

YUKON GOVERNMENT CLIMATE CHANGE ACTION PLAN

FEBRUARY 2009



TAKING ACTION ON CLIMATE CHANGE

Yukon
Government



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“ For many Canadians, the North is part of the imagined body. It’s an extension of the self, not the rational self but the self that feels. When the North is damaged and we hear about it, we hurt. The twenty-first century will tell us — once and for all, I suspect — how much of ourselves we’re prepared to destroy.”

— Margaret Atwood

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Extensive flooding took place in the Southern Lakes region during the summer of 2007. Very high snow packs and the weather were factors.





MESSAGE FROM THE YUKON GOVERNMENT

The Climate Change Action Plan sets out how the Yukon government is responding to climate change. It shows us actions now underway as well as what new or enhanced actions would help advance our priorities. It identifies priority actions which are to be undertaken now and actions which should be undertaken in the future.

This action plan is the result of input received from more than 100 individuals and organizations through written submissions, workshops and meetings. The plan, providing clear direction and action, advances the goals of the Climate Change Strategy.

Implementation of the Action Plan will involve all departments and agencies of the Yukon government. We will also work with partners to meet the challenges and opportunities of climate change in Yukon – other governments, non-government organizations, industry, and the academic community.

Climate change is a global challenge where all jurisdictions, including Yukon, have an important role to play. Our response to climate change will build on our territory's strengths as well as acknowledge our inherent challenges.

The Climate Change Action Plan will help us coordinate and improve our efforts to adapt to, understand, and lessen our contributions to climate change. Living in a healthy environment is something we all wish to enjoy as well as pass on to our children and future generations.

Dennis Fentie
Premier

Elaine Taylor
Minister of Environment



HIGHLIGHTS

It is the belief of the Yukon government that climate change is happening, that human behaviour is a major contributor, and that a coordinated response is needed.

The Climate Change Action Plan recognizes that the Yukon government must concentrate on the challenges and opportunities that are most relevant to our rural and northern setting. Realizing the magnitude of work to be undertaken, not all actions or goals can be achieved immediately.

A key priority of the Action Plan is to enable effective adaptation to climate change. No matter how much people reduce their greenhouse gas emissions, climate change will continue for many years. That is the simple reality. We therefore need to adapt.

Recognizing the Yukon government cannot address climate change alone, priority will be given to forging partnerships with other governments, organizations and individuals to facilitate a comprehensive and coordinated approach to addressing climate change in the territory.

Work by the Yukon government and others in response to climate change will also provide economic, social and other environmental benefits. It is essential that we all prepare for the impacts of a warming climate. Climate change is real, and it threatens our forests, our watersheds, and our way of life.

did you know?

The Yukon government already has undertaken many actions that respond to climate change, including:

- developing the Yukon Cold Climate Innovation Centre,
- supporting the Northern Climate ExChange for public education and outreach,
- funding community recycling depots and other groups that reduce waste generation, promote public awareness and divert solid waste, and
- working with provincial and territorial counterparts to enhance national building standards.

Southern Kluane Lake
near the Slims River.



YUKON GOVERNMENT'S CLIMATE CHANGE ACTIONS

Goal 1 – Enhance Knowledge and Understanding of Climate Change

- Establish a Yukon Research Centre of Excellence
- Establish climate change research study areas
- Develop climate scenarios

Goal 2 – Adapt to Climate Change

- Complete a Yukon infrastructure risk and vulnerability assessment and determine adaptation strategies in response
- Develop an inventory of permafrost information for use in decision making
- Complete a Yukon water resources risk and vulnerability assessment
- Create a tool to facilitate the collection and distribution of water quantity and quality data
- Conduct a Yukon forest health risk assessment
- Conduct treatments to reduce forest fuel loads and protect communities
- Conduct a Yukon forest tree species and vulnerability assessment

Goal 3 – Reduce our Greenhouse Gas (GHG) Emissions

- Yukon government's internal operations: cap GHG emission in 2010, reduce GHG emission by 20% by 2015 and become carbon neutral by 2020
- Report on Yukon government operations through 'The Climate Registry'
- Develop a carbon offset policy for internal operations
- Incorporate environmental performance considerations in the government's procurement decisions
- Government-funded new residential construction will meet GreenHome energy efficiency standards
- Government-funded commercial and institutional, construction and renovation will meet or exceed the LEED Certified Standard for energy efficiency

- Improve energy efficiency and reduce the greenhouse gas emissions of the government's light vehicle fleet
- Implement an Environmental Stewardship Initiative for the Department of Education and Yukon schools
- Establish 'green action committees' in all departments
- Conduct an energy analysis of all Yukon government buildings and complete energy saving retrofits
- Develop best management practices for industry to reduce GHG emissions
- Undertake an extensive study of the transportation sector and recommend options to reduce emissions
- Develop incentives for fuel efficient transportation
- Develop pilot projects to demonstrate home and commercial energy efficiency and heating technology
- Improve access to home energy evaluations by providing evaluator training
- Develop wood energy opportunities for residential and institutional heating

Goal 4 – Lead Yukon Action in Response to Climate Change

- Forecast potential future GHG emissions for Yukon
- Work with federal partners to ensure national GHG Inventory is accurate and consistent for Yukon
- Set a Yukon-wide emissions target within two years
- Create a Climate Change Secretariat
- Determine the potential of a Yukon carbon economy
- Incorporate climate change considerations into government decision making
- Create a community engagement forum for taking action on climate change



INTRODUCTION

The Climate Change Action Plan sets out in detail the actions the Yukon government will undertake to address climate change, within its areas of responsibility. It builds upon the **goals** set out in our Climate Change Strategy, which are to:

- enhance our knowledge and understanding of climate change,
- improve our ability to adapt to climate change,
- reduce our greenhouse gas emissions, and
- lead Yukon action in response to climate change.

The government wants Yukon to become a region able to minimize the negative impacts of climate change, committed to mitigation, and willing to recognize and act on new opportunities presented by climate change.

As a small jurisdiction with limited resources, Yukon must focus on priority actions that provide the most benefit to the territory. The following **principles** guided the development of the Climate Change Action Plan:

- *Focus on relevant issues* — Concentrate on the challenges and opportunities that are most relevant to Yukon and our rural and northern setting.
- *Use an informed approach* — Base our actions on science, traditional knowledge and analysis. Where uncertainties exist, these will be identified but not used as a barrier to prevent action.
- *Take logical steps* — Not all actions or goals can be achieved immediately. For many actions, additional information, research, regulations, policies or infrastructure may be required. In those cases, ensure each step works logically and effectively towards achieving the final objective.
- *Build on existing strengths* — Yukoners have proven experience in public education, outreach, monitoring, research, building sciences and energy solutions programs. Build on and expand these strengths and expertise.



A broad representation of Yukoners were involved with the development of the Action Plan.

definitions

Mitigation – Measures that seek to avoid, reduce or delay global warming by reducing GHG emissions. For example, switching to renewable energy sources such as hydro is one way to mitigate climate change.

Intergovernmental Panel on Climate Change (IPCC) – The scientific body established to collect and synthesize the world's best research on climate change. Their work on the Fourth Assessment Report (AR4) recently won the Nobel Prize. All reports, including the *Summary for Policymakers*, can be found online: www.ipcc.ch.



DEVELOPING THE ACTION PLAN

The Yukon government released its Climate Change Strategy in 2006. Environment Yukon then began researching and collecting information needed to develop this Action Plan. Preparation included discussions with a wide variety of government and non-government representatives, an interdepartmental workshop, working-group meetings and several external workshops.

The Scoping the Yukon Government Climate Change Action Plan Workshop invited people from all over Yukon to share their views on what actions should be taken. Two intensive events were held for youth, giving them a venue to make comments, state concerns, and offer suggestions.

Environment Yukon also undertook a jurisdictional review and an inventory of current Yukon government actions on climate change.

Since the release of the Climate Change Strategy, Yukoners have voiced increased concern about global and local climate change. They have also shown an increased commitment to doing something about it – and a keen interest in participating in discussions on what should be done.

