



Yellowknife

community energy plan

Yellowknife Community Energy Planning Committee



July 21, 2006



Table of Contents

Abbreviations	1
Acknowledgements	2
Summary – Yellowknife Community Energy Plan	6
PART 1: Introduction	10
1-1 Background.....	10
1-2 CEP Committee’s Vision, Goals, & Targets	10
1-3 The Interim CEP – 8 Action Areas.....	11
PART 2: Yellowknife’s GHG Emissions and Energy Profile and Forecast.....	12
2-1 Introduction - Unique solutions for a unique City.....	12
2-2 Yellowknife Energy and Emissions Profile 2004.....	13
2-3 Action Areas – What is feasible?	14
2-4 Forecasts and Scenarios.....	16
2-5 How to get there?.....	18
PART 3: Principles and Recommendations.....	21
3-1 Principles	21
3-2 Suggested Implementation Timeframe.....	22
3-3 Recommendations – Summary & Details	23
3-4 Next Steps.....	41
References.....	42
Appendix 1 –Fold-out energy profile poster.....	43
Appendix 2 – Suggested Terms of Reference for CEP Implementation Advisory Committee.....	44
Appendix 3 – Reference Reports and Materials	45

Abbreviations

CBIP	Commercial Building Incentive Program
CEP	Community Energy Plan
CO ₂	Carbon Dioxide – a greenhouse gas created when fuels are burned
EGH	EnerGuide for Houses – program that rates homes based on a computer model of their energy use.
EGH-80	EnerGuide for Houses - minimum score that indicates a “highly efficient house”
FCM	Federation of Canadian Municipalities
GHG	Greenhouse Gas
GJ	Gigajoules – a metric measure of energy
KWh	Kilo-watt hours – a metric measure of electrical energy
MNECB	Model National Energy Code for Buildings
PCP	Partners for Climate Protection Program
tCO _{2EQ}	Tonnes of Carbon Dioxide Equivalent – a measure of Greenhouse Gases

Acknowledgements

First, we would like to thank the many **members of the public** who contributed through public meetings, e-mails, phone calls, letters, and personal conversations.

CEP Committee Members

The volunteer CEP committee met monthly for more than a year and provided guidance from many different perspectives. The fact that they were able to reach a consensus on this plan is testimony to the amount of work they put into it.

Committee Member	Affiliation
Mark Heyck	City Councillor, Committee Chair
Allen Mueller	Northland Utilities, Committee Vice Chair
Gordon Van Tighem	Mayor, ex-officio voting member
Bill Wyness	Public Works, GNWT
Bryan Swansburg	General public member
Dave H. Johnson	YK1 School board
Doug Ritchie	Ecology North
Eitan Dehtiar	Yellowknife Chamber of Commerce
Jim Sparling	GNWT Dept of ENR
Michelle Lavigne	General public member
Randy Patrick	NWT Power Corp

Past CEP Committee members

Adrienne Forest	General public member
Bob Bromley	Ecology North
Richard Horton	Department of Public Works
Wade Carpenter	YK1 School Board

CEP “Working Group”

The “working group” met weekly throughout the process to ensure that the directions of the CEP committee were carried out. They applied for funding, coordinated committee workshops and public meetings, commissioned technical studies, and wrote the community energy plan.

Mark Heyck	CEP Committee Chair
Greg Kehoe	Director of Public Works, City of Yellowknife
Allison Morley	Assistant to Greg Kehoe
Andrew Robinson	Arctic Energy Alliance, NWT Community Energy Planning Coordinator
Michael Gannon	Interim Yellowknife Community Energy Plan Coordinator
Dennis Althouse	Superintendent, Public Works, City
Bill Fandrick	City Building Inspections Manager

Many other departments at the City were also involved in reviewing and commenting on this plan - Planning & Lands, Finance, the Clerks office, Web-site development, and many more.

CEP Funding Agencies

We could not have completed this CEP without funding from all levels of government. This is a good example of how we can combine various programs to create something better than any one agency could fund on its own.

Government of Canada	\$50K – ANCAP, INAC, represented by Aleta Fowler
City of Yellowknife	\$60K -
Federation of Canadian Municipalities	\$110K – Green Municipal Fund
Government of the NWT	\$20K – Energy Conservation Program, ENR
Government of Canada and GNWT	ANCAP, ENR & MACA - Funded NWT CEP Coordinator at the Arctic Energy Alliance, who provided project management services at no-charge to the City.

Consultants

This CEP is based on 10 studies. Many consultants worked above and beyond their budget, contributing to a process that they felt was worth the extra effort.

2004 Energy Baseline	Rob Marshall, Terriplan and Jesse Row, Pembina Institute
City Facilities Study	Mike Buchanan, Arctic Energy Alliance
City Fleet Study	Alvaro Reyes, Aboriginal Engineering
City Internal Green Financing	Matt Horne, Pembina Institute and Shelagh Montgomery, SENES
Transportation	Gary Strong, Dillon Consulting
Communications	Brian McCutcheon, Outcrop
External Green Financing	Matt Horne, Pembina Institute and Shelagh Montgomery, SENES
Sustainable Planning	Aftab Erfan and Nick Lawson, Jacques Whitford
Energy Efficient Building Standards	Innes Hood, Sheltair Group
Renewable Energy	John and Elaine Carr, A.D. Williams Engineering

Summary – Yellowknife Community Energy Plan

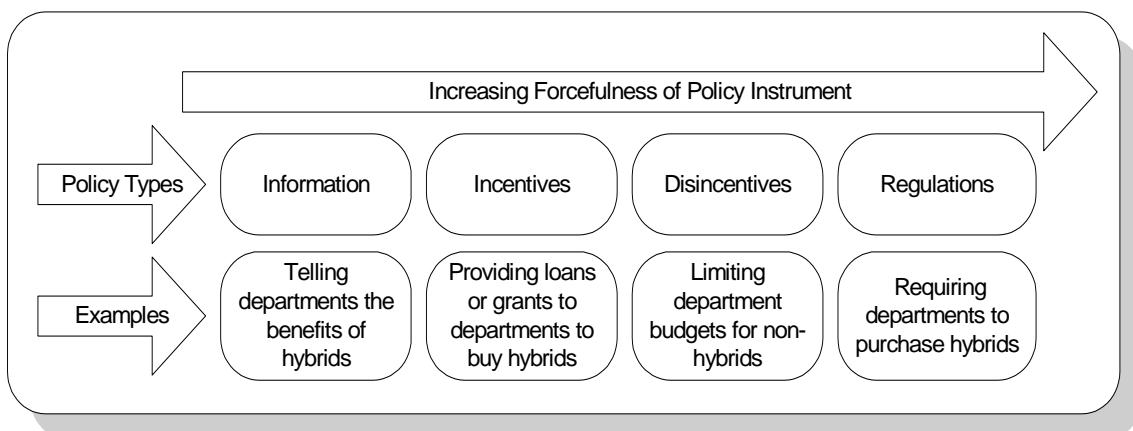
In early 2005, Yellowknife City Council formed a community energy planning committee. The committee’s task was to develop Yellowknife’s first community energy plan^a (CEP). The CEP committee members represent Yellowknife public institutions, private businesses, power utilities, and the general public. They worked hard for the last year and a half to complete the CEP.

A CEP defines specific actions a community plans to carry out, within a certain timeframe, to find better ways to make and use energy. Planning is a cycle and the CEP is a living document. With each cycle, a community defines and carries out specific actions, evaluates the outcomes, updates information about their energy use, learns about new options, and decides on new actions. With each cycle, a community has more information and makes new decisions, to keep working towards their vision of the future.

The Yellowknife CEP committee held workshops and public meetings to collect ideas. They hired technical and economic experts to do a baseline energy study and research what energy options could work best for Yellowknife to reduce greenhouse gas emissions and save money.

Using this research, the Arctic Energy Alliance developed four future energy use scenarios. The final scenario combines energy efficiency and renewable energy options. It shows that we could reduce Yellowknife’s greenhouse gas emissions by over 70% by 2024 - AND the City, residents, and businesses could save money at the same time.

The following figure shows a spectrum of policy instruments, with examples, that a community can use to take action. The forcefulness of the instruments increases from left to right, as they shift from voluntary, information-based approaches to regulatory approaches.



^a This CEP does not address the need for action on greenhouse gas emissions and climate change because the need for action was recognised when the City joined the Federation of Canadian Municipalities’ “20% Club” in 1997. An excellent update on the status of climate change in the Arctic is provided by the Arctic Climate Impact Assessment (Appendix 3).

Over 95% of Yellowknife's electricity comes from hydroelectric generators – an electricity source with low greenhouse gas emissions. Yellowknife is a compact city - people probably spend less time driving than in other Canadian cities. In spite of these factors, Yellowknife greenhouse gas emissions per person are almost twice the Canadian average and 40 times the level that the United Nations says we need, to slow down climate change.

