoff  Set standards for the use of native species, or low maintenance/low water (“xeriscaping”) species  Addition of green perimeter requirements for new buildings/developments	E/P	Planning Dept.	Developers, Community Associations, Local Businesses
<b>LU.10</b>	Provide Greening Incentives for Non-Residential Properties	Reduce water rates if landscaping standards are followed  This includes apartment buildings, as well as commercial, and institutional buildings.	O	Planning Dept	Eng & Eng Dept
<b>LU.11</b>	Develop a Street Greening Plan for Whitehorse	Encourage the planting of indigenous species  Focus on urban areas of Whitehorse  Co-benefit of educating City staff  Vegetation would help mitigate emissions from vehicular traffic and buildings  Trees along streets provide a narrowing effect has the tendency to slow vehicular traffic down.  This could be associated with “streetscaping” initiative that includes benches, lighting, etc.	E/P	Planning Dept.	Escarpment Parks Society, DUGS



Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
<b>STRATEGY VI</b>					
Encourage use of public transportation at a residential level.					
LU.12	Encourage Adoption of Location Efficient Mortgages (LEMs)	<p>LEMs mean that lenders recognize the potential savings of a more accessible housing location when assessing a household's borrowing ability.</p> <p>LEM consider transportation and housing costs together, so vehicle cost savings are treated as additional income that can be spent on a mortgage.</p> <p>This gives homebuyers an added incentive to choose location efficient residences, and tends to encourage more infill development as opposed to more automobile-dependent development at the urban periphery (Hare, 1995; Goldstein, 1996; Hoeveler, 1997; Russo, 2001).</p> <p>LEMs tend to benefit lower-income households by providing financial savings and improving affordable transport and housing options.</p>	E/P	Eng & Env Dept	YHC

### 3.5.2 Recommendations – Land Use

Of the twelve actions proposed in the above table, four were highlighted by the Steering Committee for immediate implementation as part of the Three Year Plan. The following four actions were selected because of relative ease of initiation and City support:

- LU.1 Change Zoning Bylaws to Encourage Residential Development (in Mixed Use Residential/ Commercial Areas)
- LU.4 Remove Disincentives for Developing Secondary Suites in Existing Homes
- LU.5 Provide Financial Support for the Development of Neighbourhood Strategic Plans
- LU.8 Institute Landscape Award for Non-Residential Properties

### 3.6 Waste

Since the adoption of the first Solid Waste Action Plan (SWAP) the City of Whitehorse has undertaken initiatives to reduce the amount of waste going to the landfill. Some of

these initiatives include establishing a user-pay system at the landfill, implementing city-wide curb side collection program, and undertaking full cost accounting for the landfill.

**3.6.1 Ideas for Action**

This table includes three initiatives with the overall goal of reducing waste that enters the landfill; thereby reducing landfill-based greenhouse gas emissions.

Ref #	Action	Details	Type of Initiative	Lead (Person, Dept, Org.)	Partners
<b>STRATEGY I</b> Reduce waste that enters landfill.					
W.1	Implement Waste Reduction Policy for Decommissioning Buildings	Develop policy that mandates, where suitable, salvaging of used materials as part of all building decommissioning.  Currently, salvaging of old building material is standard practice when decommissioning City buildings.  Indirect energy savings when building material is diverted from the landfill and is re-used.	P	Eng & Env Dept	
W.2	Research Feasibility and Cost/Benefit of ICI Waste Collection System	Research feasibility of implementing a waste collection system for the Institutional/Commercial/Industrial (ICI) sector that can be tailored to the needs of specific businesses (varying types and volumes of waste streams) to divert more waste from the landfill. Possible waste collection streams include office paper, cardboard, plastics, composts, and garbage.  Consideration should include economics, health restrictions (particularly food service sector), and alleyway access.	O	Eng & Env Dept	
W.3	Review Options to Improve Free Store Facility	<b>Phase I:</b> Mandate facility operator to improve free store operations. (Moving free store to large bins has decreased salvaging of daily materials).  <b>Phase II:</b> Implement improvements to free store.  Construct facility to allow for greater diversion	E/O	Eng & Env Dept; Public Works	Raven Recycling

### **3.6.2 Recommendations – Waste**

The Steering Committee recommends that of the three actions listed above, that Phase I of W.3 Review Options to Improve Free Store be implemented as part of the Three Year Plan because of the low cost of implementation, and the high potential to redirect large disposal items.

### **3.7 Monitoring and Baseline Data Improvements**

As discussed in **section 2.4.3**, monitoring is an essential step in the success of implementing the LAP.

During the compilation of Whitehorse's community baseline data there was a lack of accurate and/or current data for some sectors; including, heating oil, propane, and wood use for the residential and commercial sectors, and the transportation sector. The current baseline data are based on statistics (vehicle travel surveys), researched assumptions (residential wood and propane usage) and informal data collection from local heating oil providers.

In order to improve our ability to track future emissions efficiently and accurately, data collection methods should be developed and partnering opportunities should be fully exploited with other organizations and levels of government. Below is a listing of potential monitoring initiatives:

1. Odometer Readings – work with YG Motor Vehicle Branch to research, develop and implement a system for tracking odometers of private vehicles.
2. Re-calculate transportation sector emissions – Utilize traffic count data from the 2002 city-wide transportation study.
3. Undertake transportation counts and survey - Include vehicle traffic, active transportation, and transit rider-ship. Frequency of data collection would need to be established, and would need to account for seasonal variations.
4. Investigate ways to accurately collect usage data on heating oil, propane, and wood.

Another important aspect of monitoring is the development of indicators to measure the effectiveness of specific initiatives. These indicators will need to be developed specific to initiatives in the action plan.

### **3.8 Implementation of the Community Action Plan**

As part of the development of this LAP report, the outline for a Community Strategic Plan (CSP) was created. Development of the CSP will be key to implementing the LAP. The goal of the CSP is to ensure effective communication with participating levels of government, stakeholders, and the public to maximize existing resources, including research, educational tools, and funding opportunities. The preliminary design for the CSP is as follows:

- Develop Steering Committee:
  - Led by Environmental Coordinator

- Publish notice in newspaper to invite participants to submit letter of interest to join committee
- Invite representatives from the following organizations: Northern Climate Exchange, YG Energy, Mines & Resources, YG Environment Department, Environment Canada, Energy Solutions Centre
- Hold monthly meetings
- Proposed Activities for Steering Committee:
  - Develop work plans for LAP actions recommended in the Three-Year Plan.
  - Identify appropriate funding opportunities.
  - Design LAP community consultation activities
  - Review feasibility of actions that were not recommended in the Three-Year Plan.
  - Research and select appropriate monitoring techniques
  - Outline methods for reporting and information-sharing

The formation of this Committee should be the first step in implementing the LAP.