A draft of the Climate Change Action Plan was circulated for public comment from May 12 to July 31, 2008. This plan is the end result of the views and values put forward by many individuals and organizations over the last two years.

information

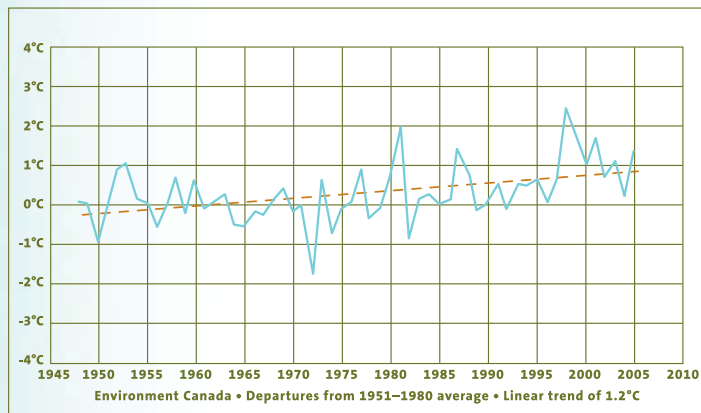
You can find the following climate change related documents on the Environment Yukon website (www.environmentyukon.gov.yk.ca):

- Government of Yukon Climate Change Strategy (2006)
- A Snapshot: Yukon Government Actions on Climate Change during 2006 & 2007
- Scoping the Government of Yukon Climate Change Action Plan: Workshop Report, November 2007
- Yukon Youth Outside (the box) Final Report, December 2007
- ‘What We Heard’ summary of comments on the draft Yukon Government Climate Change Action Plan
- Draft Yukon Government Climate Change Action Plan (May 2008)

IMPACTS OF CLIMATE CHANGE IN YUKON

According to the Intergovernmental Panel on Climate Change (IPCC), the overall temperature of the globe has risen 0.74°C over the past century. Environment Canada reports that Canada’s average temperature has risen about 1°C between 1950 and 2000 as depicted in Figure #1. According to the *Arctic Climate*

Figure 1: Annual National Temperature Departures and Long-Term Trends



Source: Environment Canada Climate Trends and Variations Bulletin, 2005

Impact Assessment (2004), winter temperatures in Alaska and western Canada (including Yukon) have increased by as much as 3-4° C in the same time period.

Climate change impacts are classified as being one of two general types: bio-physical impacts include physical changes to northern landscapes and ecosystems; socio-economic impacts arise from bio-physical impacts and are expected to change how all Yukoners live and work. These impacts were outlined in some detail in 2004 in the *Arctic Climate Impact Assessment*, which also predicted the following for Yukon:

- Higher year-round temperatures — winters warming more than summers, with winter warming being greater farther north; summers warming more in south and central Yukon than in the north, due to the moderating effect of the Beaufort Sea.
- More precipitation in the winter, with the change being greater farther north. There will be little change in average summer precipitation levels.
- More extreme weather events, both in winter and summer, including heavy summer rainfall and thunder storms.

This Action Plan is based on a common understanding that climate change is happening, that human behaviour is a contributor, and that a coordinated response is needed.



Flooding on the North Klondike Highway in August 2008

YUKON'S STRENGTHS AND RESOURCES

Yukon government regulations, policies and programs can be used to respond to climate change—see Appendix 2 for further information about government departments' climate change-related programs. We cannot, however, address climate change alone.

definitions

Climate – The average weather for a particular region and time period.

Adaptation – Taking actions that can prevent or reduce the negative impacts of climate change and/or build on the positive impacts. For example, altering infrastructure maintenance and construction in response to melting permafrost.

Greenhouse gases (GHGs) – Includes water vapour, carbon dioxide, methane and nitrous oxide.

Greenhouse gas emissions – The release of substances that can be transformed into greenhouse gases and/or the direct release of greenhouse gases into the atmosphere.

“(Youth are) concerned about the future. There are so many changes happening so quickly and more action is needed.”

– Participant at 2007 Youth Engagement Forum

A Spruce Bark Beetle infestation is responsible for these dead and dying trees near Haines Junction.



Recently Yukon has experienced some extreme weather events:

- Yukon's 2004 fire season was the largest on record, doubling the previous record
- Extensive flooding in 2007 in the Southern Lakes region
- Flooding in 2008 closed the North Klondike Highway

Forging partnerships with other governments, organizations, and individuals will help the Yukon government develop a comprehensive and coordinated approach to addressing climate change. (See Appendix 3 for further information about partners.)

During the public consultation on the draft Action Plan, most people made it clear that they wanted and expected the Yukon government to take a leadership role. They wanted the Action Plan to set out specific actions and identify priorities. Yukoners also recognized that we all have a role in reducing GHG emissions and coming up with ways to adapt to change.

Yukoners have proven experience in research, public education, and energy solution programs. Traditional knowledge is also important in helping to understand climate change impacts and developing adaptation strategies. We can and will build on these strengths and resources.





SUMMARY OF ACTIONS

The Climate Change Action Plan identifies actions already underway as well as actions to come that will effectively enhance the Yukon government's response to climate change.

The actions support one or more of the goals of the Climate Change Strategy. Most actions serve more than one purpose. For example, monitoring water flow and ice breakup is used to assess flood risk for communities. Over time this information can help us understand water flow and ice breakup trends and identify adaptation measures.

ACTION PLAN PRIORITIES

A key priority of the Action Plan is to **enable effective adaptation** to climate change in Yukon. No matter how much we reduce our greenhouse gas emissions, climate change will continue for many years. We therefore need to adapt.

The Action Plan **responds to public needs**. We plan to use a phased approach to implement timely actions that give tangible results in terms of our ability to understand, adapt to and mitigate climate change.

The Action Plan recognizes that the Government of Yukon cannot address climate change alone. Priority will therefore be given to **forging partnerships** with other governments, organizations and individuals to facilitate a comprehensive and coordinated approach to addressing climate change in the territory.



The Yukon Geological Survey is studying how permafrost and landslides affect Yukon terrain. This information will allow scientists to predict how climate change will affect terrain disturbances in future, which has implications for infrastructure such as highways and pipelines. (Kluane Lake, July 1988)





Melting permafrost is exposing graves and cultural resources at Herschel Island.

definitions

Permafrost – The layer of permanently frozen ground that underlies more than half of Yukon. Permafrost exists wherever ground temperatures remain at or below 0 degrees Celsius throughout the year.

Permafrost Health Outreach Program – The University of Alaska and Yukon government have partnered to install long-term permafrost monitoring systems near several Yukon schools. The program will allow students to monitor local permafrost changes and will also support academic research on permafrost, climate change and infrastructure.

RECOMMENDED ACTIONS, BY GOAL

The Action Plan gives effect to the goals of the Climate Change Strategy:

1 Enhance our knowledge and understanding of climate change

The actions we will take to advance this goal focus on research and understanding. Additional work in future is needed to support public education and training. The Yukon government already has several research and training programs underway, such as monitoring development and administering scientific research permits.

2 Improve our ability to adapt to climate change

The actions we will take to advance this goal focus on the areas of infrastructure, water, and forests. Additional work currently underway is also identified in the areas of biodiversity, land use planning, human health, community adaptation planning, emergency response planning, agriculture, and building standards. For example, the Yukon government, in collaboration with other governments and academics, is participating in several permafrost projects, given the significant effects thawing is having on roads and buildings.

3 Reduce our greenhouse gas emissions

The actions we will take to advance this goal focus on the Yukon government's operations, the transportation sector, and buildings (commercial and residential). For example, the Yukon Housing Corporation offers a wide range of programs to help Yukoners build energy efficient homes and also help existing homeowners to repair, upgrade and improve the energy efficiency of their existing homes. The Energy Solutions Centre also offers a number of programs to help reduce energy use and greenhouse gases. As well, the government has begun 'greening' our vehicle fleet by switching to more fuel efficient cars and developing policies to encourage more effective use.

4 Lead Yukon action in response to climate change

The actions we will take to advance this goal focus on emission targets, leadership, reporting, and coordination. The Yukon government will continue to work with other governments on climate change initiatives at a national and international level.



Arctic Lupine covers a knoll on Herschel Island. Vegetation change in Yukon is one impact of climate change.

'PRIORITY' VERSUS 'ONGOING'

The Climate Change Action Plan recognizes that the Yukon government must concentrate on the challenges and opportunities that are most relevant to our circumstances.

'Priority' actions will build on work already underway and contribute to the government's long-term response to climate change. The 'ongoing' actions are areas where we are currently taking action but recognise that more is needed. In some instances, future work requires additional information, research, regulations, policies, infrastructure or additional resources. We heard during the public consultation that we needed to be clear about which actions would be done first – people recognized we would not be able to do everything at once.

LINK TO THE ENERGY STRATEGY FOR YUKON

Climate change and energy are inextricably linked. The Energy Strategy for Yukon and the Climate Change Action Plan were developed at the same time to help ensure they dealt with common issues in a consistent manner. For example, developing new hydro energy sources will further reduce GHG emissions while increasing energy supply.

The Energy Strategy identifies goals, principles, and actions related to the development of energy resources in Yukon and the management of energy. While actions already underway in the following areas are noted in the Action Plan, it is the Energy Strategy that deals in detail with:

- energy conservation and efficiency
- electricity production, distribution and supply
- alternate and renewable energy production, and
- energy resource development.

definitions

Renewable energy – Energy that comes from sources renewed on an ongoing basis through natural processes. Examples include the sun, the wind, wood, flowing water, or relatively warm ground, air or water temperatures.