Yellowknife's first CEP offers 12 recommendations for actions to carry out, from 2006 to 2014. The recommendations are uniquely tailored to help Yellowknife reduce greenhouse gas emissions and save money. They are based on five principles, and support the vision, goals, and targets of the CEP committee.

The recommendations use a mixture of policy instruments:

1. Put more emphasis on long-term (20 to 100 years) planning that includes life-cycle analysis of environmental, social and economic factors.
2. Incorporate energy use and greenhouse gas emissions considerations into all aspects of the City's decision-making.
3. Adopt the following targets for greenhouse gas reductions over the 2004 baseline levels:
 - a. City operations – reduce emissions by 20% by 2014.
 - b. Entire community – reduce emissions by 6% by 2014.
 - c. Adopt a long-term (20-100 years) target for the entire community by 2014.
4. Create tools to implement and monitor progress of the CEP:
 - a. Create a public committee to provide advice on the implementation of the CEP and periodically report to Council.
 - b. Hire an Energy Coordinator until at least the end of 2010.
5. Adopt sustainable energy planning guidelines based on the 21 principles in the *Definition of Sustainable Planning Principles¹* report and provide this report to City administration for use in the Planning and Development Department's development of overall Sustainable Planning Principles.
6. Lead by example on energy and climate change:
 - a. Continuously improve efficiency of all City facilities.
 - b. Initiate wood pellet heating pilot project in a City facility.
 - c. Pursue renewable energy options within City operations with the goal of replacing heating oil as a fuel source by 2014.
 - d. Require all new City facilities to meet or exceed the requirements of the Commercial Buildings Incentive Program (CBIP), which requires the building to be at least 25% more efficient than the Model National Energy Code for Buildings (MNECB).
 - e. Implement into fleet operations the following:

- Purchase a demonstration fuel-efficient vehicle such as a Smart-car or Hybrid,
 - All vehicles purchased should be in the top 10% of efficiency for vehicle class required, and
 - Fuel efficiency driver training program.
- f. Require EnergyStar appliances/office products for all new purchases.
 - g. Create an internal funding mechanism to fund renewable energy and energy efficiency projects that reduce greenhouse gas emissions.
7. Adopt energy efficient building standards and incorporate into the City's building by-law:
 - a. Use EGH-80 as a standard for new residential construction,
 - b. Use CBIP as a standard for new commercial construction, and
 - c. Use EnergyStar as a standard for appliances/office equipment in all new construction.
 8. Implement measures to encourage active transportation and transportation efficiency:
 - a. Accelerate implementation of the recommendations contained in the 2005 Integrated Parks, Trails & Open Spaces Study.
 - b. Encourage hybrid taxis and share-taxis.
 - c. Support public transit while continuing to explore opportunities to increase efficiency and effectiveness.
 - d. Make the City's fuel efficiency driver training program available to the public after it is established.
 - e. Implement specific measures to make cycling and walking easier such as the creation of bike lanes and improved maintenance of sidewalks and walking trails.
 - f. Investigate ways of strengthening the Yellowknife anti-idling by-law.
 9. Promote action from other orders of government:
 - a. To create a green financing mechanism for residents and businesses.
 - b. To make bio-fuels available in the NWT as they become available in the Canadian market place.
 10. Form local and regional energy partnerships
 - a. Partner with local utilities and building owners (including other levels of government) to facilitate an early start to construction of a new hydro-electric station on the Snare system so that hydro-electricity can be used to replace fossil fuels.
 - b. Partner with local businesses, including northern mines, to draw on their expertise in energy management.
 11. Inform the public about Yellowknife's Community Energy Plan and share the success stories and innovative actions that the City is taking.

12. Pilot a green financing program for City home owners that focuses on reducing the use of fossil fuels for home heating.

PART 1: Introduction

1-1 Background

In 1997, the City of Yellowknife joined the Federation of Canadian Municipality's (FCM) Partners for Climate Protection (PCP) program - then known as the "20% Club". The PCP program is a five-step framework that helps communities reduce their greenhouse gas (GHG) emissions and achieve sustainable community development:

1. Complete a GHG inventory and forecast
2. Set a GHG reduction target
3. Develop a Local Action Plan
4. Implement the Plan
5. Measure Progress

City Council formed a Community Energy Planning (CEP) committee in March 2005, to guide development of the CEP. This committee's work and the CEP process has brought the City near completion of steps 2 and 3 in the PCP framework.

1-2 CEP Committee's Vision, Goals, & Targets

Our Vision:

Our community will use an ongoing CEP process and consider economic, social and environmental costs and benefits, to strive to meet or exceed the standards of climate protection excellence, as set out by the FCM's Partners for Climate Protection Program.

Our General Goals:

To meet the above vision, we will:

- Provide information and encourage people to participate in the CEP process.
- Create a CEP that increases energy efficiency and renewable energy use, to reduce GHG emissions.
- Create an innovative CEP that evolves with the community and technology.

Our Targets:

The CEP Committee has adopted the following targets:

- a. City operations – reduce emissions by 20% by 2014.



- b. Entire community – reduce emissions by 6% by 2014.
- c. Adopt a long-term target – 20 to 100 years - for the entire community by 2014.

These targets are included as recommendation 3 of this CEP.

1-3 The Interim CEP – 8 Action Areas

The CEP committee presented an *Interim CEP*² to City Council in late 2005. It included details of how the CEP committee commissioned an energy baseline, held public meetings and workshops, and developed eight “Action Areas” that needed more investigation.

In 2006, the CEP committee hired consultants to investigate these action areas. The CEP is based on the background materials and information in the consultants’ reports. The reports are available as part of the larger CEP binder or on the City’s website.

PART 2: Yellowknife's GHG Emissions and Energy Profile and Forecast

2-1 Introduction - Unique solutions for a unique City.

Yellowknife is unique in how it uses energy. The 2004 energy use baseline gives us information about Yellowknife's GHG emissions and energy profile. The energy profile shows what energy we use, where we use it, and how much it costs.

The nine "Action Area" reports provide background information and ideas in the following areas:

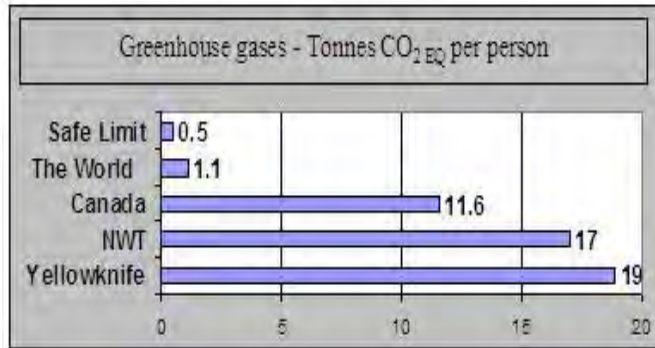
- "Financing Options for External Green Energy Projects" 2006, Pembina Institute and SENES
- "Definition of Sustainable Planning Principles" 2006, Jacques Whitford
- "Renewable Energy in Yellowknife for Homes and Buildings" 2006, A. D. Williams Engineering
- "Life-cycle Cost Analysis - Energy Standards for New Buildings" 2006, Pembina Institute
- "Transportation Report" 2006, Dillon Consulting
- "Fleet Report" 2006, Aboriginal Engineering
- "Facilities Report" 2006, Arctic Energy Alliance
- "Financing Options for Internal Green Energy Projects" 2006, Pembina Institute and SENES
- "CEP Communication Plan" 2006, Outcrop Communications

These reports show how Yellowknife's unique situation can lead to unique solutions.