#### **4.0 RECOMMENDATIONS**

A Three-Year Plan is recommended based on key actions identified in both the City and Community Action Plans. Immediate development of work plans for these actions is recommended because there exists City will, or partnership or funding potential for their implementation. Some of these actions also have high potential to reduce GHG emissions in the short-term, while others have significant co-benefits. The remaining actions are not considered lower in priority; however, their feasibility has not been thoroughly evaluated. Further analysis of the GHG reduction potential and cost-benefit analyses is required prior to the implementation of the action plans.

To continue the City's commitment to work towards the goal of reducing GHG emissions and energy use, it is recommended that the City:

1. Adopt reduction targets for City emissions of 20% below 1990 levels and for community emissions of 6% below 2001 levels by the year 2013 as an interim measure; and
2. Adopt the Local Action Plan as a guiding document to mitigate climate change.

## 5.0 REFERENCES

- Canada Mortgage and Housing Corporation (CMHC). 2000. Practices for Sustainable Communities.
- City of Calgary. 2002. Carbon Dioxide Emissions Abatement Plan: Part 3, Implementation Phase, Status Report 2001.
- City of Edmonton. 2001. Edmonton's Community-Wide Greenhouse Gas Emissions Reduction and Energy Plan, Part 1: Strategy Document, October 15, 2001.
- City of Guelph. No date. 1994 Climate Change Protection Program.
- City of Hamilton. 1998. Climate Protection Action Plan Report.  
[www.vision2020.hamilton-went.on.ca](http://www.vision2020.hamilton-went.on.ca)
- City of Ottawa. 1995a. A City Plan for Greenhouse Gas Emission Reductions, August 25, 1995.
- City of Ottawa. 1995b. City of Ottawa's Task Force on the Atmosphere Action Plan, October 17, 1995.
- City of Regina. 2003. Personal Communication with Kim Sare, Air Pollution Coordinator, City of Regina, March 12 and 20, 2003.
- City of Whitehorse. 2001. City of Whitehorse Strategic Plan (2001-2003).
- City of Whitehorse. 2002a. Official Community Plan (OCP).
- City of Whitehorse. 2002b. Citizen Survey.
- City of Whitehorse. 2003. Whitehorse Moves Community Transportation Workshop held on Oct 24-28, 2002.
- Environment Canada. 1999. Canada's Greenhouse Gas Inventory: 1997 Emissions and Removals with Trends.
- Environment Canada, 2003. <http://www.ec.gc.ca/climate/home-e.html>.
- Ferguson Simek Clark Consulting Engineers. 2001. Whitehorse Aquatic Centre, Energy Simulation Report.
- Government of Canada. 2002. Climate Change Plan for Canada.
- International Council for Local Environmental Initiatives (ICLEI). 2000. PCP Inventory Compilation & Analysis. Prepared for the Partners for Climate Protection Program.
- International Council for Local Environmental Initiatives (ICLEI). 2003. Personal communication (email) with Megan Jamieson on May 16, 2003.
- Natural Resources Canada. 2001. Residential Energy Use Model data communicated through personal email with Samuel Blais, Jan 30, 2002.
- Northern Climate Exchange (NCE). 2003a. Bulletin 2,  
<http://yukon.taiga.net/knowledge/resources/bulletins.html>.
- Northern Climate Exchange (NCE). 2003b. Bulletin 10,  
<http://yukon.taiga.net/knowledge/resources/bulletins.html>.

Partners for Climate Protection (PCP). 1999. ICLEI CCPC Protocol/Guidelines for Reporting, Draft 3.0, April 1999.

Torrie Smith Associates Inc. 1999. Cities for Climate Protection – Greenhouse Gas Emissions Software Version 3. Software program developed for Partners for Climate Protection (PCP) program.

Town of Fort Smith. 1997. Climate Protection Action Plan, Sept 1997.

Town of New Glasgow. 1999. City Operations, Greenhouse Gas Emissions Inventory for 1990 and 1997 & Action Plan for Reducing Green House Gas Emissions, Sept 1999.

UMA Engineering Ltd. 2003. City of Whitehorse 2002 City-Wide Transportation Study.

Voluntary Challenge & Registry Inc (VCR). 1999. Canada's Climate Change Voluntary Challenge and Registry. [http://www.vcr-mvr.ca/index\\_e.cfm](http://www.vcr-mvr.ca/index_e.cfm).

Yukon Development Corporation. 2001. An Action Plan for Reducing Greenhouse Gas Emissions.

Yukon Energy Corporation Ltd. (YECL). 2003. Personal Communication with Hector Campbell, May 27, 2003. Historical Electrical Emission Coefficients.

Yukon Government. 2002. Personal Communication with Perry Diamond at the Department of Energy Mines and Resources, Feb 6 2002.

Yukon Government. 2003. Personal Communication with Scott Gilbreath at the Yukon Bureau of Statistics, May 14 2003.

## **APPENDIX A. Partners for Climate Protection Program - 1995 Council Resolution**

**95-01-31** (January 9, 1995)

Moved by Councillor Harris, seconded by Councillor Storey  
WHEREAS air quality contributes to a healthy environment; and

WHEREAS the Federation of Canadian Municipalities provides the framework to enable the City of Whitehorse to work towards improving and maintaining air quality;

BE IT RESOLVED that Council adopt the Canadian Declaration on Climate Change, and pledge to:

- seek the involvement of all sectors of their local community in the development of a "local action plan" to reduce local emissions of greenhouse gases with special emphasis on CO<sub>2</sub> emissions;
- undertake initiatives to significantly reduce energy use and emissions associated with municipally owned or controlled buildings and vehicle fleets;
- undertake initiatives to change public attitudes and behaviour through information, advice, awareness raising, promotion and training; and
- join strategic procurement initiatives that aggregate global or national municipal demand for energy products and services so as to promote more cost effective CO<sub>2</sub> reduction technologies and to facilitate the commercial availability of advanced technologies; and

BE IT FURTHER RESOLVED that the initiatives towards improving and maintaining air quality be evaluated for overall cost effectiveness.

- Carried Unanimously -

## **APPENDIX B. Climate Change Related Policies from 2002 Official Community Plan**

The policies included below have been selected from the 2002 Official Community Plan (OCP). Only relevant sections from each policy have been included.