The *Energy Strategy for Yukon* – released in January 2009 – sets out a long-term vision for the responsible development of energy resources. The Strategy can be downloaded at http://www.emr.gov.yk.ca/energy/energy_strategy.html





Regional climate change scenarios – Climate change scenarios will help researchers understand how Yukon’s climate is changing and trends for the future. Scenarios describe possible future climate and can project climate variability and changes, such as those associated with precipitation or extreme weather events.

Yukon Alternative Energy Demonstration Project

In 2008 a hybrid, solar and wind renewable energy demonstration project was refurbished at Yukon College and put on public display. This project included a partnership between the Yukon government, the Northern Research Institute and Yukon College.



ACTIONS IN DETAIL

GOAL 1: ENHANCE OUR KNOWLEDGE AND UNDERSTANDING OF CLIMATE CHANGE

Priority: Research

In order to respond to climate change we must learn about and understand it, accepting that climate change and supporting science is continually evolving. To further knowledge development, the Yukon government must support and be actively engaged in research. This will help us better understand what changes are occurring and how to incorporate new knowledge into decision making.

Work now underway in this area... includes leading and participating in research projects across the territory on a variety of topics from geology to agriculture to biological diversity. Information on these activities is regularly shared with the public through reports, workshops, presentations, news releases and the Yukon government website. The research priority also includes administering a permitting process and collecting results through Yukon Archives.

Actions to be undertaken ...

- **Establish a Yukon Research Centre of Excellence**
Effective coordination and distribution of research in the territory ensures that information gets to the people who need and will use it. The Centre of Excellence will facilitate research and help achieve a number of other climate change objectives related to monitoring and research, adaptation, and reducing GHG emissions.
- **Establish climate change research study areas**
Undisturbed natural ecosystems are needed for monitoring and research to support climate change research projects in Yukon. These ecosystem study areas will support the gathering of knowledge required to understand and respond to climate change. These study areas will become part of national and international monitoring networks.
- **Develop regional climate scenarios**
Understanding how the climate may change over time helps us make informed planning and management decisions. ‘Regional Climate Scenarios’ would show the variety of climatic conditions that could be experienced in Yukon and the challenges those changes may pose for a community or a profession, such as engineering.



Yukon College, a central hub for northern research.

GOAL 1 CONTINUED...

ONGOING: PUBLIC EDUCATION

Climate change affects us all. In order to be able to adapt and take action to reduce our contribution to it, we all need to be aware of the impacts, consequences and potential responses.

Work now underway in this area... includes providing public presentations and maintaining networks to disseminate climate change information. Examples include incorporating climate change information in school curriculum materials, and providing financial support to the Northern Climate ExChange for public education and outreach.

Actions to be undertaken... Government will identify additional opportunities to share climate change information with the public, especially in those areas where we have a direct role, e.g. public education.

ONGOING: TRAINING

Some sectors will be affected more than others by climate change, for example building construction. Construction methods will need to be adjusted in order to adapt to climate change impacts as well as reduce GHG emissions. Some sectors will need to modify their business operations. Training and education will raise awareness of how climate change may affect specific sectors and provide advice on how to best respond.

Work now underway in this area... includes training such as courses on fuel efficiency for fleet vehicles, energy evaluator skills, self-help courses for home builders, and alternative energy systems for heating and training on the Leadership in Energy and Environmental Design (LEED) standard.

Actions to be undertaken... Government will identify additional training opportunities based on need and demand. We will look to expand programming to professionals based on demand.

definitions

Northern Climate ExChange (NCE) – As part of the Northern Research Institute of Yukon College, NCE provides a credible independent source of information, develops shared understanding and promotes action on climate change in northern Canada.

Students in Faro are part of the Permafrost Health Outreach Program.





The Yukon government, in partnership with University of Alaska, is field testing permafrost adaptation techniques to reduce costly and dangerous frost heaves on Yukon highways.



The Yukon government, through the Northern Strategy Trust Fund, has helped the Yukon River Inter-Tribal Watershed Council undertake specialized water quality monitoring of the Yukon River Basin. This international research project is gathering climate change-related baseline data. The project trained eight Yukon First Nations members in water quality testing. This water data then can be analyzed to monitor the Yukon River for changes. The intensive sampling program began in 2008 and will continue until 2010.

GOAL 2: ADAPT TO CLIMATE CHANGE

Priority: Infrastructure

The Yukon government has an enormous investment in infrastructure including roadways, bridges, airports, buildings and underground water and sewer lines. We need to consider the impacts of climate change when planning and maintaining our infrastructure to ensure it is safe, available for use, and fiscally responsible.

Work now underway in this area... includes experiments with different road building techniques to reduce permafrost degradation, monitoring permafrost and terrain hazards to inform planning, and keeping up to date on construction developments to ensure new builds are meeting national guidelines.

Actions to be undertaken...

- **Complete a Yukon infrastructure risk and vulnerability assessment and determine adaptation strategies needed in response**
Yukon's infrastructure is vulnerable to changes in climate, such as precipitation and freeze-thaw cycles. This assessment will measure the risk to government-owned infrastructure and identify adaptation strategies to inform future planning.
- **Develop an inventory of permafrost information**
Changes to permafrost pose a large risk to Yukon infrastructure. This project will document past and present geological conditions in order to determine potential future changes to ground conditions, which will in turn help inform decision making.



GOAL 2 CONTINUED...

Priority: Water

Water is essential to life in Yukon including drinking water, fish and wildlife, electricity production, and recreation. We need to continue to monitor the impacts of climate change on water in order to best protect public safety, property and the environment.

Work now underway in this area... includes ongoing monitoring of water systems across Yukon, e.g. monitoring stream flow and snow pack levels. Flood forecasting is also conducted and used by emergency response agencies and the public to help protect public safety and private property.

White Sweet Clover is an invasive species in Yukon. At more than two metres tall it can obscure a driver's view of signage and wildlife, creating a serious hazard for motorists.

Actions to be undertaken ...

- **Complete a Yukon water resources risk and vulnerability assessment**
The quantity and quality of Yukon's water resources, both ground and surface, are expected to change due to climate change. Understanding the risks and vulnerabilities posed to Yukoners by these changes is an essential step to developing a response and ensuring water management decisions are being made with the best information available.
- **Create a tool to facilitate the collection and distribution of water quantity and quality data**
A variety of water data is collected across the territory by governments and the private sector. A tool that centralizes this data will provide access to this valuable information for use by decision makers responsible for managing water in Yukon.

In 2004, more forest burned in Yukon than in the rest of Canada combined.

Priority: Forests

The Yukon government needs to assess the risks that climate change poses to forest health and find out ways to respond to them. Forests are important to our economy, provide a vital carbon sink, and support biodiversity.





Water management in the territory involves the interests of:

- Yukon government
- Federal government
- First Nation governments
- Municipalities
- Boards and Councils
- Stakeholders



Work now underway in this area... includes the ongoing operation of the Model Forest Special Project Area, government support for the Strategic Forest Management Plans now being developed and implemented by the Champagne and Aishihik First Nations and the Teslin Tlingit Council, and support to the University of British Columbia and the Northern Climate ExChange’s work to build an environmental information base for Yukon.

Actions to be undertaken ...

- **Conduct a Yukon forest health risk assessment**
The health and viability of Yukon forests is sensitive to climate change. This assessment would identify past, present and future forest health concerns, identify appropriate monitoring systems, and suggest strategies for adaptation.
- **Conduct treatments to reduce forest fuel loads and protect communities**
Scientists confirm that the average temperature is rising in Yukon, which in turn increases the risk of forest fires. Fire Smart is a successful program that reduces the fuel load within communities, helping to protect them from forest fires. Plans to reduce the fuel load in large areas outside of communities are needed to further protect communities.
- **Conduct a Yukon forest tree species and vulnerability assessment**
It is expected that changes in climate will shift the tree line. Identifying the vulnerabilities of Yukon tree species to climate change and options for adaptation will inform Yukon forest management decisions.

Ongoing: Biodiversity

Yukon is rich with a wide variety of flora and fauna. Climate change may threaten this diversity. Yukoners rely on flora and fauna for food, business, and recreation. We need to understand how biodiversity is affected by climate change.

Work now underway in this area... The Yukon government currently participates and leads a number of monitoring programs that contain climate change elements, such as the Wolf Creek Research Basin and the Arctic Borderland Ecological Knowledge Co-op.

Actions to be undertaken... We will continue to work with partners on monitoring programs, including the long term monitoring of species of high value to Yukoners. Expanding programming or monitoring of invasive species will be considered in the future.

GOAL 2 CONTINUED...

Ongoing: Land Use Planning

Climate change will affect how land is used and managed. Land use planning is taking place across Yukon on many levels. These land use plans will need to ensure the implications of climate change are considered and incorporated.

Work now underway in this area... The Yukon government is currently involved in a number of regional and local land use planning projects across Yukon.

Actions to be undertaken... We will continue to participate in these planning exercises and bring the relevant knowledge available about climate change to the table for consideration.