2-2 Yellowknife Energy and Emissions Profile 2004

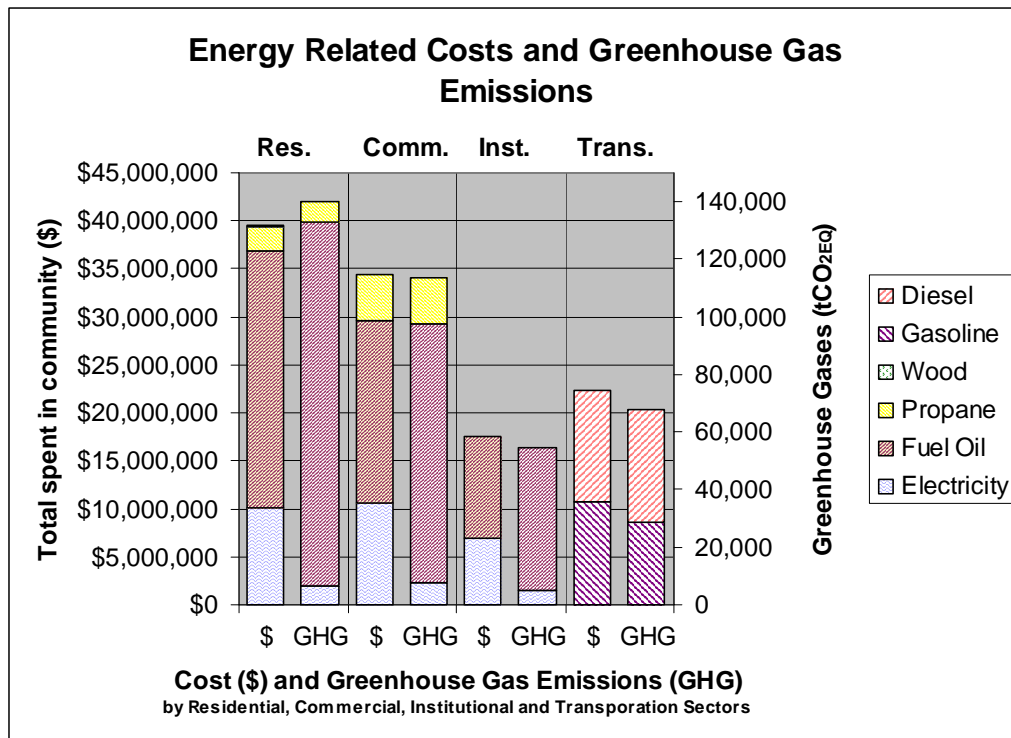
Over 95% of Yellowknife's electricity now comes from hydroelectric generators – an energy source with low greenhouse gas emissions. Yellowknife is a compact city - people spend less time driving than in other Canadian cities and our greenhouse gas emissions from transport within the city are low compared to larger cities in the south.

In spite of these factors, Yellowknife greenhouse gas emissions per person are almost twice the Canadian average and 40 times the level that the United Nations says we need, to slow down climate change.



The graph below summarizes the *City of Yellowknife Energy and Emissions Baseline*³ report. (Also look at the foldout energy profile in Appendix 1.) The baseline measures energy costs and greenhouse gas emissions linked to the residential, commercial, institutional, and transportation sectors, based on different energy sources.

It shows that, in 2004, heating fuel for homes and commercial buildings was the largest energy cost and source of greenhouse gases. Transportation was also a significant source of greenhouse gas emissions in Yellowknife.



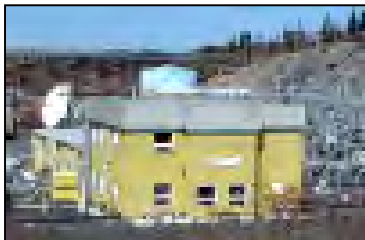
2-3 Action Areas – What is feasible?

The public and the CEP committee members generated a huge number of ideas on how Yellowknife could reduce greenhouse gas emissions and save money on their energy bills. The committee organised the ideas into “Action Areas” and conducted studies to figure out which ideas could not only reduce GHG emissions but also made financial sense.

Renewable Energy for Heating

The majority of Yellowknife’s greenhouse gas emissions come from burning heating oil to heat homes and buildings. The *Renewable Energy in Yellowknife for Homes and Buildings*⁴ report shows that wood pellets, solar heating technologies, and ground source heat pumps have near zero GHG emissions and could be cheaper than heating oil.

Burning wood pellets is considered to be a greenhouse gas neutral energy source^b and wood pellets are currently about half the price of oil. Solar heating technologies such as passive solar housing designs, solar hot water heaters and solar air heaters can be cost effective ways of reducing GHG emissions, particularly if they are designed in to buildings from the beginning.



The report also says that when demand for electricity grows, the NWT Power Corporation plans to expand the hydroelectric system that supplies Yellowknife. In the meantime they will use the diesel-powered “Jackfish” generator as needed.

If the Power Corporation could offer a lower electricity price, electric ground source heat pumps could compete with the cost of heating oil. Electric ground source heat pumps are more efficient than baseboard electric heaters. With increased demand for electricity, the new hydro plant might be built sooner, avoiding the need to use the Jackfish plant and reducing GHG emissions.

^b Under the Kyoto Protocol, bio-mass (including wood) is treated as a carbon neutral energy source.

Energy Efficient Buildings

The *Life-cycle Cost Analysis - Energy Standards for New Buildings*⁵ report looks at how better building practices could reduce GHG emissions and energy costs. Better building practices usually mean increased investment in upfront, capital costs. The report says that the extra investment would be paid back within 2 to 4 years for buildings and 6 to 8 years for houses.



A well-built house that meets the EGH-80 standard uses 40% less energy than a typical house that is currently being built in Yellowknife. The energy savings for buildings that met the CBIP standard would be even higher. Buildings that use less energy use less heating oil and produce less GHG emissions.

Transportation

The *Transportation*⁶ report shows that trucking companies use much of the diesel sold in Yellowknife to truck things to the mines but not to deliver goods to Yellowknife because those trucks bring enough fuel with them to make it back to the south.

Yellowknife residents burn many times more fuel than we can account for, by just the commute to work. Yellowknife is a compact city with few roads, and it is not clear where people are using the gasoline and diesel fuel. One factor is the kinds of vehicles we drive. Yellowknifers typically drive sport utility vehicles that are more expensive and use two times more fuel than a typical car and four times more than a high efficiency car such as the Toyota Prius.

The *Transportation*⁶ report and the *Fleet Report*⁷ both show that efficient vehicles such as the hybrids or Smart Cars could have paybacks of two years or less for high mileage vehicles such as taxis. Private car owners in Yellowknife drive both the Toyota Prius hybrid and the Smart car.



Both reports also show that using fuels that contain biodiesel in diesel or ethanol in gasoline could reduce GHG emissions.

One of the best ways to reduce GHG emissions from transportation is to convince people to drive less. The *Transportation*⁶ report shows that Yellowknife's public transit system does not carry enough riders to significantly offset the greenhouse gases the buses produce. But if people regularly filled the bus instead of driving, we could reduce GHG

emissions significantly, even if we switched to using smaller buses. And we could achieve even greater reductions if people used “active transport” such as walking, biking, or skiing instead of driving.

2-4 Forecasts and Scenarios

For this CEP, the Arctic Energy Alliance developed future energy use scenarios. The study compares total energy costs and greenhouse gas emissions under the following four scenarios:

- Business as usual
- Energy efficiency
- Renewable energy
- Energy efficiency and renewable energy scenarios together

The final scenario shows how renewable energy options and modest improvements in energy efficiency could reduce Yellowknife’s greenhouse gas emissions by over 70% by 2024 - and save the City, residents, and businesses money at the same time. We could reduce greenhouse gas emissions by 76% to less than 4.5 Tonnes CO₂ EQ per person and reduce annual energy costs by 22% per person including the price increases since 2004.

All four scenarios assumed the following:

- The Yellowknife population increases 25% by 2024, as defined by the NWT Bureau of Statistics.
- The price of oil increases from 2004 to 2005 prices and then stays the same. The price of oil is already 30% higher than in 2004 and most people believe the price of oil will keep rising, so there may be more financial savings than we show.
- The Jackfish Power plant ran for about 15% of the time in 2004, but that was a year with low water levels. For future years, we assumed that it would be used 4% of the time. This does not include the possibility that Jackfish could be used more as demand increases.
- We did not include the capital costs of alternative projects. However, all the included projects had an 8-year payback or better - they are all good financial investments.

The “business as usual” scenario

The business as usual scenario describes energy use and costs, and greenhouse gas emissions in a world where we use energy the same way we use it today. No specific actions work to change the way we use energy.

Energy efficiency scenario

The energy efficiency scenario assumes the following actions:

- Home owners fix up their homes so they use less energy
- The City fixes up city buildings so they use less energy
- Businesses & government fix up their buildings so they use less energy
- New homes and buildings meet high standards for energy efficiency
- Everyone has more energy efficient habits
- People replace old appliances with energy star appliances
- People replace “gas-guzzling” vehicles with more efficient ones

The scenario assumes that all these actions together would reduce both energy costs and greenhouse gas emissions by 1% each year for buildings. We based this assumption on a recent report by the National Round Table on the Environment and the Economy that shows we can use existing technology to increase energy efficiency by 40% over the next 40 years.⁸

The scenario also assumes that these actions would reduce energy costs and greenhouse gas emissions by 2% each year for transportation. We based this assumption on the fact that we have cheaper vehicles available that use half the fuel that a typical Yellowknife vehicle uses.

Renewable energy scenario:

The renewable energy scenario assumes the following actions:

- Some Yellowknife buildings start using electric ground source heat pumps in 2014. They replace 10% of the heating oil demand. They get a special price of \$0.06/kWh from the new hydro power plant at Snare Lakes.
- Many Yellowknife homes and buildings replace oil and electric heat with efficient wood pellet boilers and stoves over the next 20 years. Yellowknife uses 10,000 tonnes of wood pellets more every year until 90% of oil heat is replaced by wood in 2024.