### **Part II Growth Management Policies**

#### **Section 4.7 The Natural Environment - Environmental Sustainability (Page 31)**

Part 4. In order to minimize vehicular trips, and to provide shopping opportunities closer to residential areas, a mix of residential and commercial development shall be encouraged in the downtown. In addition, neighbourhood commercial development shall be encouraged to continue in already established neighbourhoods and to locate in future residential neighbourhoods such as Beyond Copper Ridge and Lower Porter Creek.

Part 5. The City may consider educating property owners to retrofit existing buildings with sustainable energy alternatives and conservation measures through educational programs.

Part 6. Where practical, the City may consider pursuing natural energy alternatives for new development. This may be accomplished through educational programs. Examples of natural energy alternatives include the implementation of wind, solar and geothermal power.

Part 7. In order to ensure good air quality in the Whitehorse area, the use of modern pollution control technology and the implementation of additional emission reduction and management strategies shall be actively pursued.

Part 9. The City may, in reviewing its road and servicing standards, consider potential development standards that are environmentally appropriate, economically efficient and effective from a maintenance perspective.

#### **Section 5.1 Parks & Recreation - Trail and Greenway Corridors (Page 36)**

11. Every effort shall be made to maintain or enhance current recreational trails in the Whitehorse area. Blocking of established trails is to be avoided, and a contiguous trail system that links neighbourhoods and activity areas together shall receive priority. Any new development shall be reviewed in relation to trail continuity and access to recreation areas. Where appropriate, green belt buffers shall be integrated to protect wildlife corridors or to protect important landscape features. In some cases, existing trails may need to be relocated to allow new development to take place. This shall be the responsibility of the developer.

12. A public planning process may be initiated in order to help resolve conflicts between recreational uses. This process shall be fair in addressing the conflicts. For example, a conflict between motorized and non-motorized use may occur and the outcome may be the designation of areas, which allow for the two uses in separate areas or at different times of the day or year. To facilitate this process, the following aspects shall be considered:

- a. the environmental sensitivity of the area under consideration, including the impact of proposed uses;
- b. linkages to trails in adjacent areas;
- c. minimization of noise from motorized trails; and
- d. the separation of motorized and non-motorized trail uses.



**Section 5.2 Parks & Recreation - Greenbelt Designation (Page 37)**

3. Land designated as Greenbelt along the Yukon River corridor are intended to support an extensive trail network with the following considerations:

- a. where possible the use of the existing trail network shall be encouraged;
- b. a variety of trails shall be provided, ranging from rustic trails, which provide access to the more remote areas, to well developed trails along the more popular sections with viewing areas, day use areas, and access points to the riverfront; the level of use would reflect the type of trail; and
- c. the more popular, high volume trails shall be well marked and trail signage developed to allow for a safe and enjoyable hike for all user levels.

**Section 7.1 Residential - Settlement Patterns (Page 54)**

7. The City shall encourage the development of vacant sites or the redevelopment of under-utilized sites for residential purposes in the downtown area.

**Section 7.6 Residential – Urban Designation (Page 60)**

7. In order to ensure a contiguous and compact residential pattern, and to take advantage of established utilities and road systems, the potential for infill and redevelopment of established residential areas shall be reviewed, and phased in over a long-term period, where practical.

**Section 8.4 Economic Development - Neighbourhood Service Commercial (Page 75)**

1. Neighbourhood service commercial areas are permitted in the Residential – Urban land use designation with the purpose of providing a full range of commercial and office activity within residential neighbourhoods. Neighbourhood service commercial areas may also include, within the site, multi-family housing.
2. The total area devoted to neighbourhood service commercial uses shall not exceed a gross site area of 2 hectares or an aggregate building area on the site of 1500 m<sup>2</sup>.
3. Neighbourhood service commercial uses shall generally be limited to sites flanking a Collector Road as defined on Map 10, or to sites situated contiguous with other neighbourhood facilities such as a community centre or educational facility.

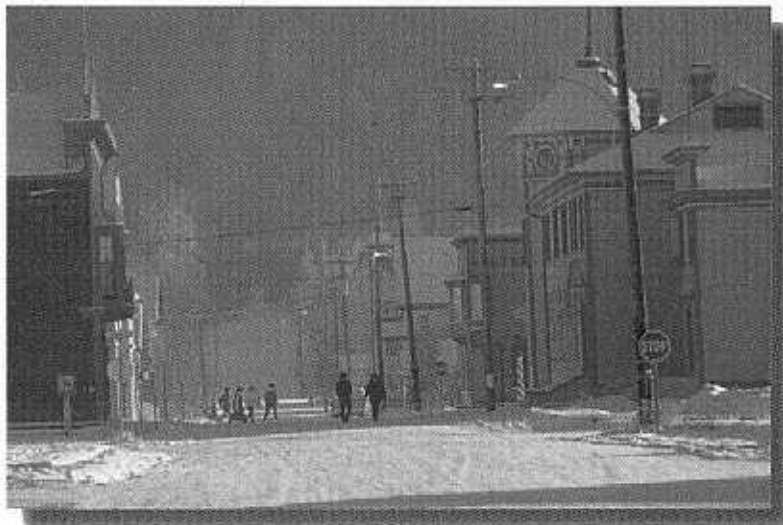
**APPENDIX C. MOU – Yukon Municipal Energy Solutions  
Partnership**



Natural Resources  
Canada

Ressources naturelles  
Canada

**Yukon**  
Government



**MEMORANDUM OF UNDERSTANDING**  
**Yukon Municipal Energy Solutions Partnership**

THE GOVERNMENT OF CANADA

*and,*

THE GOVERNMENT OF THE YUKON

*and,*

THE ASSOCIATION OF YUKON COMMUNITIES

*and,*

THE FEDERATION OF CANADIAN MUNICIPALITIES



Federation of  
Canadian Municipalities  
Fédération canadienne  
des municipalités

**MEMORANDUM OF UNDERSTANDING**  
**Yukon Municipal Energy Solutions Partnership**

**Among**

**THE GOVERNMENT OF CANADA,**  
as represented by the Minister, Natural Resources Canada

*and,*

**THE GOVERNMENT OF THE YUKON,**  
as represented by the Minister Responsible for the  
Yukon Development Corporation and the Minister, Community Services

*and,*

**THE ASSOCIATION OF YUKON COMMUNITIES,**  
as represented by the President

*and,*

**THE FEDERATION OF CANADIAN MUNICIPALITIES,**  
as represented by the President.

**AS** the municipal sector provides vital services and infrastructure in communities throughout the territory;

**AS** there are significant opportunities to produce substantial energy savings and reduce greenhouse gas emissions through integrated energy solutions for municipal facilities and operations;

**AS** the municipal sector has the opportunity to lead the implementation of sustainable energy and environmental practices in the Yukon in support of local, territorial and national energy, economic, and environmental goals;

**AS** Canadian municipalities, through the Federation of Canadian Municipalities, have partnered with the Government of Canada to support energy innovation and environmental stewardship;

**AS** a portion of the Federation of Canadian Municipalities' Green Municipal Funds supports community-driven energy management planning, and efficiency and renewable technology investments in the municipal sector to achieve cost savings, reduce greenhouse gas emissions, and improve environmental performance;

**AS** the Yukon government has created initiatives to facilitate energy cost-savings, make energy efficiency a standard, ongoing practice in the territory and to foster the production and sale of cost-competitive renewable energy to meet the needs of Yukon consumers, business, First Nations and public governments; and

AS the purpose of the Yukon Municipal Energy Solutions Partnership is to establish an action-oriented joint venture to produce cost-effective, long-term, integrated efficiency and renewable energy solutions in the Yukon municipal sector consistent with the principles of sustainable energy development.