Ongoing: Human Health

The extent of the impacts climate change will have on human health and well-being in Yukon are currently unknown. Climate change could result in an increase in vector born diseases, lack of access to fresh fruit and vegetables, agricultural products, and indigenous meats or a general decline in health and well-being due to changing weather patterns. Depending on how climate change affects Yukon over time, the reverse could also be true. Warming trends could make it possible to increase agriculture.

Work now underway in this area... includes monitoring health trends to identify and develop responses and providing Yukoners with essential health services that are responsive to demands and change.

Actions to be undertaken... We will continue to monitor health trends, evaluate our health programs and keep services responsive to changing priorities and demand.



The Yukon government participates in numerous monitoring programs with climate change components, including:

- Wolf Creek Research Basin
- Porcupine Caribou Herd Body Condition Assessment
- Kluane Ecosystem Monitoring Project
- Mammalian Biodiversity Monitoring.



- The Government of Canada released *Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity* in 2008.
- This report identifies important health considerations as a result of climate change.

The Marsh Lake Flood Response Incident Management Team received the Premiers Award of Excellence for its response to flooding in the summer of 2007.





Climate change is likely to cause a cascade of impacts on animals, including the Southern Lake caribou pictured here.



- The Northern Climate ExChange, funded by the Yukon government through the Northern Strategy Trust, is currently in the process of completing a Climate Change Adaptation Plan for Dawson City. This plan seeks to identify Dawson-specific initiatives for building community resilience to a changing climate. These initiatives will be identified in the short-term, mid-term and long-term (5-20 yrs, 20-50 yrs and 50-100 yrs).

Ongoing: Community Adaptation Planning

Adaptation to climate change happens at the local level. Communities require support in order to make informed decisions regarding climate change. Yukon communities are already moving forward on the planning that is required to respond to climate change, including completing community sustainability plans.

Work now underway in this area... includes providing support through the Northern Strategy Trust Fund to the Northern Climate ExChange to assist three Yukon communities to develop and implement community adaptation plans.

Actions to be undertaken... We will continue to support community-level adaptation planning with technical advice and expertise as well as financial resources.

Ongoing: Emergency Response Planning

Climate change may bring more frequent extreme weather events such as storms, forest fires and floods. It is important to be prepared for emergencies so as to ensure public safety and security.

Work now underway in this area... includes planning and assistance to Yukon communities in developing their own emergency response plans.

Actions to be undertaken... We will continue to work proactively to identify potential new or expanded threats or events that might be the result of climate change in Yukon and develop or update response plans as necessary.



GOAL 2 CONTINUED...

Ongoing: Agriculture

Climate change and rising temperatures may provide new agricultural opportunities in Yukon. Changes to Yukon's water regime may provide a positive impact in some areas and negative in others. Supporting the local production and sale of agricultural products will reduce food transportation costs and increase local sustainability for Yukoners.

Work now underway in this area... includes supporting the local production and sale of agricultural products through the provision of information, expertise, promotions and project support.

Actions to be undertaken... We will continue to work with local producers to enhance the production and supply of agricultural products. We will also prepare for the opportunities or threats to the agricultural community as they become apparent.

Ongoing: Building Standards

Climate change will affect the environmental health and safety of our buildings. This may include issues related to changes in ground stability from melting permafrost, air temperature, moisture and winter snow loads.

Work now underway in this area... includes regulating and enforcing building standards and working with other jurisdictions to keep up to date on building standard best practices and guidelines.

Actions to be undertaken... We will work to alter building standards to address these issues.

Agriculture in Yukon may expand northward, beyond this Carcross farm, as a result of climate change.





- The Mayo-Dawson transmission line continues to displace 10,000 tonnes of GHG emissions each year.
- Phase 1 of the Carmacks to Stewart Crossing Transmission Line was completed in fall 2008 and will reduce GHG emissions by 23,000 tonnes per year.
- \$5 million was allocated to install a third hydro turbine at the Aishihik hydro electric plant. This addition will reduce GHG emissions by up to 3800 tonnes a year.

Yukon Energy can generate up to 112.4 megawatts (MW) of power, of which 75.4 MW comes from hydro, 0.8 MW from wind, and the rest from diesel.

GOAL 3: REDUCE OUR GREENHOUSE GAS EMISSIONS

Priority: Yukon Government Operations

The Yukon government owns and operates a large number of buildings and vehicles. We also participate in activities that produce GHG emissions such as field work with aircraft and operating heavy machinery for snow clearing and road maintenance. The Yukon government will demonstrate leadership by reducing GHG emissions from our operations. As most GHGs from our operations are produced from burning fossil fuels, this commitment is both environmentally and fiscally responsible. Some of these actions are jointly being undertaken with the Energy Strategy for Yukon.

Work now underway in this area... includes actively adapting our light and heavy vehicle fleets. In the light fleet, work is underway to: reduce the size of the fleet; reduce the total distance driven; reduce idling rates; provide cost incentives to drive more fuel efficient vehicles; and reduce the proportion of larger vehicles in the fleet. In the heavy fleet, work is underway to: reduce and monitor idling time; improve preventive maintenance routines; improve tire performance; convert used engine oil to furnace oil; and recycle used anti-freeze. This priority also includes supporting enhanced recycling and composting within some departments to increase landfill diversion and building tools to track energy use in government buildings.

Actions to be undertaken...

- **The Yukon government will meet the following emission reduction targets in its internal operations: cap GHG emissions in 2010, reduce GHG emissions by 20% by 2015 and become carbon neutral by 2020**

A target is essential to measure long-term progress. Targets for an absolute reduction in GHG emissions from government's internal operations will in part be met by the actions identified below. New actions will be identified and completed in the future to keep us on track to meet these targets.

- **Report on Yukon government operations through 'The Climate Registry'**

A reporting mechanism is required in order to measure and track progress against the target. The Climate Registry is a third party verification organization which provides tools and support to track GHG emissions. The government will publicly release the compiled emission reports annually.

continued

- **Develop a carbon offset policy for internal operations**
A policy will be developed to help us offset the emissions produced by our operations to reach our target of becoming carbon neutral. This policy will focus on encouraging investment in Yukon-based businesses and initiatives.
- **Incorporate environmental performance considerations in the government's procurement decisions**
The Yukon government purchases a wide variety of goods and services. We will establish a green procurement policy to ensure our purchasing choices are both environmentally and fiscally responsible.
- **Government-funded new residential construction will meet GreenHome energy efficiency standards**
The energy efficiency of a home affects its long-term operation and maintenance costs as well as its GHG emissions. Using GreenHome standards for all new housing built by the Yukon government will enhance the energy efficiency of Yukon's housing stock.
- **Government-funded commercial and institutional, construction and renovation will meet or exceed the LEED Certified Standard for energy efficiency**
The energy efficiency of a building affects its long-term operation and maintenance costs as well as its GHG emissions. Ensuring the Leadership in Energy and Environmental Design (LEED) certified energy efficiency standard is met on all new commercial and institutional buildings renovated or built by the Yukon government will help reduce long term operation costs and decrease GHG emissions.
- **Improve energy efficiency and reduce the greenhouse gas emissions of the government's light vehicle fleet**
After heating buildings, transportation is the largest producer of GHG emissions for the Yukon government. Building on the work now underway, we will continue replacing older equipment with more fuel efficient models, which will in turn reduce GHG emissions substantially.

continued

definitions

Carbon Neutral – Means maintaining an equal balance between producing and using carbon. For example, the production of carbon-dioxide emissions can be off-set, or made neutral, by undertaking carbon reducing activities such as planting trees in urban areas or buying carbon offsets from a wind energy company.

Carbon Offsets – An emission reduction credit from another organization's project that results in less carbon dioxide or other GHGs in the atmosphere than would otherwise occur. Carbon offsets are typically measured in tons of CO₂ – equivalents (or 'CO₂eq') and are usually bought and sold through a number of international brokers, online retailers, and trading platforms.

Carbon Capture and Storage – A mitigation approach to reducing GHG emissions which is based on capturing carbon dioxide (CO₂) and storing it, e.g. capturing CO₂ emissions from power plants and injecting it deep into the ground.





Environment Yukon staff have been using a Smart Car since 2007.



The new Tombstone Interpretive Centre will meet Leadership in Energy and Environmental Design Standards (LEED).

The Athletes Village for the 2007 Canada Winter Games was built to the Yukon Housing Corporation's GreenHome design standard.



