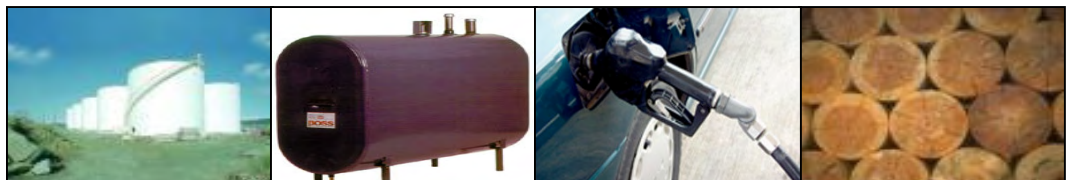


your community your energy your plan

Community Energy Planning Toolkit

November, 2006



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The Arctic Energy Alliance (AEA) developed this Toolkit with help from Mary McCreadie, NWT Literacy Council. We particularly recognize the contribution of these AEA staff:

- Andrew Robinson
- Jenn Sharman
- Dean Green



The AEA produced the Toolkit for NWT communities. We encourage you to copy and use the information and worksheets. Please contact the AEA if you have comments about the Toolkit or for more information about community energy planning.

The AEA also recognizes and thanks the communities we've worked with over the years. These experiences helped to form the Toolkit.

- | | |
|------------------|--------------|
| ▪ Deline | ▪ Enterprise |
| ▪ Fort McPherson | ▪ Gameti |
| ▪ Norman Wells | ▪ Wha Ti |
| ▪ Yellowknife | |

For their support and funding for this project, the AEA also thanks the NWT Association of Communities, the Department of Municipal and Community Affairs, GNWT and the Government of Canada.



Northwest Territories Municipal and Community Affairs



What is the community energy planning toolkit?

The community energy planning toolkit has everything that NWT communities need to successfully develop and implement a community energy plan. The Arctic Energy Alliance developed the toolkit based on our work with NWT communities and best practices in energy planning.

The Toolkit is based on a 6-step process that has proved useful for NWT communities. Each section of the toolkit has guidelines, worksheets, samples, and other practical information you can use to effectively and efficiently carry out each step in the process.

The Toolkit includes a CD, with a folder for each section. The CD contents are exactly the same as the Toolkit. All files are PDF format except the Excel spreadsheet and the PowerPoint presentation. Each section includes an Appendix with all the worksheets for that step in Word format, so you can change them to suit your needs.

Who should use the toolkit?

The Arctic Energy Alliance produced this Toolkit for elected community governments and their staff. The toolkit is particularly useful for community energy coordinators and members of Community Energy Planning committees.



Each NWT community government has a Gas Tax funding agreement with the Department of Municipal and Community Affairs. The agreement runs from 2006 to 2011. Each community needs to create a community energy plan as part of this funding agreement.

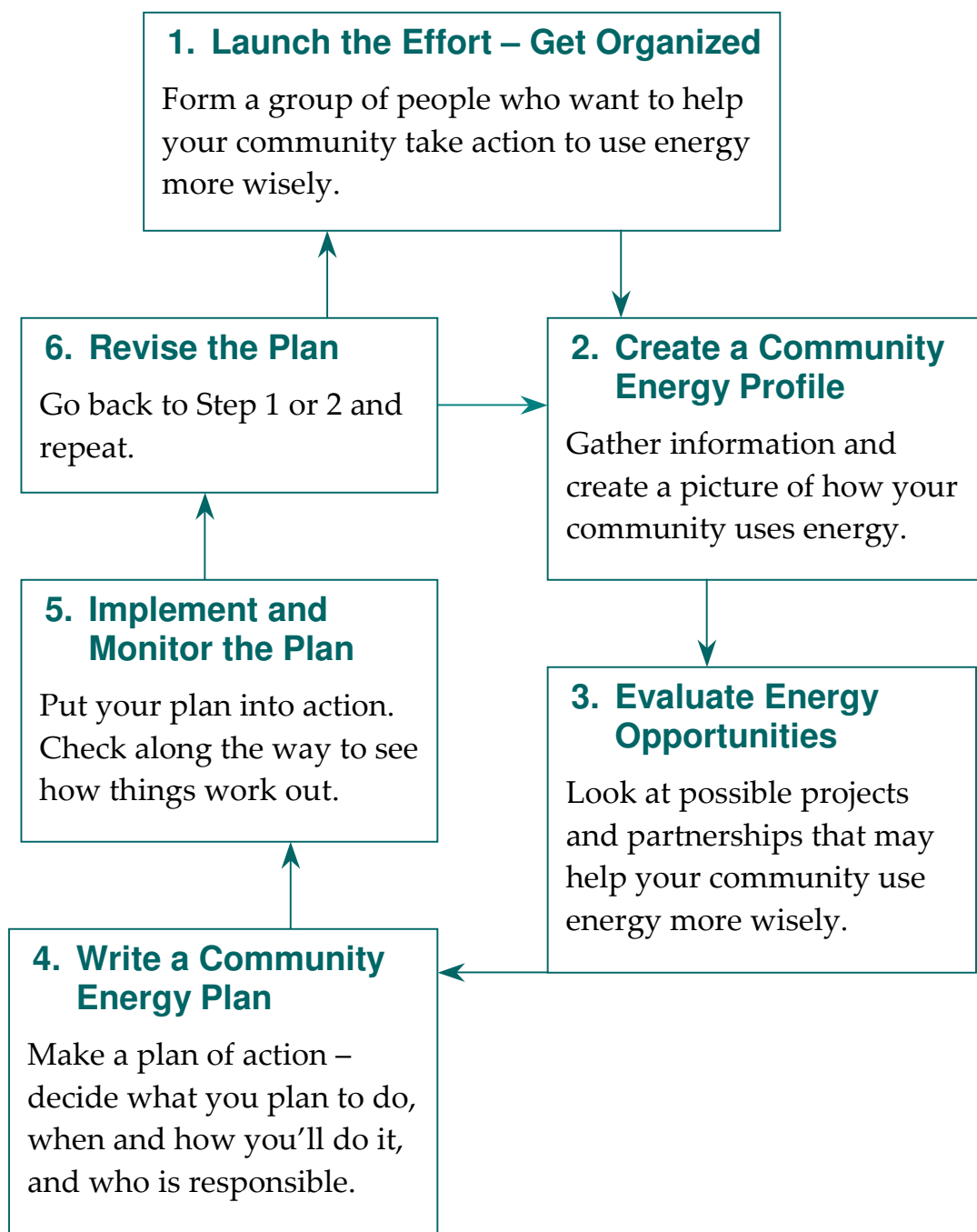
What is community energy planning?