NOW, THEREFORE, the understanding is as follows:

## **1. Responsibilities of the Association of Yukon Communities**

- 1.1 The Association of Yukon Communities will be responsible for encouraging its members to:
  - 1.1.1 participate in the Municipal Energy Solutions Partnership in accordance with the terms of this Agreement;
  - 1.1.2 develop a municipal public buildings and operations energy use data base;
  - 1.1.3 conduct comprehensive energy assessments of municipal facilities and operations;
  - 1.1.4 promote renewable energy resources and technologies as part of an integrated community energy management approach;
  - 1.1.5 implement recommended, long-term energy cost-saving solutions where a prudent business case exists;
  - 1.1.6 sponsor proposals to the programs and special funds administered by the Federation of Canadian Municipalities;
  - 1.1.7 endorse the Federation of Canadian Municipalities' council resolution on Partners for Climate Protection.

## **2. Responsibilities of the Federation of Canadian Municipalities**

- 2.1 The Federation of Canadian Municipalities will be responsible for:
  - 2.1.1 promoting and contributing to effective implementation of the Yukon Municipal Energy Solutions Partnership initiative;
  - 2.1.2 providing information sessions and workshops for Yukon municipal leaders and administrators on community energy management, the Federation's programs and special funds and related national initiatives in cooperation with the Association of Yukon Communities and the Canada-Yukon Energy Solutions Centre;
  - 2.1.3 giving due and timely consideration to proposals submitted by the Association of Yukon Communities or its members to Federation programs and special funds in accordance with established guidelines.

### **3. Responsibilities of the energy solutions partnership**

- 3.1 Natural Resources Canada and the Yukon Development Corporation acting through their joint venture, the Canada-Yukon Energy Solutions Centre, will be responsible for:
- 3.1.1 assisting municipalities with creating comprehensive energy end use data bases that support community energy management planning;
  - 3.1.2 organizing and assisting in carrying out comprehensive professional technical assessments of municipal facilities and operating systems to identify opportunities for energy savings;
  - 3.1.3 preparing facility-specific, energy action business plans with recommendations for appropriate and cost-effective efficiency and renewable energy solutions;
  - 3.1.4 providing one-window access to available federal and territorial government energy efficiency, renewable energy, and other community energy management programs, services and related investments;
  - 3.1.5 assisting municipalities in developing proposals to the Federation of Canadian Municipalities programs and special funds;
  - 3.1.6 recovering costs for technical assessments and the development of energy action business plans, not otherwise provided through programs from the Federation of Canadian Municipalities, Natural Resources Canada or Yukon Development Corporation, as a fee for service financed by sharing savings from energy solution projects implemented by the participating municipality;
  - 3.1.7 providing municipalities with access to financing options including leases and loans where appropriate, subject to business case and program guidelines;
  - 3.1.8 supporting individual municipalities implementing the Green Leaf Eco-Rating System in cooperation with the Association of Yukon Communities;
  - 3.1.9 assisting municipalities through the Association of Yukon Communities to extend rural electrification to property owners within community boundaries by adapting the Yukon government Rural Electrification Program for municipal delivery; and
  - 3.1.10 compiling an annual report for distribution to the partners detailing cost savings and other agreed upon performance indicators, such as greenhouse gas emission reductions, achieved by municipal participants implementing recommended energy solutions.

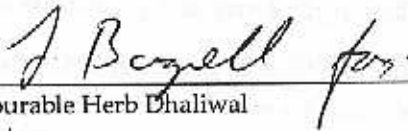
**4. Effect of the Memorandum of Understanding**

4.1 The Memorandum of Understanding is not intended to create legally binding obligations among the Parties.

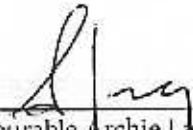
**5. Duration of the Memorandum of Understanding**

5.1 The Memorandum of Understanding is for three years effective on the date of signing, and may be renewed or amended by the parties in writing.

Signed at Whitehorse, Yukon, the 23rd day of June 2003.



Honourable Herb Dhaliwal  
Minister  
Natural Resources Canada




Honourable Archie Lang  
Minister Responsible for  
Yukon Development Corporation



Honourable Glenn Hart  
Minister  
Department of Community Services



Mayor Glen Everitt  
President  
Association of Yukon Communities



for Mayor Yves Ducharme  
President  
Federation of Canadian Municipalities

## **APPENDIX D. April 2003 Municipal Leaders' Resolution on Climate Change**

Draft recommendations of the Municipal Leaders' Forum on Implementing Kyoto will be forwarded to the Federation of Canadian Municipalities to guide ongoing policy development on the implementation of the Kyoto Protocol.

### **Background**

The following principles, approved by FCM members, guide policy development on the implementation of the Kyoto Protocol.

1. No region of the country bears an unreasonable cost related to reducing greenhouse gas emissions;
2. Greenhouse gas emissions related to producing oil, gas and electricity are allocated to consuming jurisdictions and sectors, rather than producing jurisdictions;
3. Sinks in the forest and agriculture sectors, particularly in Western Canada, are pursued as part of a national strategy to diversify rural economies through development of a bio-economy;
4. Investment in research and development, pilots and commercialization of technologies and processes that remove carbon dioxide from waste streams (i.e., coal gasification, injection into reservoirs); and that
5. Canada's action plan to meet the Kyoto target maximizes improvements in productivity and competitiveness.