- **Implement an Environmental Stewardship Initiative for the Department of Education and Yukon schools**
School buildings are some of the biggest energy users in Yukon. They also house many minds that are interested and concerned about climate change. The Department of Education will work with schools on ways to identify how they can reduce their ecological and carbon footprint and provide opportunities for students and teachers to take meaningful action.
- **Establish “Green Action Committees” in all departments**
Staff involvement affects government’s ability to develop and implement actions to reduce GHG emissions. Each department will establish Green Action Committees to help identify, develop and implement actions to further support the reduction of GHG emissions within departments.
- **Conduct an energy analysis of all Yukon government buildings and complete energy-saving retrofits**
Energy use in buildings has been the biggest contributor to GHG emissions within our operations. Completing an energy analysis will help identify the buildings that require action first and identify the retrofits that are required.
- **Develop best management practices for industry to reduce GHG emissions**
Industry and business play a big role in the production of GHGs in Yukon. Helping industry and business reduce their GHG emissions will also help them reduce fuel costs. Starting with the oil and gas sector we will develop best management practices to reduce GHG emissions.



GOAL 3 CONTINUED...

Priority: Transportation

The transportation sector contributes approximately 60 per cent of Yukon's GHG emissions. Reducing emissions from this sector will significantly affect Yukon's overall GHG contribution to climate change.

Work now underway in this area... includes supporting voluntary air emissions vehicle testing clinics, encouraging the local production of goods (agricultural and other) to reduce emissions from transportation and supporting alternative-fuel manufacturing and use in Yukon.

Actions to be undertaken...

- **Undertake an extensive study of the transportation sector and recommend options to reduce emissions**
A better understanding of the transportation sector is required in order to move forward on actions to reduce emissions. This study will provide additional knowledge about where the emissions are created within the transportation sector and identify opportunities to reduce GHG emissions.
- **Develop incentives for fuel efficient transportation**
Using more fuel efficient methods of transportation is one way to reduce GHG emissions. Incentives will be considered to encourage the purchase of fuel efficient vehicles as well as promote public and active modes of transportation.

63% of the Yukon's 2006 GHG emissions were from transportation. (National Inventory Report 1990-2006. Greenhouse Gas Sources and Sinks for Canada)



The Yukon Housing Corporation operates from offices at 410H Jarvis Street. Their website is: www.housing.yk.ca. Some of the programs offered are:

- **Alternate Energy System Program** – Financial support to install alternate energy systems such as solar, wind, micro-hydro or heating systems such as heat pumps and heat exchangers in the home
- **Home Repair Enhancement Program and Rental Rehabilitation Program** – Loans for home and rental energy efficiency repairs such as window replacement and furnace upgrade
- **GreenHome Incentive** – Financial support to upgrade existing homes or build new homes to meet GreenHome standards
- **Home Energy Evaluations** – Grant for homeowners who have energy evaluations performed on their homes. Energy advisors perform an on-site assessment and submit a personalized report with recommended repairs to improve the home's energy efficiency.

Yukon's first SuperGreen houses in Watson Lake incorporate the most energy efficient construction standards in Canada.



Priority: Commercial and Residential Buildings

Approximately 30 per cent of the Yukon's GHG emissions come from heating our residential, commercial and institutional buildings. Reducing fossil fuel use in space heating will help reduce GHG emissions as well as reduce operating costs for the building owner.

Work now underway in this area... includes Yukon Housing Corporation programs that support the construction and renovation of homes to meet health and safety standards as well as energy efficiency standards. The Yukon government is also working with our inter-jurisdictional counterparts to enhance and revise national building standards with regards to energy efficiency and pilot a variety of energy efficient and renewable energy technologies.

Actions to be undertaken...

- **Develop pilot projects to demonstrate home and commercial energy efficiency and heating technology**
Increasing energy efficiency and utilizing non fossil fuel-based heating systems are an essential part of reducing emissions from space heating in both home and commercial buildings. Testing the viability and feasibility of technologies, especially for a cold climate, will help inform building owner decisions on space heating in the future.
- **Improve access to home energy evaluations by providing evaluator training**
A home energy evaluation utilizes trained local evaluators to provide useful and specific advice to homeowners. This information will help homeowners make informed decisions to increase energy efficiency. There are currently not enough evaluators in Yukon to meet the demand and more are required. The Yukon government will provide the training needed to establish more evaluators.
- **Develop wood energy opportunities for residential and institutional heating**
Burning wood efficiently to heat buildings produces less GHG emissions than burning oil. Supporting ways to efficiently use wood heat will help reduce GHG emissions as well as develop local economic opportunities for Yukon's forestry industry.

Ongoing: Solid Waste Sector

The solid waste sector produces the fifth highest amount of GHGs in Yukon. Methane is released from decomposing organic material in landfills and is a more damaging GHG than carbon dioxide. There are about 20 successful recycling and composting programs around the territory, but more can be done to support their efforts and encourage new programs to start.

Work now underway in this area... includes funding programs for recycling depots and non-governmental organizations to reduce waste generation, promote public awareness, and encourage diversion, as well as administering the Yukon Solid Waste Regulations.



The Energy Solutions Centre (ESC) operates from their office at 206A Lowe Street. Their website is: www.nrgsc.yk.ca

A couple of the services and programs ESC offers for federal and Yukon government programs are:

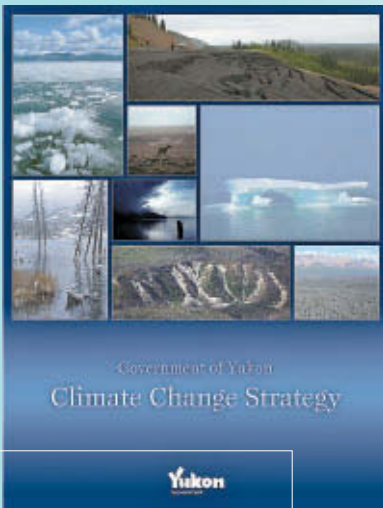
- delivering energy efficiency and renewable energy programs in Yukon, and
- distributing information on energy efficiency and renewable energy technology and programs.

Logging near Watson Lake.



definitions

Carbon Dioxide (CO₂) – A heavy colourless gas formed by the burning of fossil fuels such as coal, oil and natural gas. It is also formed in animal respiration and in the decay or combustion of animal or vegetable matter. CO₂ is absorbed from the air by plants through photosynthesis. The IPCC recognizes CO₂ as the principal contributor to increasing atmospheric levels of GHGs.



“The Yukon government will demonstrate climate change leadership” – Government of Yukon Climate Change Strategy, September 2006

did you know?

The Yukon government is part of the national effort to create a Canada-wide framework for Industrial Air Emissions.

Actions to be undertaken... We will continue to provide the Waste Reduction and Recycling Initiative and build on opportunities to expand support for community recycling programs. The Yukon government is undertaking a study to review the administration and operations of territorial solid waste sites. This review is intended to assist the government with determining sustainable management practices for the solid waste sites. The study will examine aspects such as the sustainability and viability of different disposal methods along with the associated environmental impacts, such as carbon footprint and emissions.

GOAL 4: LEAD YUKON ACTION IN RESPONSE TO CLIMATE CHANGE

Priority: Emission Targets

In order to provide clear expectations on GHG emissions, it is important to identify a Yukon-wide reduction goal. Yukon has already seen a significant reduction in its GHG emissions. Emissions in 2006 were more than 27 per cent lower than emissions in 1990.

Work now underway in this area... includes voluntary reporting of GHG emissions to Natural Resources Canada and Environment Canada.

Actions to be undertaken...

- **Forecast potential future GHG emissions for Yukon**
The potential for future emissions is important to consider when establishing a reduction target. This project will include current territorial trends and potential development scenarios. This information will help identify policies, regulations, or technologies that will help meet our Yukon-wide reduction target.
- **Work with federal partners to ensure national GHG reporting is accurate and consistent for Yukon**
Federal departments currently report on GHG emissions for provinces and territories. An accurate and consistent reporting mechanism is essential to track progress on meeting a reduction target. By working with our federal partners, we will ensure that the national reporting mechanisms are appropriate for Yukon.
- **Set a Yukon-wide emissions target within two years**
A Yukon-wide GHG emissions target will provide clarity. Technical research and analysis will be undertaken to develop a Yukon-wide reduction approach. The target will be developed in a manner that shows our commitment to reducing our contribution to climate change, yet still allows for responsible growth of our population and development of our resource based industries.

GOAL 4 CONTINUED...

Priority: Leadership

The Yukon government can and will provide leadership on climate change in the north. Yukoners are feeling the effects of climate change and urgent action is needed.

Work now underway in this area... The Yukon government developed the Climate Change Strategy as well as this Climate Change Action Plan. We have also begun developing important partnerships, including the development of the Yukon Cold Climate Innovation Centre.

Actions to be undertaken...

- **Create a Climate Change Secretariat**
Government-wide collaboration is essential if we are to provide a coordinated response to climate change, whether it is implementing actions or communicating regionally, nationally and internationally. The Climate Change Secretariat will be responsible for ensuring the effective implementation of the Action Plan as well as providing corporate leadership within government on climate change linked issues.
- **Determine the potential of a Yukon carbon market**
Carbon trading systems have been established around the world and are creating a market for carbon. Market mechanisms could help develop new opportunities for Yukoners. This project will explore these opportunities and make a policy recommendation based on the findings.
- **Incorporate climate change consideration into government decision making**
In order to make informed decisions, climate change needs to be considered in decision making processes. This will start with documents that provide advice to the Premier and Cabinet to be expanded to other levels of government decision making.