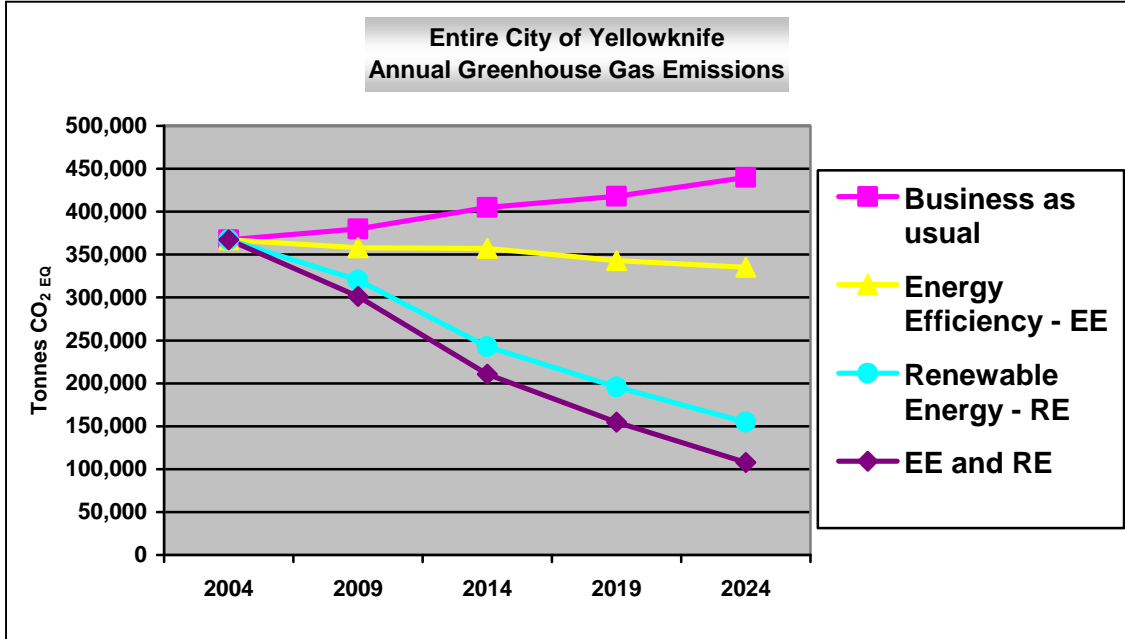
Combined Energy Efficiency & Renewable Energy scenario:

This scenario combines the actions from both the energy efficiency and the renewable energy scenarios, and it produces very interesting results.

Yellowknife could reduce greenhouse gas emissions by over 70% (76% per person).

Yellowknife could reduce total annual energy costs by 3% (22% per person). These savings include the 30% rise in energy costs since 2004.

The chart below shows how the four scenarios affect annual greenhouse gas emissions over 20 years. It is not easy to predict the future, but it’s clear that Yellowknife could significantly reduce greenhouse gas emissions and save money at the same time.

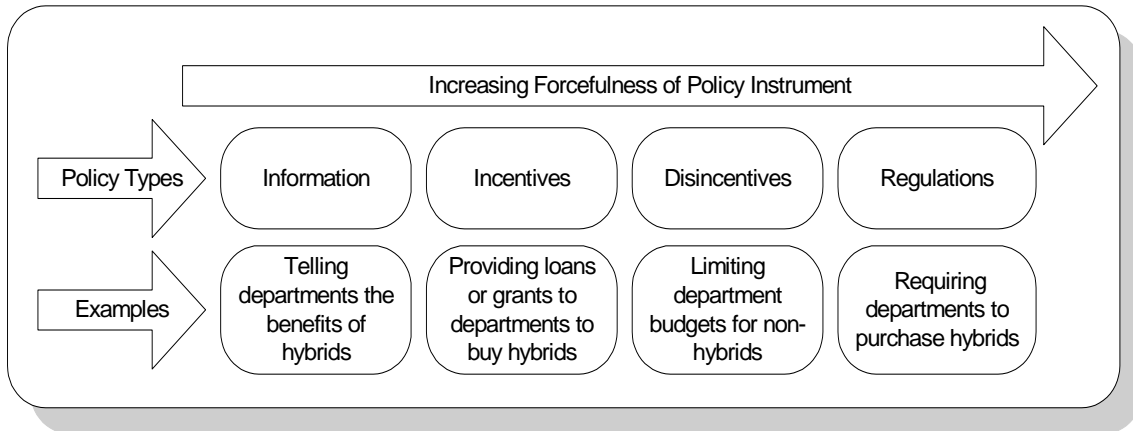


2-5 How to get there?

These scenarios are financially viable and produce greenhouse gas savings. But what path will Yellowknife actually follow? This section looks at what the City could do to help guide the community towards a renewable and efficient future.

Policy instruments

The figure below is from the *Financing Options for External Green Energy Projects*⁹ report. It shows a spectrum of policy instruments, with examples, that a community can use to take action. The forcefulness of the instruments increases from left to right, as they shift from voluntary, information-based approaches to regulatory approaches. This CEP suggests a mixture of these policy instruments.



Information - Leading by example in City facilities & operations

The action area reports recommend various ways the City can reduce emissions and save money in its own facilities and operations such as:

- Increase energy efficiency in the City’s vehicle fleet and in existing facilities.
- Find and use alternatives to heating oil to heat buildings.
- Apply the CBIP standard to any new facilities.
- Use a life cycle cost analysis to set up a “revolving fund” to re-invest savings from early projects in future ones.

By following the recommendations in these reports, the City would quickly become a leader in energy efficient and low emissions practices. The City should share these experiences with the rest of the community.

Financial Incentives - Life Cycle Analysis

The *Life-cycle Cost Analysis - Energy Standards for New Buildings*⁵ report and the *Renewable Energy in Yellowknife for Homes and Buildings*⁴ report show that the options to reduce heating oil use often have significant up-front costs. People will recover these costs through lower heating oil bills. But not everyone has the extra cash to cover these upfront costs, when they purchase a home or building.

The *Financing Options for External Green Energy Projects*⁹ report shows that there are several ways that the City could create programs that would help residents or businesses finance those initial costs. The CEP recommends that this assistance should focus on reducing fossil fuel use for home heating because heating homes is the largest source of greenhouse gas emissions. The switching to a cheaper, more efficient vehicle does not have a higher up-front cost so there is less need for financial assistance.

Life Cycle Analysis (LCA) compares the initial cost of buying something such as a car, house, or building with the annual costs of operation and maintenance. A large part of

operating costs are energy costs. A Life Cycle Analysis helps show whether or not we save money in the long run if we invest in energy saving options. LCA can be done in many ways, but two common ways are to look at the “simple pay-back” or to look at the difference between loan payments on the extra investment and the savings on energy bills.

Regulations - Planning

The *Definition of Sustainable Planning Principles*¹ report lists 21 principles which, over the long term would have a large effect on the way the City regulates development. This would change the way energy is used in the City. The first principle from that report also forms the first recommendation of this CEP and there are many more over-laps.

One of the most interesting regulations that could be changed is the building code. The research reports recommend strengthening the current building codes to use the EGH-80 standard for new housing and the CBIP standard for new buildings.

PART 3: Principles and Recommendations

3-1 Principles

The recommendations in the CEP are based on a set of 5 principles.

1. The City of Yellowknife wishes to be a leader in addressing Climate Change.
 - a. Climate change is having real and significant effects in the North today and these effects are projected to accelerate as atmospheric concentrations of greenhouse gases increase.
 - b. In Yellowknife, burning fossil fuels is the main source of climate changing greenhouse gases. The primary gas responsible is carbon dioxide (CO₂).
 - c. The City of Yellowknife has joined the Federation of Canadian Municipalities' (FCM) "Partners for Climate Protection" program.
 - d. At the 4th Municipal Leaders Summit on Climate Change, 5-7 December 2005, Montreal, PQ, municipal leaders from around the world committed to reducing greenhouse gas emissions from their communities by 30% by 2020 and 80% by 2050.¹⁰
2. The City of Yellowknife wishes to be a leader in addressing the rising costs of energy.
3. Financial savings from energy efficiency and renewable energy projects should be used to pay for more energy efficiency and renewable energy projects.
4. The City wishes to use all forms of energy more efficiently, with particular emphasis on reducing greenhouse gas emissions.
5. The City has tools that can be used to affect energy use:
 - Leading by example - "in-house" operations
 - Demonstration projects
 - Providing information
 - Building local and regional partnerships
 - Lobbying other levels of government
 - Providing financial incentives and disincentives
 - Legislating on:
 - Overall City planning
 - Community development
 - Transportation
 - Building design

3-2 Suggested Implementation Timeframe

This energy plan covers the period from 2006 until 2014, which is 10 years after the first energy baseline was completed. To check progress, a mid-term baseline should be completed in 2010 (with data from 2009), as part of the next general plan.