Adopted at the 2002 FCM Annual Conference  
Resolution ENV02.2.04 – A Municipal Proposal for  
Ratification of the Kyoto Protocol

FCM is also pursuing:

- 1) FCM's principles for ratification serve as the basis for negotiations between FCM and the Government of Canada on the design and implementation of the climate change plan;
- 2) FCM to pursue in the negotiations with the Government of Canada:
  - recognition of public and private ownership of sinks to ensure that good forestry and agriculture practices are recognized and disincentives to good forestry and agriculture practices are not created;
  - determination of the role municipal governments will play in the domestic emissions trading and offsets systems when created;
  - assessment of options for recognizing early actions taken to reduce greenhouse gas emissions that are appropriate in the rollout of a domestic emissions trading system.

Adopted by the National Board of Directors, December 2002

### **COMMUNITY ENGAGEMENT & EDUCATION**

1. Expand the Partners for Climate Protection (PCP) program with at least \$5M per year, for at least 5 years.
2. Increase funding to the Green Municipal Enabling Fund or through some other mechanism to support development of community action plans to reduce greenhouse gas emissions so that all PCP communities have local action plans in place no later than 2005.



3. Engage municipal governments in the design and execution of the 1-tonne challenge citizen engagement campaign so that local efforts are complemented and supported by national outreach efforts.
4. Provide start-up funding for community groups and stewardship initiatives.
5. Inspire market transformation and behavioural change through public education, in association with incentives and regulatory changes.
6. Provide more and ongoing public education and outreach to associate greenhouse gas emissions reduction with the more commonly sought benefits of reduced costs and co/multiple benefits.
7. Develop and implement recognition programs.
8. Target child & youth programming for greenhouse gas emissions reduction.
9. Partner with municipal governments and utilities for delivery of campaigns.
10. Encourage municipal & utility partnerships to support neighbourhood challenges.

### **INFRASTRUCTURE**

1. The new 10-year infrastructure program accept:
  - a) municipal infrastructure projects not presently accepted in the Green Municipal Investment Fund that reduce greenhouse gas emissions such as: landfill gas capture, waste reduction, community energy systems, wastewater biogas capture, transit and solid waste management, particularly organics diversion;
  - b) water conservation projects and drinking water treatment processes that reduce energy consumption and use renewable energy technologies;
  - c) wastewater and storm water systems (including combined sewers), treatment plant upgrades that reduce pollution in effluent, that allow for recycling and reuse and that improve energy efficiency and use renewable energy technologies;
  - d) alternative/advanced vehicle technologies and fuels for fleets and transit systems and other methods that will lead to reduced single occupant use of vehicles, use of improved technology engines (hybrids);
  - e) retrofits of municipal and community facilities to increase energy efficiency and use renewable energy technologies; and
  - f) infrastructure investment, including transit systems, tied to smart growth principles.
2. The Green Municipal Funds and the Government of Canada, through the new 10-year Infrastructure Program, require that the design, construction and retrofitting of municipal infrastructure be proactively designed for future climate events going beyond conventional climate standards, well adapted to climate change and natural hazard impacts.
3. The Government of Canada makes regional climate data accessible to municipal governments.
4. That infrastructure projects recognize the importance of demand side management approaches ahead of supply side approaches.
5. Improved partnership between all orders of government to improve communication and develop a clearing-house of information of the results of climate change research and impacts. Provide financing to support expansion of public transit in those areas where such transit is currently overused or at capacity and is therefore limiting public access.

### **Water Quality, Quantity & Use**

1. Infrastructure program include new supply side and demand management projects including public education/outreach.
2. Require full cost recovery (including future capital and O&M) supporting user-pay principle, including life cycle costing and financing and graduated rates based on increased usage.

3. Support research into new technologies, including innovation.
4. In an interdisciplinary manner with provincial/territorial and municipal governments, facilitate the planning and implementation of watershed protection strategies to address distribution, consumption, and related water quality, quantity and use concerns.

### **Wastewater & Storm Water Management**

1. Encourage appropriate technologies that meet the needs of rural, remote and small communities.
2. Offer incentives for reducing water/energy consumption and pollution at source.
3. Seek opportunities for use of non-potable water such as for fire, irrigation, parks etc., and investigate opportunities for newer technologies.
4. Encourage natural ecological and other best practice treatment approaches.
5. Investigate international achievements with innovative technologies and consider their adoption in Canada and support programs to remove associated barriers.
6. Develop codes/standards that reduce energy use for wastewater treatment systems that exceed Kyoto requirements and are well adapted to changing climate events. Direct this to energy efficiency as opposed to treatment processes that do create CO<sub>2</sub>.

### **Solid Waste**

1. Support product stewardship “from cradle to grave” programs (definition –responsible for your product from beginning to end), including responsible packaging and recycled content standards and require extended producer responsibility for waste.
2. Promote and fund waste diversion as a greenhouse gas emissions reduction opportunity.
3. Fund innovative resource recovery technologies.
4. Create more local markets for recycled goods.
5. Recognize diverted wastes (plastics, paper, etc.) as a carbon credit.

### **Municipal Facilities**

1. Federal government fund more applied research including pilot projects, joint venturing with municipal governments e.g. pilot projects including cold climate areas.
2. More flexibility and easier access for energy audits and subsequent retrofit implementation and simpler funding mechanisms for implementation of energy retrofits.
3. Seed local revolving funds to finance retrofit projects.
4. Develop municipal capacity for energy planning/management.

### **Transportation**

1. Invest in programs that improve driver impact on vehicle efficiency.
2. Invest in technologies and management approaches to improve fleet performance, e.g. establish a national credit for hybrid purchases.
3. Encourage integrated land use and transportation planning that supports sustainability objectives (rural and urban communities).
4. Fund transit capital cost requirements for small & large communities.
5. Include performance measures/standards in federal funding.
6. Support investments in more efficient technologies such as hybrids, fuel cells, alternative fuels etc.
7. Provide tax exemption for employer provided transit benefits.
8. Encourage vehicle fuel efficiency standards, such as, California standards.
9. Support alternate means of transportation and reduced use of individual automobiles through management functions such as TDM initiatives, etc.

10. Overall transportation strategy with anti-idling regulations as a component. Establish anti-idling guidelines for government fleets.

### **POLICY AND FISCAL TOOLS**

1. Strengthen the National Building Code for Buildings and Houses to increase energy efficiency and the use of renewable energy technologies.
2. Establish an energy showcase for municipal governments (i.e. transportation showcase).
3. Establish provincial/territorial financing mechanisms for municipal and community building retrofits that can partner with the Green Municipal Funds.
4. Foster international links for municipal governments for markets of superior Canadian technologies.
5. Establish one window into the federal government for municipal governments to help deal with the “red tape” structural recommendation.
6. Exempt Energy Star products from GST and other low energy products, and tax credits for more expensive purchases such as hybrid vehicles.
7. Identify, rationalize & coordinate similar program at all three orders of government and utilities.
8. Establish policy that would phase out sale of high emission off-road equipment in favour of energy efficiency and alternative fuel equipment.