Priority: Coordination

In order to develop a comprehensive response to climate change, the Yukon government must work in partnership at the local, regional, national and international levels. These partnerships are required with all orders of government, business, industry organizations and individuals.

did you know?

The Yukon government is part of the national effort to create a Canada-wide framework for Industrial Air Emissions. The framework would target and regulate large final emitters. The government supports the effort to limit emissions provided it doesn't unduly restrict or impede economic growth in Yukon.



The Yukon government has held Yukon Youth Outside (the box), a youth engagement forum on climate change, in 2007 and 2008.

did you know?

The Yukon government took part in the Climate Leaders Summit held in Poznan, Poland in December 2008. The summit let Yukon's delegation learn best practices of other jurisdictions and build networks to support our future climate change efforts. Yukon government representatives also attended portions of the United Nations climate change conference underway at the same time.

Yukon youth are keen to be engaged on climate change.

Work now underway in this area... includes participating in national and international climate change forums, engaging youth through an annual engagement forum, and participating in numerous sector specific working groups and national organizations considering climate change.

Actions to be undertaken...

- **Create a community engagement forum for taking action on climate change**

Many governments, organizations and individuals across the territory are responding to climate change. Facilitating inter-agency collaboration and partnerships among these bodies will help achieve a coordinated Yukon response to climate change. As a small jurisdiction, working together will be more efficient and effective.

Ongoing: Review and Report

In order to ensure accountability in implementing this Action Plan we must regularly and publicly report on progress.

Work now underway in this area... The Yukon government currently reports to the public on its work through a number of different venues, including reports in the legislature, the public release of reports such as the State of the Environment Report, and through the media.

Actions to be undertaken... The Yukon government will regularly report to the public on the progress made on implementing this Action Plan. We will also review and update this Action Plan as necessary.





NEXT STEPS

The Climate Change Action Plan is part of the Yukon government's commitment to address climate change in the territory. The plan identifies priority actions to be undertaken right away that will involve several different departments.

During the public consultation, we heard the public expected us to take a visible and measurable approach and to show leadership. In response, we've ensured this Action Plan sets out the steps we will be taking in the immediate future as well as the actions we are already taking. We have made clear which areas the Yukon government will take the lead on.

The Yukon government will need a multi-party and multi-disciplinary approach to implement and coordinate this Action Plan. Government will need to work in partnership to effectively respond to climate change. We must also expand our technical expertise in climate change, especially the management and reduction of GHG emissions.

The Climate Change Action Plan identifies the many actions needed for an effective response to climate change. It sets out the policies, programs, and research the Yukon government will undertake or enhance. It shows how work already underway advances the goals first set out in the Climate Change Strategy.

Did you know? Environment Yukon biologists and other researchers are involved in a 41 inventory and 17 wildlife management projects. Pictured here are members of the 40 Mile caribou herd where a lichen assessment is underway.

Climate change likely played a role in this large landslide near Carmacks in 2006. Warming temperatures caused the permafrost layer to thin, thus weakening the soil strength.

did you know?

The Yukon government supports the principles of the Kyoto Accord reached in 1997.



Copenhagen, Denmark will host a major UN climate change conference in 2009 that, if agreement is secured, will put in place a successor treaty to the Kyoto Protocol of 1997.

Climate change and energy use are very closely linked – and what type of energy we use affects our GHG emissions levels. The Action Plan does not focus on energy sources and production in detail as these areas are dealt with by the Energy Strategy for Yukon. The Yukon government recognizes, however, that energy production, sources and use will significantly affect our efforts to adapt to climate change impacts.

Individual Yukoners must also find ways to adapt to, understand, or reduce their individual contributions to climate change. During the public consultation we heard that Yukoners are interested in taking personal action in response to climate change. While the focus of the Climate Change Action Plan is on actions the Yukon government will undertake to address climate change within its areas of responsibility, many actions do include the public, e.g. housing programs. *(See Appendix 6 for a list of climate change resources available to the public, including suggestions for individual action.)*

Work by the Yukon government and others in response to climate change will provide economic, social and other environmental benefits. It is essential that we all prepare for the impacts of a changing climate. Climate change is real, and it threatens our forests, our watersheds, and our way of life.

Ultimately, it will be the collective action of Yukoners that determine whether or not we will successfully adapt to climate change in the North. This Action Plan places a high priority on actions and programs that are accessible to the people of Yukon and benefit all members of the public.





APPENDIX 1: CLIMATE CHANGE AND GREENHOUSE GASES

According to the *Arctic Climate Impact Assessment* (2004), many climate change impacts are already being observed in the North. The assessment noted that:

- permafrost and polar ice are melting at unprecedented rates,
- sea levels are rising,
- coastlines are eroding,
- glaciers are receding,
- beetle infestations are occurring in our forests, and
- new species of animals and plants are moving into northern areas while other northern native species are declining.

The Intergovernmental Panel on Climate Change's (IPCC) *Fourth Assessment Report* (2007) found that the overall temperature of the globe has risen 0.74°C over the past century. Environment Canada reports that the country's average temperature has risen about 1°C between 1950 and 2000. According to the *Arctic Climate Impact Assessment* (2004), winter temperatures in Alaska and western Canada (including Yukon) have increased by as much as 3-4°C in the same time period.

Caribou calf.

How the Greenhouse Effect works:

Our planet is kept warm due to the greenhouse effect. This means that energy radiated by the earth is trapped by the atmosphere instead of escaping into outer space. GHGs (carbon dioxide, methane, and nitrous oxide) that trap this energy are usually found in the atmosphere at very low concentrations. However, the concentration of these gases is increasing and scientists believe this is, in part, a result of human activities such as the burning of fossil fuels.

Prior to the Industrial Revolution, the IPCC says that carbon dioxide (CO₂) concentration in the atmosphere was 280 ± 10 parts per million (ppm) for several thousand years. But, according to Environment Canada, the present atmospheric CO₂ concentration is above 360 ppm. This is the highest level of CO₂ concentration in our atmosphere in the past 420,000 years. These high concentrations are trapping more and more of the energy radiated from the earth which, in turn, is contributing to global temperatures and affecting our climate.

The *Arctic Climate Impact Assessment* report projected that the rate and magnitude of future temperature change will be greatest in high latitude regions of the Northern Hemisphere. The assessment predicted that average temperatures in the arctic may rise by as much as 4 to 7 degrees Celsius in the next 100 years.





GHGs and Global Warming:

The IPCC considers global climate change to be the most significant threat our environment faces today.

The IPCC believes there is a direct link between the increase of GHGs in our atmosphere and global increases in temperatures. For this reason, many jurisdictions are introducing measures to limit their GHG emissions. For instance, the Government of Canada has made climate change a priority and has developed emissions regulations and GHG reduction targets.

The most common GHG in our atmosphere is Carbon Dioxide (CO₂), which is formed through natural processes and by the burning of fossil fuels. Compared to the rest of the country, Yukon contributes only a small percentage of the total Canadian GHG emissions. According to Environment Canada's *National Inventory Report 1990-2006: Greenhouse Gas Sources and Sinks in Canada*, Yukon residents each produce approximately 12.6 tonnes of GHGs annually. According to the same report, this is below the national average of 22.1 tonnes.

Greenhouse Gas Emissions in Yukon:

In looking at Yukon GHG emissions by sector (see *Figure 2: Yukon Greenhouse Gas Emissions by Sector*), Environment Canada statistics show that:

- The cyclical nature of Yukon's resource economy significantly affects emission levels. Emissions were highest in 1996 and lowest in 2006. There was more activity in Yukon's mining industry in the 1990s than there is now.
- The transportation sector accounts for the largest share of GHG emissions in Yukon. In this sector, heavy duty diesel vehicles are the largest contributors. Other significant contributors include government, business, and personal vehicles.
- Off-road diesel use is a major contributor. This includes activities such as use of heavy mobile equipment in the construction, agriculture and mining sectors, and recreational vehicles such as snowmobiles and all-terrain vehicles (ATVs).
- The electricity sector can be a major contributor to GHG emissions when energy demands are high. When the demand for electricity exceeds Yukon's hydro generation capacity, diesel generators are used to make up the shortfall.

According to the *Arctic Climate Impact Assessment* (2004), arctic sea-ice coverage has shrunk over the past 50 years. This Beaufort Sea iceberg is off the coast of Yukon.