If approved, we recommend that the affected departments in the administration of the City will implement the CEP. Each recommendation includes a list of departments that would be affected. A CEP Implementation Coordinator and a CEP Implementation Advisory Committee are also recommended (see Recommendation #4).

These tools are recommended because the CEP is intended to be a living plan that adapts over time. With that in mind, each recommendation has a suggested implementation timeframe:

- Short-term – to be completed by the end of 2006
- Medium term – to be completed by the end of 2009
- Long-term – to be completed after 2009

2009 was chosen because the CEP recommends that the City hire an energy coordinator at least until the next baseline is completed. The goal of this position is that, by 2010, energy coordination activities will be integrated into the day-to-day operations of the City. At that time the City can re-evaluate the necessity of the energy coordinator position. 2009 is also when we expect the City to review its general plan and energy considerations should be included in that review.

3-3 Recommendations – Summary & Details

The CEP Committee recommends that the City of Yellowknife take action to:

1. Put more emphasis on long-term (20 to 100 years) planning that includes life-cycle analysis of environmental, social and economic factors.
2. Incorporate energy use and greenhouse gas emissions considerations into all aspects of the City's decision-making.
3. Adopt the following targets for greenhouse gas reductions over the 2004 baseline levels:
 - a. City operations – reduce emissions by 20% by 2014.
 - b. Entire community – reduce emissions by 6% by 2014.
 - c. Adopt a long-term (20-100 years) target for the entire community by 2014.
4. Create tools to implement and monitor progress of the CEP:
 - a. Create a public committee to provide advice on the implementation of the CEP and periodically report to Council.
 - b. Hire an energy coordinator until at least the end of 2010.
5. Adopt sustainable energy planning guidelines based on the 21 principles in the *Definition of Sustainable Planning Principles¹* report and provide this report to City administration for use in the Planning and Development Department's development of overall Sustainable Planning Principles.
6. Lead by example on energy and climate change:
 - a. Continuously improve efficiency of all City facilities.
 - b. Initiate wood pellet heating pilot project in a City facility.
 - c. Pursue renewable energy options within City operations with the goal of replacing heating oil as a fuel source by 2014.
 - d. Require all new City facilities to meet or exceed the requirements of the Commercial Buildings Incentive Program (CBIP), which requires the building to be at least 25% more efficient than the Model National Energy Code for Buildings (MNECB).
 - e. Implement into fleet operations the following:
 - Purchase a demonstration fuel-efficient vehicle such as a Smart-car or Hybrid,
 - All vehicles purchased should be in the top 10% of efficiency for vehicle class required, and
 - Fuel efficiency driver training program.
 - f. Require EnergyStar appliances/office products for all new purchases.
 - g. Create an internal funding mechanism to fund renewable energy and energy efficiency projects that reduce greenhouse gas emissions.

7. Adopt energy efficient building standards and incorporate into the City's building by-law:
 - a. Use EGH-80 as a standard for new residential construction,
 - b. Use CBIP as a standard for new commercial construction, and
 - c. Use EnergyStar as a standard for appliances/office equipment in all new construction.
8. Implement measures to encourage active transportation and transportation efficiency:
 - a. Accelerate implementation of the recommendations contained in the 2005 Integrated Parks, Trails & Open Spaces Study.
 - b. Encourage hybrid taxis and share-taxis.
 - c. Support public transit while continuing to explore opportunities to increase efficiency and effectiveness.
 - d. Make the City's fuel efficiency driver training program available to the public after it is established.
 - e. Implement specific measures to make cycling and walking easier such as the creation of bike lanes and improved maintenance of sidewalks and walking trails.
 - f. Investigate ways of strengthening the Yellowknife anti-idling by-law.
9. Promote action from other orders of government:
 - a. To create a green financing mechanism for residents and businesses.
 - b. To make bio-fuels available in the NWT as they become available in the Canadian market place.
10. Form local and regional energy partnerships
 - a. Partner with local utilities and building owners (including other levels of government) to facilitate an early start to construction of a new hydro-electric station on the Snare system so that hydro-electricity can be used to replace fossil fuels.
 - b. Partner with local businesses, including northern mines, to draw on their expertise in energy management.
11. Inform the public about Yellowknife's Community Energy Plan and share the success stories and innovative actions that the City is taking.
12. Pilot a green financing program for City home owners that focuses on reducing the use of fossil fuels for home heating.

On the next few pages, each recommendation is described in more detail.

1. Long term planning	Put more emphasis on long-term (20 to 100 years) planning that includes life-cycle analysis of environmental, social and economic factors.
	- This recommendation has 3 parts: long-term planning, life-cycle analysis and the “triple bottom line”.
Current situation	<ul style="list-style-type: none"> - The City’s longest-term plan is the 20-year General Plan, revised every 5 years. - There is no standard way to measure life-cycle costs and benefits in current use by the City. This makes it difficult to justify spending extra capital to produce energy savings in the future. - The City does look at environmental, social and economic factors but this is not formally recognised as a “triple bottom line” approach.
Rationale	<ul style="list-style-type: none"> - Planning for Climate Change requires thinking more than 20 years ahead because actions today will have effects up to 100 years from now. Although planning far into the future is not precise, the City should put more emphasis on planning 20 – 100 years ahead. - Using standardised life-cycle analyses allows the City to identify opportunities to invest in energy saving features that would result in savings over the life of the project. - Using a “triple bottom line” approach ensures that the City considers all three Environmental, Social and Economic factors consistently. Greenhouse gas emissions and energy costs would be covered by the environmental and economic factors, respectively.
Responsible Department:	- All Departments
Suggested timeframe	
	2006 - Use life-cycle analysis for all energy projects.
	By 2009 - Incorporate life-cycle analysis for all City projects.
	After 2009 - Analyse energy use and greenhouse gas emissions for next 20-100 years - Create a long-term CEP for period post 2014.
Greenhouse Gas Impact	- Potential to facilitate large reductions over the long-term, both from City operations and the whole community.
Financial Impact	- Increased use of life-cycle analysis will improve financial health of the City by reducing operating costs.
Background & References	<ul style="list-style-type: none"> - This is based on the first recommendation in the <i>Definition of Sustainable Planning Principles</i>¹ report. - Life-cycle analysis means “Calculating the cost of a system or product over its entire life span including upfront planning and development, capital, operation and maintenance (energy), disposal, and any costs for cleaning up the environment.”

2. Decision making	Incorporate energy use and greenhouse gas emissions considerations into all aspects of the City's decision-making.
Current situation	- City administration provides Councillors with various 'considerations' on the issues that come before them. Administration does not usually provide information on energy use or greenhouse gas emissions.
Rationale	- Many of the decisions that Council makes will directly or indirectly impact the City's greenhouse gas emissions. Councillors should be provided with information on the energy use and greenhouse gas impacts of issues that come before Council.
Responsible Department:	- All Departments
Suggested timeframe	
	2006 - Administration (with help from the energy coordinator) to provide information to Councillors on the potential energy and greenhouse gas impacts in Council briefings.
	By 2009 - This function to be integrated into the day-to-day operations of all City departments.
	After 2009 - Continue to improve integration of energy use and greenhouse gas emissions considerations into day-day operations of all City departments.
Greenhouse Gas Impact	- Potential to facilitate large reductions over the long-term, both from City operations and the whole community.
Financial Impact	- Administration will require extra time and resources to properly research energy and greenhouse gas emissions impacts.
Background	- Energy and greenhouse gas emissions impacts can be evaluated using information from the 2004 baseline that is part of this CEP. - The principles in the <i>Definition of Sustainable Planning Principles¹</i> report will be useful to identify areas of decision making that affect energy and greenhouse gas emissions.

3. Targets

Adopt the following targets for greenhouse gas reductions over the 2004 baseline levels:

- a. City operations – reduce emissions by 20% by 2014.
 - b. Entire community – reduce emissions by 6% by 2014.
 - c. Adopt a long-term (20-100 years) target for the entire community by 2014.
-

Current Situation

- The City joined the “20 % Club” in 1997, but did not adopt any specific greenhouse gas reduction targets.
- Many Canadian municipalities are adopting similar targets, but are using 1996 as the baseline year and have set a target date of 2012. Accurate data for greenhouse gas emissions were not available for Yellowknife before 2000.

Rationale

- Adopting the above targets will create a goal that can provide motivation for action.
- The *Future Scenarios* section of this report shows that over 70% GHG reductions are possible using existing technologies that would pay for themselves through their energy savings.
- The *Facilities Review*¹¹, *Fleet Review*⁷ and *Renewable Energy in Yellowknife for Homes and Buildings*⁴ reports have identified opportunities within City operations.
- At the 4th Municipal Leaders Summit on Climate Change, Montreal, PQ, 5-7 December 2005, municipal leaders from around the world committed to reducing GHG emissions from their communities by 30% by 2020 and 80% by 2050.
- 99% of 142 Yellowknifers who responded to a survey at the 2006 Yellowknife Trade Show thought that Yellowknife should reduce GHG emissions by 10% or more over the next 10 years.