Community energy planning is a process that helps communities find the best ways to use energy more wisely.

Most NWT communities use energy planning to find ways to:

- Replace imported, non-renewable sources of energy such as fossil fuels with more local, renewable sources of energy such as wind, water, or sunlight.
- Reduce negative environmental impacts from energy use, such as greenhouse gas emissions, noise, or fuel spills.
- Keep money related to energy use in the community, rather than spending this money outside the community.
- Use energy more efficiently.

6 Steps - Energy Planning Process



How long does it take to go through the community energy planning process?

Community energy planning is an ongoing cycle. To complete one cycle may take a few years. Here is an estimate of how long it takes to complete each step of one cycle of the process.

1. Launch the effort – get organized: 2 months
2. Create a community energy profile: 3 months
3. Evaluate energy opportunities: 3 to 6 months
4. Write a community energy plan: 2 months
5. Implement and monitor the plan: 6 months to a few years
6. Revise the plan – repeat from step 2.

Take the time you need for each step before going on to the next. A community energy plan identifies a list of projects you work on for a certain period of time. The period of time may be a year, five years – however long best suits your community at that time.

When you complete the projects you start the cycle again. With each cycle your community may update the energy profile – step 2, focus on new options – step 3, and write a new action plan – step 4. With each cycle your community has more information and makes new decisions, to keep working towards your vision of using energy more wisely.

For each cycle, your community needs to be realistic about what they can achieve and focus on decisions and actions that bring success – there is always another cycle for new decisions and actions.

Who does the work?

Ideally, people who live in the community do as much work as possible on the community energy plan. The community and individual people benefit when local people get involved as volunteers, paid staff, or contractors. Local people that work on the energy planning process develop and apply new skills that stay in the community.

We encourage communities to develop helpful partnerships for community energy planning. The Arctic Energy Alliance has worked closely with several NWT communities. Ecology North was a key partner for the Wha Ti community energy plan. Other potential partnerships may include businesses, different levels of government, non-profit groups involved with energy or sustainable living, or charitable foundations.

Communities may also decide to hire outside consultants to do some or all of the work. Look in Step 1: Launch the Effort – Get Organized for Request for Proposal (RFP) Guidelines and tips for working with consultants.

How much does it cost for community energy planning?

The cost can vary a lot. Some communities identify and carry out various detailed studies during the planning process. They need a larger budget to hire and pay consultants to carry out the detailed studies. For example Yellowknife and Wha Ti both spent over \$200,000 to develop an energy plan.

Other communities do fewer or no detailed studies, and need less money. For example, the Arctic Energy Alliance spent about \$500 per community to complete Step 2: Create a Community Energy Profile. They used data only from the Petroleum Products Division, Department of Public Works, GNWT to create the profile.

We recommend that communities budget at least \$25,000 to \$50,000 to use this Toolkit to carry out an effective energy planning process that involves local people.

Community energy planning is one part of the Integrated Community Sustainability Plan (ICSP). If communities choose to combine the energy planning process with an overall process to develop a sustainability plan, you need to identify a budget to carry out the combined work.

Why is community energy planning important?

Community energy planning can help your community save money and reduce greenhouse gas emissions. A community energy plan can bring economic, environmental, and social benefits to a community.

What are the economic benefits of community energy planning?

The main economic benefits of community energy planning are to:

- Develop local jobs to increase energy efficiency and to produce and maintain more local sources of energy.
- Keep more of the money that we spend on energy in the community.
- Reduce energy costs and create economic development opportunities.
- Apply for and receive government funding for energy related projects. One example is Gas Tax funding.