Figure 2: Yukon Greenhouse Gas Emissions by Sector

Greenhouse Gas Categories	1990	1995	2000	2001	2002	2003	2004	2005	2006
TOTAL (kt CO₂ eq)	538	547	445	433	444	440	414	398	394
ENERGY	526	532	430	418	428	424	398	382	377
a. Stationary Combustion Energy	226	248	191	168	169	163	131	126	123
Electricity and Heat	93.6	53.3	17.0	14.6	17.2	10.7	7.99	7.53	7.81
Fossil Fuel Industries	2.9	91	84	56	48	28	11	29	38
Mining & Oil and Gas	4.12	10.3	1.54	2.09	2.90	2.11	1.73	3.08	0.53
Manufacturing	8.01	0.47	—	0.03	—	—	—	—	—
Construction	5.46	4.45	2.40	1.64	1.58	2.65	1.95	1.07	1.06
Commercial / Institutional	81.9	60.8	52.9	51.2	53.1	58.5	40.0	39.8	30.4
Residential	29	19	33	29	31	41	55	39	39
Agriculture & Forestry	1.24	7.56	0.95	13.9	14.7	19.9	13.2	6.27	6.02
b. Transportation Energy	300	280	240	250	250	260	260	250	250
Domestic Aviation	21	21	23	16	15	20	22	22	27
Road Transportation (total)	180	218	162	165	168	164	160	157	144
Light Duty Gas Vehicles	79.1	72.5	48.9	47.2	45.6	45.0	39.1	34.3	28.5
Light Duty Gas Trucks	30.4	41.7	39.6	41.4	42.5	44.2	40.3	37.7	33.5
Heavy Duty Gas Vehicles	10.2	9.69	5.89	6.28	6.08	6.31	5.83	5.28	4.49
Motorcycles	0.46	0.41	0.32	0.32	0.35	0.38	0.35	0.32	0.27
Light Duty Diesel Vehicles	0.55	0.51	0.35	0.34	0.33	0.34	0.32	0.28	0.24
Light Duty Diesel Trucks	0.60	0.96	2.51	2.55	2.58	2.71	2.53	2.65	2.68
Heavy Duty Diesel Vehicles	57.2	88.0	63.5	65.5	69.0	63.6	69.9	75.2	72.7
Propane & NG Vehicles	1.5	4.0	0.68	1.0	1.6	1.9	2.1	1.1	1.5
Others (total)	100	40	50	70	70	70	80	70	80
Off Road Gasoline	10	8	10	10	10	10	3	3	2
Off Road Diesel	90	30	40	60	60	60	80	70	80
c. Fugitive Sources	—	3.77	2.71	2.15	5.40	3.54	2.71	2.12	1.03
Oil and Natural Gas	—	3.77	2.71	2.15	5.40	3.54	X	X	X
INDUSTRIAL PROCESSES	1.38	2.09	0.71	0.61	0.99	0.75	0.49	0.56	0.56
SOLVENT & OTHER PRODUCT USE	0.18	0.22	0.24	0.21	0.16	0.21	0.20	0.17	0.31
WASTE	10	12	14	14	14	15	15	16	16
a. Solid Waste Disposal on Land	7.6	9.3	11	11	12	12	12	13	13
b. Wastewater Handling	2.9	3.2	2.9	2.8	2.8	3.0	3.1	3.1	3.1

Source: Summary of GHG Emissions for Yukon: Environment Canada. National Inventory Report 1990–2006. Greenhouse Gas Sources and Sinks for Canada. 2008.

Notes: (1) — : Indicates no emissions. (2) X: Indicates confidential data. (3) kt CO₂ eq: Kilotons of CO₂ equivalent. (4) Emission totals in chart may not add up due to rounding protocol.



APPENDIX 2: YUKON GOVERNMENT DEPARTMENTS AND THEIR ROLES

The Yukon government can use regulations, policies and programs to respond to climate change.

Many different government departments are involved in climate change-related matters and will be active participants in the implementation of the Climate Change Action Plan. Departments have the following areas of involvement in climate change:

Community Services is responsible for local area planning in rural areas; vehicle licensing and registration (shared with Highways and Public Works); building codes and standards; emergency preparedness, operation of solid waste sites and infrastructure development.

Economic Development is responsible for programs to assist business development in the territory, including ones that may address new threats or opportunities presented by climate change.

Education is responsible for public education in Yukon, including the development of school curriculum that addresses climate change issues.

Energy, Mines and Resources is responsible for developing territorial energy policies; designing and delivering public programs on energy conservation and efficiency; managing the development of pipelines in the territory; forest resource management; geological, soil and permafrost surveys; agriculture; managing and regulating Yukon's mineral resources and oil and gas resources; and regional land use planning.

Environment is responsible for wildlife monitoring and management; biodiversity and ecosystem monitoring; air and water quality; hydrological monitoring; environmental education; territorial waste reduction and recycling programs; environmental protection; and the preparation of this Action Plan.

Executive Council Office is responsible for supporting the incorporation of northern technology, knowledge and experience in climate change plans and programs. ECO also supports intergovernmental relations, and provides corporate assistance and leadership with respect to assessment of development projects.

Health and Social Services is responsible for health care and health programs that may be needed to address climate change-related health issues.

APPENDIX 2 CONTINUED...

Highways and Public Works is responsible for Yukon's highways, aviation and marine infrastructure (airports and ferries) and all government buildings and infrastructure, including fleet vehicles.

Tourism and Culture is responsible for managing heritage sites and artifacts; encouraging the preservation and rehabilitation of historic buildings; supporting Yukon's tourism industry and promoting best practices in the industry; providing licenses to researchers and scientists doing work in Yukon; and conducting research on the paleo-history of Yukon.

Yukon Development Corporation is a crown corporation of the Yukon government which works with the Yukon Energy Corporation to provide electricity and related energy services in the most economical yet environmentally and socially responsible way possible.

Yukon Energy Corporation is a publicly-owned electrical utility that operates as a business, at arms length from the Yukon government, and are the main generator and transmitter of electrical energy in Yukon. YEC works with its parent company, Yukon Development Corporation, to provide Yukoners with a sufficient supply of safe, reliable electricity and related energy services.

Yukon Housing Corporation is responsible for building and operating government-owned staff and social housing, and delivering numerous housing programs available to the public to help upgrade and repair homes and improve the energy efficiency of housing stock Yukon-wide.



University of Alberta scientists found permafrost just south of Dawson City that is about 740,000 years old.



APPENDIX 3: YUKON GOVERNMENT PARTNERS

The Yukon government is committed to building partnerships with other levels of government and non-government organizations to address climate change in Yukon. Climate change cannot be solely the responsibility of one government or organization – a comprehensive and coordinated approach to adaptation, reducing GHG emissions and research is needed.

Partners in the Yukon government’s response to climate change could include:

Government of Canada: The Government of Canada sets and promotes broad goals for addressing climate change at the national level, sets related federal regulations and standards and has a number of initiatives related to climate change in place. It has funding programs designed to support climate change work by other organizations, including initiatives in the North. Canada also participates in international forums and agreements on climate change.

Inter-governmental Forums: Inter-governmental and international forums that address climate change and network on related topics include, but are not limited to, groups such as the Canadian Council of Ministers of the Environment, the Canadian Council of Resource Ministers, the Canadian Council of Forest Ministers, the Council of the Federation, the Western Premiers Forum, the Northern Premiers Forum, and the Arctic Council.

Non-government Organizations: Several Yukon-based NGOs are involved in climate change initiatives.

Privately Owned Businesses: Many Yukon-based businesses are already taking action to respond to climate change. Home appliance retailers and heating and building contractors, for example, provide products and technologies that promote energy conservation. Resource-based activities are also affected, since they are both major energy consumers and are looking for ways to conserve energy.

Public: Many individual Yukoners have made a conscious decision to reduce their contribution to climate change and adapt as necessary. One way is to improve energy conservation and efficiency in their homes, which results in cost savings as well as reduced GHG emissions.

APPENDIX 3 CONTINUED...

Universities and Research Institutes: Many universities and research organizations based outside of Yukon are actively engaged in research projects related to climate change here. These organizations contribute expertise, knowledge and funding to climate change initiatives in Yukon. They often collaborate with local researchers, organizations and communities in their work.

Yukon College: Yukon College, through the Northern Research Institute and the Northern Climate Exchange, undertakes research and action projects on northern climate change and provides related support, information outreach and education.

Yukon First Nations: Yukon First Nations are involved in delivering a variety of programs to their citizens, and are committed to addressing climate change through the use of traditional knowledge and other means.

Yukon Municipalities: Municipal governments are engaged in developing and implementing Integrated Community Sustainability Plans. These plans address issues such as community energy systems, public transit, waste disposal and energy efficiency. Municipalities are also responsible for land planning, municipal infrastructure and services within their municipalities.

Migrating Tundra and Trumpeter swans rest and feed at M'Clintock Bay each spring on their way to their northern nesting grounds. This is one of the few ice-free waterbodies in the region in April, making it a critical stopover but one that is very dependent on local weather conditions.