Responsible Department:

- All Departments

Suggested timeframe

- 2006 - Adopt targets a. and b.
 - By 2009 - Report progress to council every year
- Conduct a new baseline study in 2009.
 - After 2009 - Create a long term target for the period post-2014.
- Expand scope of CEP to incorporate transportation of people and goods to and from Yellowknife.
- Continue to do baselines every 5 years.
-

Greenhouse Gas Impact

- Potential to motivate large reductions over the long-term, both from City operations and the whole community.

Financial Impact

- CEP studies have shown that there are ways to meet these targets that can be self-financed from the energy savings.

4. Implementation tools	<p>Create tools to implement and monitor progress of the CEP:</p> <ul style="list-style-type: none"> a. Create a public committee to provide advice on the implementation of the CEP and periodically report to Council. b. Hire an Energy Coordinator until at least the end of 2010.
Current situation	<ul style="list-style-type: none"> - The current CEP committee will dissolve when the CEP is completed. There is also an unofficial “CEP working group” that coordinates the detailed CEP work. An energy coordinator has been working on contract since the fall of 2005. The City has approved a 6-month position for the remainder of 2006.
Rationale	<ul style="list-style-type: none"> - The above tools would ensure that the CEP is implemented.
Responsible Department:	<ul style="list-style-type: none"> - Department of Public Works
Suggested timeframe	<ul style="list-style-type: none"> 2006 - Commit to employing an energy coordinator until the end of 2010. - Create a CEP implementation advisory committee to review implementation progress and report to Council. By 2009 - Incorporate energy and GHG programs into day-to-day City operations. - Evaluate energy coordinator role and whether the position is still needed. - After 2009 - Conduct another energy use and GHG emissions baseline in 2010 using data from 2009.
Greenhouse Gas Impact	<ul style="list-style-type: none"> - Potential to motivate large reductions over the long-term, both from City operations and the whole community.
Financial Impact	<ul style="list-style-type: none"> - Administration will require time to participate in the CEP implementation working group. - A CEP coordinator is estimated to cost \$80,000 per year.
Background	<ul style="list-style-type: none"> -

5. Sustainable Planning Guidelines	Adopt sustainable energy planning guidelines based on the 21 principles in the ‘Definition of Sustainable Planning Principles’ report and provide this report to City administration for use in the Planning and Development Department’s development of overall Sustainable Planning Principles.
Current Situation	<ul style="list-style-type: none"> - The City’s <i>General Plan</i>¹² and <i>Downtown Plan</i>¹³ both contain wording that suggest that issues of sustainable planning are already part of the consciousness of the City and have in some cases been pursued to a considerable level of detail, especially with respect to transportation. - The City’s planning department is working on overall Sustainable Planning Principles.
Rationale	<ul style="list-style-type: none"> - The CEP committee identified that community energy use and planning practices are closely linked and therefore commissioned a study and workshop on sustainable planning principles that relate to energy use. - As the Planning Department is working on a complete set of sustainable planning principles these energy related principles should be included as part of that exercise.
Responsible Department:	- Department of Planning and Development
Suggested timeframe	<ul style="list-style-type: none"> - Adopt principles in the <i>Definition of Sustainable Planning Principles</i>¹ report and provide this report to City administration for use in the Planning and Development Department’s development of overall Sustainable Planning Principles. - Apply the principles to at least 1 new sub-division (Niven VII ?). - Apply the principles to retrofit 1 older neighbourhood (Old Airport Road ?). - Include sustainable energy planning principles in the general plan (2009).
Greenhouse Gas Impact	- Potential to motivate large reductions over the long-term, both from City operations and the whole community.
Financial Impact	<ul style="list-style-type: none"> - No direct costs associated with adopting principles. - Applying the principles may have costs associated with individual projects and developments.
Background	<ul style="list-style-type: none"> - The <i>Definition of Sustainable Planning Principles</i>¹ report has 21 principles organised by theme: <ul style="list-style-type: none"> a. Overall City planning b. Community form (i.e. development) c. Transportation d. Building design

6. Lead by example

Lead by example on energy and climate change

- a. Continuously improve efficiency of all City facilities.
- b. Initiate wood pellet heating pilot project in a City facility.
- c. Pursue renewable energy options within City operations with the goal of replacing heating oil as a fuel source by 2014.
- d. Require all new City facilities to meet or exceed the requirements of the Commercial Buildings Incentive Program (CBIP), which requires the building to be at least 25% more efficient than the Model National Energy Code for Buildings (MNECB).
- e. Implement into fleet operations the following:
 - a. Purchase a demonstration fuel-efficient vehicle such as a Smart-car or Hybrid,
 - b. All vehicles purchased should be in the top 10% of efficiency for vehicle class required, and
 - c. Fuel efficiency driver training program.
- f. Require EnergyStar appliances/office products for all new purchases.
- g. Create an internal funding mechanism to fund renewable energy and energy efficiency projects that reduce greenhouse gas emissions.

Current Situation
(comment ‘a’
matches with
recommendation ‘a’
and so on)

- a. The City has already started a number of successful energy saving initiatives such as the replacement of traffic signals with LED bulbs and other examples mentioned in the *Interim CEP*².
- b. The largest contributor to greenhouse gas emissions within City operations and in the City in general is the burning of heating oil.
- c. As mentioned above, the largest contributor to greenhouse gas emissions within City operations and in the City in general is the burning of heating oil.
- d. The City has no standards for energy efficiency in new facilities.
- e. The second largest contributor to greenhouse gas emissions within City operations and in the City in general is transportation. The City has no standards for energy efficiency in new vehicle purchases
- f. The City has no standards for energy efficiency in new appliances / office equipment.
- g. Energy efficiency projects over \$5000 must be included in the City’s annual budget for approval by Council. Any financial savings that result from energy efficiency or renewable energy projects remain in the City’s “general fund”.

Rationale
(comment ‘a’
matches with
recommendation ‘a’
and so on)

By switching to renewable sources of energy and implementing energy efficiency projects, the City can both reduce its own greenhouse gas emissions and become a leader in community reductions.

- a. The *Facilities Report*¹¹ and the *Fleet Report*⁷, identify opportunities to reduce greenhouse gas emissions through increases in energy efficiency.
- b. The *Renewable Energy in Yellowknife for Homes and Buildings*⁴ report identifies that the payback on wood pellet boilers is excellent and that

wood pellets are considered greenhouse gas neutral. The GNWT and several local businesses are already installing wood pellet boilers and the City should join them. By installing a wood pellet boiler, the City would help create a market for wood pellets in Yellowknife and that would encourage others to do the same.

- c. The *Renewable Energy in Yellowknife for Homes and Buildings*⁴ report identifies other technologies that, along with wood pellets could be used to economically switch from heating oil to renewable sources of heat.
- d. The *Life-cycle Cost Analysis - Energy Standards for New Buildings*⁵ report shows that if new buildings in Yellowknife were built to meet the CBIP standard for energy efficiency, the extra costs would be paid back in 2 to 4 years. The GNWT has already adopted CBIP as a standard for new construction and this CEP recommends that the City adopt CBIP as a standard as part of the City's building code and for its own facilities.
- e. The *Fleet Report*⁷ recommends a driver training program similar to one that reduced fuel use by 15% in the City of Edmonton. It also identified a large potential for savings if high mileage vehicles could be replaced with hybrids or Smart-cars. The CEP committee added the requirement that all new vehicles should be within the top 10% for fuel efficiency in their vehicle class.
- f. EnergyStar is an international program that identifies the most energy efficient appliances and office equipment available.
- g. The *Financing Options for Internal Green Energy Projects*¹⁴ report recommends that projects up to a value of \$50K be financed through a "revolving fund" that will grow with time and be able to finance further projects. The fund would operate based on criteria for greenhouse gas reductions and a financial payback of 8 years or better, plus an interest rate of 4.7%

Responsible - All Departments
Department:

Suggested Timeframe

- 2006
 - Each department should create a work plan on how they will implement the recommendations.
 - Create an energy management committee that would be responsible for identifying, financing, and implementing green energy projects within municipal operations.
 - Spend \$100K (already allocated) on projects using proposed financing mechanism.

By 2009 - Add \$700K per year for 4 years to start the green energy fund.

After 2009 - Integrate energy management and the revolving energy funding mechanism into day-to-day City operations.

Greenhouse Gas Impact - The above recommendations should enable the City to achieve the target of 20% reductions in greenhouse gas emissions by 2014. Showing leadership by demonstrating new technologies and reducing greenhouse gas emissions should stimulate reductions in the entire community.

Financial Impact - With the exception of the demonstration Smart/Hybrid car and the driver-training program, all the recommendations will pay for themselves within 8 years. Smaller projects would be financed through a “revolving green fund” while larger projects would be included in the City’s budgeting process.