### **Carbon Trading**

1. Proceed after proper consultation.
2. Municipal governments want the opportunity to participate in Domestic Emissions Trading.
3. Federal government consult municipal governments on the design of the offset program (part of the emissions trading program) over summer and fall 2003.

### **Procurement**

1. Commit to longer-term green power and energy purchase agreements.
2. Expand and improve tax treatment for wind energy to other green energy forms and/or offer low or no interest loans for green power.
3. Expand existing standards under the Energy Efficiency Act as a national strategy to ensure only energy efficient systems available in Canada.
4. Support aggregate purchasing practices, including relationships with municipal governments and community-based eco-purchasing.
5. Support community greenhouse gas targets through commitments to buy green power, retrofit government buildings, and partner in community energy systems and co-generational projects.
6. Amend procurement policies to include criteria for the purchase of energy efficient and alternative fuel vehicles, products and green power.

### **Planning**

1. Increased provincial/territorial funding for community planning exercises that address:
  - compact mixed use urban form,
  - co-location of complimentary uses,
  - shared infrastructure services,
  - integrated green spaces, and
  - ensuring that greenhouse gas emissions reduction is a component of all planning.
2. Support municipal governments in developing plans that adapt to climate change, including providing access to information.

3. Establish enabling legislation to encourage urban design – i.e. densify a downtown core with good urban design. From a planning perspective, provide enabling legislation to meet Kyoto requirements, and the federal government to respect local zoning.

### **Market Tools**

1. Provide incentives for heritage redevelopment.
2. Provide greater incentives for alternative fuels (e.g., eliminate taxes on bio-diesel)
3. Provide training and incentives for marketing energy efficient appliances and alternative/hybrid vehicles.
4. Provide incentives for green power purchasing.
5. Support U-pass programs – university fees include the annual bus pass.
6. Inspire improved take-up of green mortgages.
7. Revisit class 43.1 – to get the accelerated CCA (depreciation) for energy retrofits.

### **Building Codes – Residential & Commercial**

1. Expand EnerGuide programs to include new homes, components and products and enhance financial incentives.
2. Develop building standards that require improved energy and resource efficiency and develop equivalencies in retrofits and new buildings until new codes are developed.
3. Review building standards to address climate conditions that are expected to occur during the building's life cycle.
4. Federal government to encourage provincial/territorial governments to support giving municipal governments the authority to pass bylaws that would enhance the standards in energy efficiency and water conservation.

### **Resource Recovery**

1. Federal/provincial/territorial governments establish national approaches to support the following:
  - reuse, recycle, diversion (tires, plastics, glass, organic wastes, oil, paper, paint, agricultural wastes etc., as well as, economic development opportunities);
  - deposit return systems;
  - communities can collaborate/share recycling products and resources;
  - eco-industrial recycling/reuse;
  - economic modeling to factor in environmental externalities; and
  - provide GST exemption for all recovered products.

## **APPENDIX E. Corporate and Community Emissions Inventory Data**

Included in the Appendix are the following reports that were generated from the Climate Change Protection Software Version 3.

Corporate Emissions Summary Report 1990  
Corporate Emissions Summary Report 1996  
Corporate Emissions Summary Report 2000  
Corporate Emissions Summary Report 2001  
Community Emissions Summary Report 2001

# Whitehorse

## Corporate Greenhouse Gas Emissions in 1990

### Summary Report

	Equiv CO <sub>2</sub> (tonnes)	Equiv CO <sub>2</sub> Equiv CO	Energy GJ)	Cost (\$)
<b>Buildings</b>	1,886	52.1	37,201	680,412
<b>Vehicle Fleet</b>	894	24.7	12,868	170,744
<b>Streetlights</b>	96	2.7	5,438	0
<b>Water/Sewage</b>	684	18.9	21,393	0
<b>Waste</b>	58	1.6		0
<b>Other</b>	0	0.0		
<b>Total</b>	3,618	100.0	76,900	851,156

# Whitehorse

## Corporate Greenhouse Gas Emissions in 1996 Base Year Summary Report

	Equiv CO <sub>2</sub> (tonnes)	Equiv CO <sub>2</sub> Equiv CO	Energy GJ)	Cost (\$)
<b>Buildings</b>	2,304	44.8	37,201	680,412
<b>Vehicle Fleet</b>	1,165	22.7	16,749	231,355
<b>Streetlights</b>	334	6.5	6,786	466,609
<b>Water/Sewage</b>	1,337	26.0	23,736	659,232
<b>Waste</b>	0	0.0		0
<b>Other</b>	0	0.0		
<b>Total</b>	5,140	100.0	84,472	2,037,608

# Whitehorse

## Corporate Greenhouse Gas Emissions in 2000

### Summary Report

	Equiv CO <sub>2</sub> (tonnes)	Equiv CO <sub>2</sub> Equiv CO	Energy GJ)	Cost (\$)
<b>Buildings</b>	1,674	56.4	37,900	900,970
<b>Vehicle Fleet</b>	1,002	33.8	14,387	258,616
<b>Streetlights</b>	4	0.1	7,213	407,327
<b>Water/Sewage</b>	288	9.7	19,111	719,938
<b>Waste</b>	0	0.0		0
<b>Other</b>	0	0.0		
<b>Total</b>	2,967	100.0	78,611	2,286,851



# Whitehorse

## Corporate Greenhouse Gas Emissions in 2001 Summary Report

	Equiv CO <sub>2</sub> (tonnes)	Equiv CO <sub>2</sub> Equiv CO	Energy GJ)	Cost (\$)
<b>Buildings</b>	1,680	50.8	37,801	968,707
<b>Vehicle Fleet</b>	1,272	38.5	18,207	325,846
<b>Streetlights</b>	1	0.0	7,550	526,309
<b>Water/Sewage</b>	293	8.9	18,588	727,175
<b>Waste</b>	58	1.8		0
<b>Other</b>	0	0.0		
<b>Total</b>	3,304	100.0	82,145	2,548,037