APPENDIX 4: GLOSSARY

Adaptation – Taking actions that can prevent or reduce the negative impacts of climate change and/or build on the positive impacts. Adaptation means managing risks in a way that makes infrastructure, buildings, economic and social activities, and the natural environment more resilient to change. Adaptation provides a way to ensure safer, more sustainable and self-sufficient communities.

Carbon Capture and Storage – A mitigation approach to reducing GHG emissions. It is based on capturing carbon dioxide (CO₂) and storing it, e.g. capturing CO₂ emissions from power plants and injecting it deep into the ground.

Carbon Dioxide (CO₂) – A heavy colourless gas formed by the burning of fossil fuels such as coal, oil and natural gas. It is also formed in animal respiration and in the decay or combustion of animal or vegetable matter. CO₂ is absorbed from the air by plants through photosynthesis. The IPCC recognizes CO₂ as the principal contributor to increasing atmospheric levels of GHGs.

Carbon Neutral – Means maintaining an equal balance between producing and using carbon. For example, the production of carbon-dioxide emissions can be off-set, or made neutral, by undertaking carbon-reducing activities such as planting trees in urban areas or buying carbon offsets from a wind energy company.

Carbon Offsets – An emission-reduction credit from another organization's project that results in less carbon dioxide or other GHGs in the atmosphere than would otherwise occur. Carbon offsets are typically measured in tons of CO₂-equivalents (or 'CO₂eq') and are usually bought and sold through a number of international brokers, online retailers, and trading platforms.

Climate – The average weather for a particular region and time period.

Climate Change – A change in the average weather that a given region experiences. Climate change on a global scale includes changes to temperature, shifts in wind patterns, and changes to precipitation.

CO₂ – Carbon Dioxide.

Fossil Fuels – Fuels containing carbon, the most common being coal, oil and gasoline. These fuels were formed over millions of years through the decay, burial and compaction of rotting vegetation and marine organisms. Fossil fuel combustion is the major contributor to human-generated GHGs in the atmosphere, according to the IPCC.

GHGs – Greenhouse gases.

Global Warming – The overall trend to a warmer climate for the planet. According to the IPCC, the Earth's atmosphere has warmed up by about 0.74°C in the last 100 years. Most climate change scientists think increased GHG emissions during this period led to an enhanced greenhouse effect which has in turn led to global warming.

Greenhouse Effect – Greenhouse gases allow incoming solar energy to pass through the Earth's atmosphere but prevent most of the heat radiating from the Earth's surface and lower atmosphere from escaping into outer space – similar to how a glass greenhouse works. The greenhouse effect is necessary to maintain life on earth because it helps keep the Earth 33°C warmer than it would be without the presence of an atmosphere. The presence of more GHGs allows the atmosphere to trap more heat. This is sometimes called the enhanced greenhouse effect.

Greenhouse Gases (GHGs) – Includes water vapour, carbon dioxide, methane and nitrous oxide.

Greenhouse Gas Emissions – The release of substances that can be transformed into greenhouse gases and/or the direct release of greenhouse gases into the atmosphere.

Intergovernmental Panel on Climate Change (IPCC) – The scientific body established to collect and synthesize the world's best research on climate change. Their work on the *Fourth Assessment Report (2007)* recently won the Nobel Prize. All reports, including the *Summary for Policymakers*, can be found online: www.ipcc.ch.

Mitigation – Measures that seek to avoid, reduce or delay global warming by reducing GHG emissions. For example, switching to renewable energy sources from gas and oil is one way to mitigate.

Permafrost – The layer of permanently frozen ground that underlies more than half of Yukon. Permafrost exists wherever ground temperatures remain at or below 0 degrees Celsius throughout the year.

Renewable Energy – Energy that comes from sources renewed on an ongoing basis through natural processes. Examples include the sun, wind, wood, flowing water, or relatively warm ground, air or water temperatures.

Weather – The specific condition of the atmosphere at a particular place and time, determined by measuring temperature, wind speed and direction, humidity, atmospheric pressure, cloudiness and precipitation.



Salmon spawning.



APPENDIX 5: RESOURCES

DOCUMENTS

The following climate change related documents are available on the Environment Yukon website (www.environmentyukon.gov.yk.ca):

- Government of Yukon Climate Change Strategy (2006)
- A Snapshot: Yukon Government Actions on Climate Change during 2006 & 2007
- Scoping the Government of Yukon Climate Change Action Plan: Workshop Report (November 2007)
- Yukon Youth Outside (the box) Final Report (December 2007)
- 'What We Heard' summary of comments on the draft Yukon Government Climate Change Action Plan
- Draft Yukon Government Climate Change Action Plan (May 2008)

PROGRAMS

Energy Solutions Centre

206A Lowe St. (Box 2703)
Whitehorse, Yukon
Y1A 2C6

Phone: 867.393.7063

Fax: 867.393.7061

Toll free (In Yukon): 1.800.661.0408, ext. 7063

esc@gov.yk.ca

Sample programs: Good Energy Rebates, Energy Solutions Business Directory, Storefront and Outreach, Public Buildings Energy Tracking System

Yukon Housing Corporation

410H Jarvis Street
Whitehorse, Yukon
Y1A 2H5

Phone: 867.667.5759

Fax: 867.667.3664

Toll free (In Yukon): 1.800.661.0408, ext. 5759

ykhhouse@gov.yk.ca

Sample Programs: Residential Energy Programming, Green Mortgage, R-2000 Builder Updates and Workshops, EnerGuide Evaluator Training, ecoENERGY Retrofit



APPENDIX 6: 50 WAYS TO REDUCE YOUR EMISSIONS

Revised with permission from LiveSmart BC (www.LiveSmartBC.ca)

- 1 Upgrade the insulation in your house.
- 2 Reduce air leakage by caulking around vents and window and door frames, sills, joints and around any objects that penetrate exterior walls.
- 3 Plug gaps around pipes, ducts, fans and vents that go through walls, ceilings and floors from heated to unheated spaces.
- 4 Install weather-stripping where needed on windows, doors, and interior attic hatches.
- 5 Apply shrink-film to windows and glass doors.
- 6 Move furniture, rugs, and drapes away from air grills and heating vents so that heat can circulate efficiently throughout the home.
- 7 Install energy-efficient windows and doors.
- 8 Close the damper in your wood-burning fireplace when it is not in use, and ensure that the damper fits properly, so heat does not escape out the chimney.
- 9 Turn down the heat in your home by two degrees in the winter.
- 10 Turn down the heat by three to five degrees Celsius at night and while on vacation.
- 11 Turn off the heat in your garage, and turn it on only prior to using it.
- 12 Install an EnergyStar programmable thermostat.
- 13 Use your microwave or an electric heating element instead of a gas element when heating food.
- 14 Buy a high-efficiency furnace with a variable speed motor, such as one certified by EnergyStar.
- 15 Get your furnace maintained annually.
- 16 Wrap your water heater in an insulation blanket.
- 17 Set your water heater to 49 degrees Celsius.
- 18 Install a solar water heating system to heat your water.
- 19 Wash your dishes in cold water when possible.
- 20 Wash your clothes in cold water.
- 21 Install low-flow shower heads and faucets.
- 22 Take shorter showers.

- 23 Use a front-loading washing machine, which saves water.
- 24 Hang your laundry to dry instead of using a clothes dryer.
- 25 Compost organic waste at home in your garden or with a worm composter if you live in an apartment.
- 26 Use a rake or an electric leaf blower instead of a gas-powered one.
- 27 If planting trees near your house, plant deciduous trees to the south of your house.
- 28 “Grasscycle” – leave grass clippings on your lawn or bag them and put them out for compost collection.
- 29 Use your own mulch or compost on your garden instead of buying fertilizing products.
- 30 Walk, cycle or inline skate to work one day a week.
- 31 Replace incandescent light bulbs with compact fluorescents.
- 32 Buy an electric bicycle or scooter instead of a car. This reduces vehicle emissions.
- 33 Take transit to work one day a week (or carpool).
- 34 Join a car sharing co-operative instead of owning a car.
- 35 Walk or cycle with your children to school, instead of driving. This reduces vehicle emissions.
- 36 If driving, do many short-distance errands at once so your engine stays warm.
- 37 Purchase vehicle fuel mixed with renewable ethanol, when and where it is available.
- 38 Drive below 90km/hr.
- 39 While driving, drive moderately and accelerate slowly.
- 40 Maintain proper tire inflation for your car; check your tires weekly.
- 41 Schedule regular maintenance checks for your car.
- 42 Turn off your car instead of idling for periods longer than 10 seconds.
- 43 Use a reusable bag for shopping.
- 44 Buy products that are recyclable.
- 45 Buy products that have recyclable packaging.
- 46 Buy products that are reusable.
- 47 Buy good-quality, long-lasting products that you will not have to replace so soon.
- 48 Recycle as much waste as possible.
- 49 Use rechargeable batteries where possible.
- 50 Plant a tree.



Tree seedlings.