Background - CBIP (Commercial Buildings Incentive Program) is a program run by the federal government that requires buildings to exceed the Model National Energy Code for Buildings (MNECB) by at least 25%.

7. Efficient Building Standards	<p>Adopt energy efficient building standards and incorporate into the City’s building by-law:</p> <ol style="list-style-type: none"> 1. Use EGH-80 as a standard for new residential construction. 2. Use CBIP as a standard for new commercial construction. 3. Use EnergyStar as a standard for appliances/office equipment in all new construction.
Current Situation	<ul style="list-style-type: none"> - The National Building Code does not address energy use – it only requires enough insulation to prevent condensation inside a home or building. The City Building By-law currently specifies higher insulation levels than would be required to meet the National Building Code and double-pane windows, but these levels are falling behind standard practice and are much lower than what is considered “best practice”. - The City does not have standards for energy use in appliances. - There are energy standards that could be applied in Yellowknife such as EGH-80, CBIP and ENERGY STAR, but they are voluntary.
Rationale	<ul style="list-style-type: none"> - The <i>2004 Energy Baseline</i>³ report showed that the largest source of greenhouse gas emissions and energy costs were related to the use of heating oil to heat buildings and homes. - The <i>Life-cycle Cost Analysis - Energy Standards for New Buildings</i>⁵ report shows that if new homes and buildings in Yellowknife were built to meet the EGH-80 and CBIP standard for energy efficiency, the extra costs would be paid back in 2 to 8 years. Both energy costs and greenhouse gas emissions would be much lower for homes and buildings built to these standards. - EGH-80, CBIP & ENERGY STAR were chosen as standards because they are not overly “prescriptive” – they leave room for builders to choose how they want to meet the requirements. - CBIP has already been adopted by the GNWT for new buildings that it will be constructing in the NWT.
Responsible Department:	<ul style="list-style-type: none"> - Department of Planning and Development
Suggested timeframe	<ul style="list-style-type: none"> 2006 - Create plain-language information on proposed energy efficient building codes. 2006 - Draft energy efficient building standards. By 2009 - Implement energy efficient building standards in specific new developments. After 2009 - Implement energy efficient building standards City-wide.
Greenhouse Gas Impact	<ul style="list-style-type: none"> - The <i>Life-cycle Cost Analysis - Energy Standards for New Buildings</i> report shows that the EGH-80 and CBIP standards would reduce GHG emissions by 21,600 tonnes per year by 2024 (a 4.1% reduction in 2024).
Financial Impact	<ul style="list-style-type: none"> - Because the City already has efficiency standards for homes and buildings and the proposed standards use existing programs, workloads for City staff would not increase significantly. Developing the new by-law will require staff

resources.

- The cost of meeting the new standards would be borne by the building owner, not the City.

Background

- CBIP (Commercial Buildings Incentive Program) is a program run by the federal government that requires buildings to exceed the Model National Energy Code for Buildings (MNECB) by at least 25%. As the GNWT is already requiring this standard for all new buildings, local architects are familiar with the program.
 - EGH (EnerGuide for Houses) is a program that rates houses based on a computer model of their energy consumption. A score of EGH-80 is considered to be good practice but recently constructed homes in Yellowknife have an average score of EGH-73, meaning that they use about 40% more energy than an EGH-80 house. In this case, potential home-builders would be required to show that their plans would meet the EGH-80 standard and then have their homes tested with a “blower-door” when it was built. The Arctic Energy Alliance has a team of local evaluators who could provide this service for about \$600 per house.
 - ENERGY STAR is an international program that identifies the most energy efficient appliances and office equipment available. It is being expanded to include other things such as windows and even houses. In Ontario, an “ENERGY STAR” house has to meet the EGH-80 standard.
-

-
- 8. Transportation** Implement measures to encourage active transportation and transportation efficiency:
- a. Accelerate implementation of the recommendations contained in the 2005 *Integrated Parks, Trails & Open Spaces Study*¹⁵.
 - b. Encourage hybrid taxis and share-taxis.
 - c. Support public transit while continuing to explore opportunities to increase efficiency and effectiveness.
 - d. Make the City’s fuel efficiency driver training program available to the public after it is established.
 - e. Implement specific measures to make cycling and walking easier such as the creation of bike lanes and improved maintenance of sidewalks and walking trails.
 - f. Investigate ways of strengthening the Yellowknife anti-idling by-law.
-

- Current Situation**
- The second largest contributor to greenhouse gas emissions in the City is the transportation sector. Yellowknife is a relatively compact city, so people do not drive as much as in other Canadian cities. Many times more fuel is burned in Yellowknife vehicles than can be accounted for by the commute to work - it is not clear where people are driving.
 - Although energy efficient vehicles such as cars and hybrids are readily available and serviceable in Yellowknife, the current typical vehicle uses 2 times more fuel than a car and up to 4 times more than a hybrid.
 - Yellowknife’s public transit system does not carry enough riders to significantly offset the greenhouse gases it produces.
-

- Rationale**
- The City does not have the tools to create vehicle efficiency standards like it can for buildings and homes.
 - The *Transportation*⁶ report suggested that encouraging “active transportation” such as walking and cycling could have an impact on how much people drive and could reduce greenhouse gas emissions. The City does have tools that could encourage these activities.
 - The *Transportation*⁶ report also suggested that taxi companies that switch to Hybrid vehicles would see a 2-year payback since they drive over 100,000 km per year. The City could create incentives for taxi companies to adopt hybrid cars.
 - The CEP committee felt that the transit system could be a useful tool to reduce greenhouse gas emissions if it were used more often and was more efficient. This includes the possibility of developing a “share taxi” system that would operate in a similar way to the accessible transit mini-bus – door-to-door service like a taxi, but sharing the vehicle with others who are going the same way.
 - The *Fleet Report*⁷ recommends a driver training program similar to one that reduced fuel use by 15% in the City of Edmonton. The CEP committee felt that this program would be useful to all drivers in Yellowknife once it had been established for City employees.
-

- The purchasing of a demonstration energy efficient vehicle (see Recommendation 6) could encourage Yellowknifers to buy more efficient
-

	vehicles.
Responsible Department:	- Departments of Planning and Development, Public Works and Community Services
Suggested timeframe	
2006	- Identify which trails / bike lanes would have the greatest impact on vehicle use. - Draft change to taxi by-law to encourage hybrid taxis and share-taxis. - Investigate if hotel shuttles could be used by non-guests to get to/from the Airport.
By 2009	- Fully implement <i>Integrated Parks, Trails & Open Spaces Study</i> ¹⁵ and create more bike lanes. - Implement hybrid taxi by-law. - Study share taxi/mini van options. - Include options to reduce vehicle use in new subdivisions.
After 2009	- Working Group to recommend further initiatives for implementation.
Greenhouse Gas Impacts	- Greenhouse gas reduction estimates for these recommendations are not available.
Financial Impacts	- Implementing the trails study and creating bicycle lanes would have significant costs that are not estimated in this plan. - Offering a driver training course would have significant costs that are not estimated in this plan.
Background	-

9. “Lobby”	<p>Promote action from other orders of government:</p> <ul style="list-style-type: none"> - To create a green financing mechanism for residents and businesses. - To make bio-fuels available in the NWT as they become available in the Canadian market place.
Current Situation	<ul style="list-style-type: none"> - The City cannot change everything on its own – some things are outside its jurisdiction. However, the City does have some influence over what happens at the territorial and federal levels of government. - Heating oil is the largest source of greenhouse gas emissions in Yellowknife. Solutions such as switching to wood pellets or renovating houses have high upfront costs and even if they payback in energy savings over a few years, many people do not have that kind of money saved up. - Transportation fuels with ethanol or bio-diesel content are becoming available in Canada, but are not available in Yellowknife.
Rationale	<ul style="list-style-type: none"> - The CEP committee identified “green financing” - financing to help businesses and residents overcome the high up-front costs of reducing energy use and greenhouse gas emissions - as the action most needed to make a real change in Yellowknife’s emissions as a community. - The <i>Financing Options for External Green Energy Projects</i>⁹ report examined green energy financing options that could be implemented by various levels of government. Initial discussions with the GNWT indicate that they are considering green financing options, but only on a scale that would cover the whole NWT. The CEP committee concluded that this is something that should be addressed at both the territorial government level, possibly through a “green mortgage” program from the Housing Corporation, and through direct programs from the City (see #12). - Both the <i>Fleet Report</i>⁷ and the <i>Transportation</i>⁶ study identified bio-fuels as a way to reduce greenhouse gas emissions from transportation. The committee concluded that this is something that should be addressed at the territorial and federal government level. As bio-fuels become available in Canada, they should also be imported into the NWT.
Responsible Department:	- Department of Economic Development
Suggested timeframe	<p>2006 - Create a position statement and send to all levels of government.</p> <p>By 2009 - Establish an external financing mechanism with partners such as the GNWT and private sector.</p> <p>After 2009 - Continually assess success of external financing mechanism(s).</p>
Greenhouse Gas Impacts	- Potential to motivate large reductions over the long-term, both from City operations and the whole community.
Financial Impacts	- None