# Whitehorse

## Community Greenhouse Gas Emissions in 2001 Summary Report

	Equiv CO <sub>2</sub> (tonnes)	Equiv CO <sub>2</sub> (%)	Energy GJ)
<b>Residential Sector</b>			
---	45,332	26.2	1,115,930
<b>Commercial Sector</b>			
---	35,936	20.8	860,314
<b>Industrial Sector</b>			
---	0	0.0	0
<b>Transportation Sector</b>			
Automobiles	22,990	13.3	337,258
Vans & Light Trucks	42,338	24.5	620,785
Heavy Trucks	19,226	11.1	279,370
Transit Bus	802	0.5	11,365
Unclassified	3,126	1.8	44,465
<b>Subtotal Transportation</b>	<b>88,482</b>	<b>51.1</b>	<b>1,293,243</b>
<b>Waste Sector</b>			
---	3,330	1.9	
<b>Other Sector</b>			
<b>Subtotal Other</b>	<b>0</b>	<b>0.0</b>	
<b>Total</b>	<b>173,079</b>	<b>100.0</b>	<b>3,269,488</b>

## APPENDIX F. Emissions Accounting Protocol (EAP)

The three main GHGs are CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. Each has different potential to affect global warming based on their chemical construction. As a means to compile and calculate the impact these various gases have on global warming, a single unit of measurement was developed by the international scientific community. All emissions are converted and compiled to a CO<sub>2</sub> equivalent (eCO<sub>2</sub>). For example, if one tonne of CH<sub>4</sub> were emitted, it would produce 21 times the greenhouse gas impact of one tonne of CO<sub>2</sub> over a 100-year period. Therefore one tonne of CH<sub>4</sub> has an eCO<sub>2</sub> of 21. This is the conventional method for representing the emissions of various gases (Voluntary Challenge & Registry Inc., 1999). The table below lists the Global Warming Potential or the eCO<sub>2</sub> for 1 tonne of emissions for the three main GHGs.

Global Warming Potential	
Greenhouse Gas	eCO <sub>2</sub> for 1 tonne of emissions (Based on a 100 year period)
Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	21
Nitrous Oxide (N <sub>2</sub> O)	310

Source: Voluntary Challenge & Registry Inc., 1999 Registration Guide

For the City of Whitehorse's baseline inventories only the major greenhouse gases – carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) – are inventoried. GHG emissions are compared using units of equivalent carbon dioxide (eCO<sub>2</sub>).

The EAP does not account for CO<sub>2</sub> emissions resulting from the burning of biomass (e.g. wood). Biomass is considered part of the natural carbon cycle and is omitted from the emissions inventories. However, methane and nitrous oxide emissions resulting from biomass burning are considered in the inventory. Methane from wastewater and sewage sludge is not included.

The EAP can be used to compare natural and anthropogenic activities on the basis of their GHG emission potential. The first step is to convert the energy use (e.g., diesel fuel, and electricity) or GHG generation (e.g., solid waste disposal) to eCO<sub>2</sub> emissions using emission coefficients.

### Fossil Fuel

For fossil fuel use, the conversion to eCO<sub>2</sub> emissions is straightforward as there are internationally accepted emission coefficients. Automobiles, light vans and trucks, and specialized heavy equipment comprise the Transportation category.

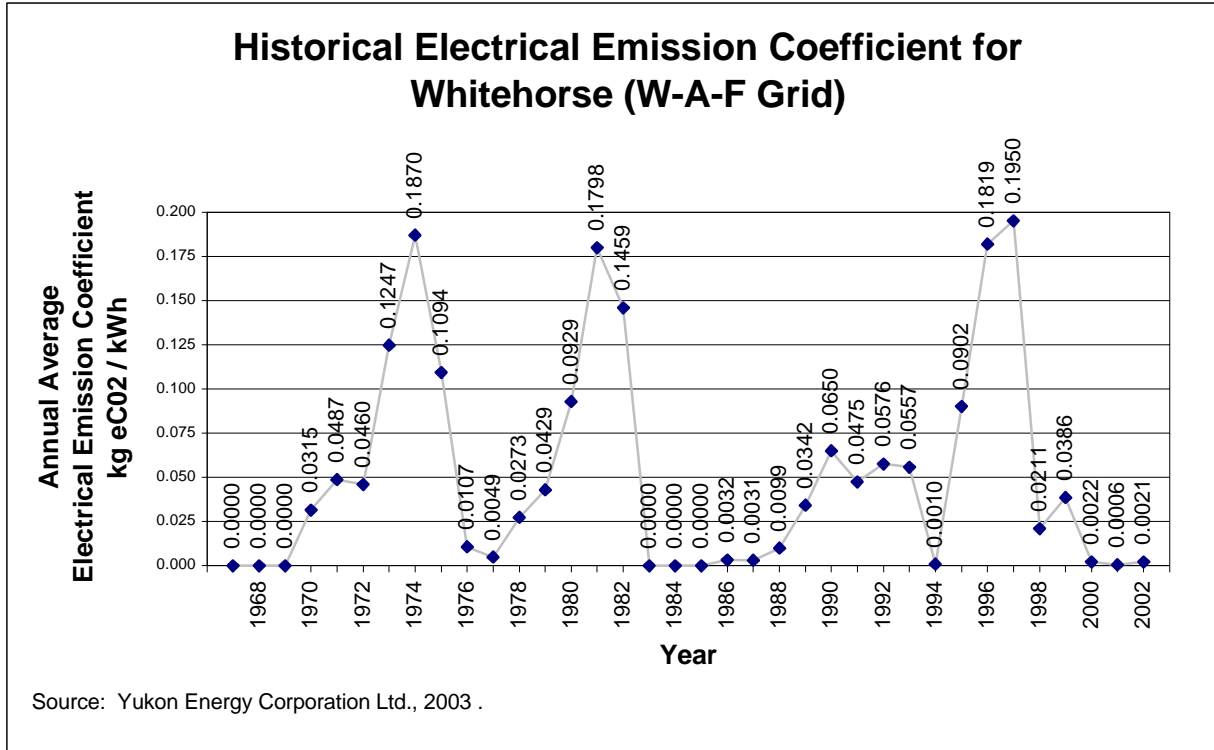
### Electricity

For electricity use, emission coefficients vary depending on the source of the electricity. Electricity generation for the City of Whitehorse is predominantly derived from hydroelectric and wind sources, both of which are emissions free. When the demand surpasses these clean energy sources, diesel generators are operated to fill the demand. The emissions coefficient for the Whitehorse-Aishihik-Faro Electrical Grid (WAF Grid) is calculated by dividing the annual emissions from all fossil fuel fired generating stations on the grid by the total annual kWh produced from all sources of electricity. This gives an annual average emission coefficient (eCO<sub>2</sub> kg/kWh) for electricity consumed on the WAF grid and is calculated by Yukon Electric Corporation.

There can be a large variability in electrical demand on the WAF grid, which varies with the level of industrial activity. For example, during the years when the Faro mine was in operation it accounted for about 40% of the WAF grid load (Yukon Development Corporation, 2001). The

other important factor that influences our electrical emissions coefficient is the supply of clean energy, predominantly hydroelectricity that is dependent on the water levels of the Yukon River and Aishihik Lake.