10. “Partner”

Form local and regional energy partnerships

- a. Partner with local utilities and building owners (including other levels of government) to facilitate an early start to construction of a new hydro-electric station on the Snare system so that hydro-electricity can be used to replace fossil fuels.
 - b. Partner with local businesses, including northern mines, to draw on their expertise in energy management.
-

Current Situation

- a. Since the two gold mines shut-down, the Jackfish diesel power plant is only used in “low-water years”. Over 95% of Yellowknife’s electricity comes from hydro dams that do not directly produce greenhouse gas emissions. The power corporation is planning to build more hydro capacity, but only when there is enough growth in demand to justify the initial cost.
 - b. There are a number of northern businesses, including the diamond mines who have won awards for their energy management programs.
-

Rationale

- a. The *Renewable Energy in Yellowknife for Homes and Buildings*⁴ report identifies that if a special rate could be negotiated for electric or ground-source heat pump heating of buildings, it could be possible to build a new hydro generating station ahead of the current plans. This would avoid the need to use the Jackfish diesel power plant.
 - b. Partnering with other northern businesses would allow sharing of information on energy saving opportunities that are specific to the north.
-

Responsible Department:

- Departments of Public Works and Planning and Development
-

Suggested timeframe

- By 2006
- a. Identify planned new facilities that could use electric / ground-source heat if a good price were negotiated.
 - b. Identify potential local business partners.
- By 2009
- a. Partner with other large customers and start formal discussions with NTPC to create a reduced electricity rate for heating buildings to allow the accelerated construction of new hydro electric generation capacity.
 - b. Continue to partner with local businesses, including northern mines, to draw on their expertise in energy management.
- After 2009
- a. Construct selected new facilities with built-in electric or ground source heat pump systems to benefit from special electricity rate.
-

Greenhouse Gas Impact

- a. Potential to maintain current situation of very low greenhouse gas emissions from electricity generation for the foreseeable future. Would also reduce greenhouse gas emissions from heating sector.
 - b. Some local businesses have made impressive reductions in their energy use and greenhouse gas emissions. There is potential for the City to do the same.
-

Financial Impacts

- a. Depending on negotiations, electric heating rate should be beneficial to both the City and the NTPC.
 - b. The City could learn from local businesses have made reductions in their energy costs.
-

11. Inform

Inform the public about Yellowknife's Community Energy Plan and share the success stories and innovative actions that the City is taking.

Current Situation - There are several awareness campaigns on energy and greenhouse gas emissions in Yellowknife – sponsored by the territorial and federal government as well as the Arctic Energy Alliance. Energy conservation is promoted daily through advertising on both television and radio. The CEP committee has tried to keep the public involved in the process through public meetings, a booth at the trade show and through the City's web-site.

Rationale - The City's resources would be better spent on creating awareness of the CEP and resulting actions rather than another general campaign aimed at climate change and energy awareness.
- The *Communication Plan*¹⁶ focuses on these areas.

Responsible Department: - All Departments

Suggested timeframe

2006 - Begin implementation of the Communication Plan.

By 2009 - Incorporate long-term recommendations/objectives contained within the Communication Plan.

After 2009 - Revise the original CEP Communication Plan to address communication requirements for 2009 to 2014.

Greenhouse gas impacts - The success of the recommendations that deal with the public will depend partly on good communications.

Financial Impacts - The communications budget for the next 3 years is expected to be \$25K per year.

Background

- Outcrop Communications Ltd. has prepared a CEP Communication Plan that proposes implementation of communication programs that encourage actions that result in ongoing reductions in Yellowknife GHG emissions.
- Priority should be paid to the target audiences that have the greatest potential to make changes that are large enough to make a noticeable difference. Give priority to communications directed towards the three priority audiences that are large enough to make a noticeable difference – City of Yellowknife employees, Yellowknife homeowners/renters and Yellowknife business operators.
- Give priority to messaging that encourages changes in space heating practices – the largest single local source of GHG emissions.

12. Green Financing for Homeowners

Pilot a green financing program for City home owners that focuses on reducing the use of fossil fuels for home heating.

Current Situation - Heating oil is the largest source of greenhouse gas emissions in Yellowknife. Most of the solutions such as switching to wood pellets or renovating houses, have high up-front costs even if they payback in energy savings over a few years. Many people do not have enough money saved up for this up-front cost.

Rationale

- The CEP committee identified “green financing” - financing to help businesses and residents overcome the high up-front costs of reducing energy use and greenhouse gas emissions - as the action most needed to make a real change in Yellowknife’s emissions as a community.
- The *Financing Options for External Green Energy Projects*⁹ report examined green energy financing options that could be implemented by various levels of government. The CEP committee concluded that this is something that could be addressed at both the territorial government level (see # 9) and through direct programs from the City. Initial discussions with the GNWT indicate that they are considering green financing options, but only on a scale that would cover the whole NWT.
- The *Financing Options for External Green Energy Projects*⁹ report identified several ways that the City could offer financial assistance to homeowners – either through “Local Improvement Charges” or by setting up an external foundation with a financial grant. The City itself cannot directly lend money or provide loan guarantees.

Responsible Department: - Department of Corporate Services

Suggested timeframe

2006 - Identify the type of program the City wishes to pursue according to the principles of this CEP.

By 2009

- Conduct more detailed analysis of required financing model.
- Implement financing program on a pilot scale.

After 2009 - Expand financing program.

Greenhouse Gas Impact - Potential to motivate large reductions over the long-term and from the whole community.

Financial Impact

- This could be set-up as a “revolving fund” in which savings would allow home-owners to pay back and possibly build the fund over time, a large initial investment would be required.
- Administering a fund like this would require additional staff beyond the Energy Coordinator.

Background

3-4 Next Steps

If council accepts this Community Energy Plan, council should then direct administration to implement the recommendations. CEP implementation would be composed of the following steps:

1. Formation by council of the CEP Implementation Advisory Committee based on the terms of reference in Appendix 2.
2. Preparation of a budget for 2007 and estimates for future years that would continue funding for the Energy Coordinator position and provide resources for each recommendation to be implemented over the next few years.
3. Preparation of short term (1 year) and long term (until 2010) work plans for each recommendation by the responsible departments with advice from the CEP implementation advisory committee 6 months after the CEP is accepted by council (February 2007).
4. Creation of the first annual CEP implementation report by administration by September 2007.
5. Implementation of CEP work plans would continue to be reported on annually until a new energy and greenhouse gas emissions baseline was conducted in 2010, based on data from 2009. The CEP implementation committee would then create a report on the first implementation period and recommend any changes needed for the implementation period from 2010 until 2014.

References

1. *Definition of Sustainable Planning Principles*. 2006, Jacques Whitford.
2. *City of Yellowknife Interim Community Energy Plan*. 2005, City of Yellowknife.
3. *City of Yellowknife 2004 Energy and Emissions Baseline* 2005, Terriplan Consultants.
4. *Renewable Energy in Yellowknife for Homes and Buildings*. 2006, A. D. Williams Engineering.
5. *Life-cycle Cost Analysis - Energy Standards for New Buildings*. 2006, Pembina Institute.
6. *Action Area 2 - Transportation*. 2006, Dillon Consulting.
7. *Fleet Report*. 2006, Aboriginal Engineering.
8. *Advice on a long-term strategy on energy and climate change*. 2006, National Round Table on the Environment and the Economy (NRTEE) http://www.nrtee-trnee.ca/eng/programs/current_programs/Energy-Climate-Change/EEC-Wedge-Advisory-Note/ECC-Wedge-advisory-note_e.htm.
9. *Financing Options for External Green Energy Projects*. 2006, Pembina Institute and SENES.
10. *World Mayors and Municipal Leaders Declaration on Climate Change*. 2005 [cited 2006 July 14, 2006]; Available from: <http://www.iclei.org/index.php?id=2447>.
11. *Facilities Report*. 2006, Arctic Energy Alliance.
12. *City of Yellowknife General Plan (Bylaw 4315)*. 2004, City of Yellowknife.
13. *City of Yellowknife Downtown Plan*. 2002, City of Yellowknife.
14. *Financing Options for Internal Green Energy Projects* 2006, Pembina Institute and SENES.
15. *Integrated Parks, Trails & Open Spaces Study*. 2005, City of Yellowknife.
16. *CEP Communications Plan*. 2006, Outcrop Communications.

Appendix 1 –Fold-out energy profile poster

Appendix 2 – Suggested Terms of Reference for CEP Implementation Advisory Committee

Appendix 3 – Reference Reports and Materials