When combining the demand side and supply side factors, the effect on electrical emission coefficients for the Grid can be significant. The following table lists the electrical coefficients for specific years. The significant variability between years has a significant impact on Whitehorse's eCO<sub>2</sub> emissions.



### Waste

A portion of the solid waste that enters the landfill results in the release of methane gas. Landfill gas generation is gradual and unlike other types of GHGs, emissions from solid waste are released over a period. For accounting purposes, these future emissions are assigned to the year that the waste was landfilled. Solid waste that is diverted from the landfill does not get inventoried in this methane calculation. In the case of compostable material, the diversion from the landfill to the compost facility results in the release of biomass neutral CO<sub>2</sub>, rather than methane.

## **APPENDIX G. Potential Funding Sources**

### **Green Municipal Investment Funds (GMIF)**

GMIF is a \$200 million permanent fund that supports the implementation of highly innovative environmental projects, through low interest loans to municipal governments and their public and private sector partners. The focus of this program is to encourage innovative technologies or practices that can add to the national knowledge base.

### **Green Municipal Enabling Funds (GMEF)**

The GMEF encourages the research of innovative strategies by providing grants to carry out feasibility studies. This program began in 2000 and is anticipated to run until 2007. Grants administered under this program would cover up to 50 per cent of eligible costs to a maximum grant of \$100,000. This program is open to Canadian municipalities and their public sector or private sector partners.

### **Urban Transportation Showcase Program (UTSP)**

The City of Whitehorse is one of 15 municipalities that have been short-listed for funding through this Transport Canada program. The City is currently developing a proposal for the Showcase Program, the goal of which is to demonstrate, evaluate and promote effective strategies to reduce GHG emissions from urban transportation. At least four proposals will be selected to receive funding.

The other component of this program is a national Information Network that will be established to disseminate information on successful GHG emission reduction strategies. This web-based network will provide opportunities for sharing information from the showcases, including lessons learned, best tools and best practices, through links to conferences and seminars, newsletters, and progress reports.

### **Pilot Retrofit Incentive (PRI)**

The PRI is offered through Natural Resources Canada's (NRCan) Office of Energy Efficiency and is directed at commercial and institutional buildings. This program provides financial contributions for qualified "energy innovator" clients to undertake energy efficiency projects in their facilities. Qualified applicants can receive contributions of up to 25 percent of eligible project costs to a maximum of \$250,000. Participants must agree to replicate their pilot measure in a least 25 percent of their similar facilities.

### **Commercial Building Incentive Program (CBIP)**

CBIP is offered through NRCan's Office of Energy Efficiency. This program provides financial incentives to offset the increased cost to design a more energy-efficient building by considering a broader range of high-efficiency equipment, systems, and options. Incentives of up to \$60,000, or twice the dollar value of the annual energy savings are available to improve energy efficiency in new buildings or additions to existing buildings. Eligible building designs must demonstrate reductions in energy use of at least 25% compared to the requirements of the Model National Energy Code for Buildings.

### **Community Development Fund**

This YG program provides assistance to municipal and First Nations governments and community non-profit organizations for projects that improve the quality of community life. Among the wide range of eligible projects are energy-related projects, including: wind energy monitoring, solar power for a summer camp, an educational wind turbine for a school, a wood-

fired district energy system, and a series of workshops to increase energy efficiency in recreation facilities.

### **REDI**

The Renewable Energy Development Initiative is an incentive program designed to encourage businesses, industry and public institutions to purchase certain types of solar and biomass heating systems. Eligible groups can apply for a refund of 40 percent of the purchase and installation of a qualifying system, up to a maximum refund of \$80,000. Systems must be commissioned by March 31, 2004.

### **Green Source**

Environment Canada has prepared a resource guide for locating funding for environmental programs. The Green Source guide includes information on public and private sector programs and organizations that provide assistance, labour costs or in-kind donations to community groups. The Green Source (January 2003) is a searchable database that can be found at:

[http://www.ec.gc.ca/ecoaction/grnsrc/index\\_f.cfm](http://www.ec.gc.ca/ecoaction/grnsrc/index_f.cfm)

### **Eco-Action**

Formerly called Action 21, this Environment Canada program provides financial support to community organizations (non-profit and non-government) for projects with measurable, positive impacts on the environment. Priority for funding is given to projects focused on clean air and climate change, clean water, and migratory bird habitat protection.

### **Affordability and Choice Today (ACT) Program**

ACT goal is to reduce the barriers to building better homes and communities through support of projects that reduce development cost and increase choice. ACT provides funding to community teams made up of builders, developers, renovators, architects, planners, industry association staff, municipal staff, non-profit and consumer groups, and others. ACT can provide funding to your community team for three different kinds of regulatory reform projects:

- Demonstration project grants of up to \$20,000
- Approval process project grants of up to \$10,000
- Promotion project grants of up to \$5,000

More information can be found at: <http://www.actprogram.com/english/grants.asp>

## APPENDIX H. Actions to Consider Further

### Corporate Buildings

- CB.1 **Municipal Services Building** – Re-commission zone heating & O/A reset schedule. (May 1997 Energy Audit)
- CB.2 **Implement Commissioning of New Buildings** - Ensure that all new buildings occupied by the City of Whitehorse are properly commissioned. As well, ensure staff is properly trained in the maintenance and operation of the building's systems.
- CB.3 **Include energy efficiency as a basic requirement when tendering capital projects** - Ensure that long-term operational costs are considered when capital projects are planned

### Residential

- R.1 **Coordinate a Residential Housing Design Competition** - Challenge builders and designers to design and build the most energy efficient/ eco-friendly home in Whitehorse. Existing homes could possibly apply.
- R.2 **Identify incentives that would encourage buying existing homes, rather than building new ones**

### Institutional/Commercial

- C.1 **Mandate requirements for natural lighting** - Ensure buildings are designed to ensure that all work areas and offices benefit from minimum levels of natural lighting

### Land Use

- CS.1 **Support the development of a market in downtown** - The more food that is grown locally the less energy is needed to ship food brought in from down south. More money is kept in local economy.
- CS.2 **Investigate the feasibility to re-instate district heating system for Takhini subdivision.**

### Transportation

- T.1 **Implement Traffic Calming Principles in Areas of Potential Pedestrian/Vehicle Conflicts**
- T.2 **Have developers pay for free bus passes as part of new residential developments** - Explore this option, although it may be an incentive to leave older neighbourhoods
- T.3 **Commit City Parking Revenue to Public Transit**