Did you know?

- 93% of NWT energy supply is imported fossil fuel - 400 million litres per year.
- The NWT spends \$230 million a year on energy – we spend more than half that outside the NWT.

In the NWT about 42,000 people live in 32 communities. We mostly use hydro and diesel generators to produce electricity. We pay a lot to bring fuel north to run the diesel generators, to heat our homes and other buildings, and to drive our cars and trucks. NWT energy costs can be up to 10 times higher than in other parts of Canada.

Energy efficiency and renewable energy projects provide local employment. Research shows that renewable energy projects create up to 12 jobs per million dollars spent, while energy efficiency improvement projects create even more.

Projects that create local employment have a multiplier effect – they create more jobs than just the jobs related directly to the project. When people have jobs they spend money in their community and create jobs for other people.

Did you know?

If a community replaces imported, non-renewable fuel with local, renewable sources of energy, more money stays in the community.

The community can use that money to provide other community services. And the community has a sustainable, more independent, secure energy supply.

Local energy efficiency and renewable energy projects help the economy in other ways too. If people in the community spend less money on their energy bills, they have more money to spend on other things. This potentially leaves more money in the community.

What are the environmental benefits of community energy planning?

The main environmental benefits of community energy planning include:

- Use less diesel and gasoline fuel, and produce less toxic exhaust local air pollution.
- Have fewer fuel spills and reduce local pollution.
- Replace diesel power plants or use them less, and reduce noise pollution.
- Use less fossil fuel and produce less greenhouse gas emissions.

Did you know?

Diesel exhaust:

- Contains over 40 toxic air contaminants,
- Increases the risk of lung cancer, and
- Can cause coughs and aggravate asthma.

Human energy use affects the environment and human health. In the past, nature mostly absorbed these effects - the scale and intensity of human energy use did not overwhelm the natural balance. Today the global population keeps growing and people around the world use more and more fossil fuels such as diesel and gasoline, the main source of greenhouse gas emissions.

Burning fossil fuels is the largest source of greenhouse gas emissions in the NWT. We produced 1,750,000 Tonnes of CO₂ in 2001. Less than half of the emissions come from activities in communities. Most emissions come from transport between communities and from industry such as diamond mines.

Did you know?

- NWT greenhouse gas emissions increased more than 60% between 1996 and 2001.
- The Arctic Climate Impact Assessment states that the Arctic is warming at twice the rate of the rest of the world.

Greenhouse gas emissions are the main cause of climate change. The effects of climate change are more severe in the north than in the southern parts of Canada. Right now most of the world depends on fossil fuels for energy, just as we do in the NWT. And although we have a small population, we're responsible to do our part.

Overall the NWT produces a relatively small amount of greenhouse gas emissions. But per person, we produce more than many other parts of the world. We need to take responsibility and do our part to help reduce greenhouse gas emissions.

Sara Kuptana, Sachs Harbour, 1999

Sila (the weather and climate) has changed all right. It is a really late fall time now, and really fast and early springtime. Long ago the summer was short, but not anymore.

What are the social benefits of community energy planning?

The main social benefits of community energy planning are to:

- Create warmer, more comfortable buildings that last longer.
- Use local sources of energy so we don't have to depend on outside sources of energy.
- Create opportunities for people to get training and develop new skills.
- Make the community more sustainable.
- Get the whole community involved in making decisions, and build community spirit and pride.

Did you know?

An average northern house uses between 4 and 8 cords of wood per year for heat.

An efficient, well-insulated house uses only 2-3 cords per year and is more comfortable

The Wha Ti Success Story

People in Wha Ti partnered with Ecology North to learn about better ways to make and use energy in their community. An Elders' advisory committee, a youth action group, the Council, and other community people worked together with technical experts.

First they looked at how people use energy and where they get energy, for example from the diesel generator. Then they looked at better ways they could make and use energy.

The federal and territorial governments funded the project so people could get paid for their work. Ecology North, the Arctic Energy Alliance, the Pembina Institute, and others did workshops so community people could learn more about energy use.

Wha Ti completed their Community Energy Plan in 2004. Here are some things they plan to do:

- ✓ Build a small, run-of-river hydro plant to make electricity
- ✓ Replace old lights and appliances with better new ones
- ✓ Use solar energy to heat water
- ✓ Use better insulation on houses and other buildings

Now people in Wha Ti and their partners are working hard to put the plan into action. Over time they will review and build on their plan to make things even better.

Working together on the Community Energy Plan brings benefits – cleaner air, less noise, less pollution from fuel spills, new jobs, and people spend less money on energy. People around the world recognize Wha Ti and Ecology North for their creative work.

Wha Ti Community Energy Plan

Options for Energy Supply and Management for Wha Ti, Northwest Territories

Prepared for the Wha Ti Charter Community by Ecology North and the Pembina Institute

Report prepared by

Bob Bromley, Ecology North
Jesse Row, Pembina Institute
Matthew Salkeld, EnergyWise Technologies
Pammi Sijmman, P.O. Systems Hydrotech Consulting
Tim Wain, Pembina Institute
Paul Cobb, Pembina Institute



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Energy planning vocabulary, references, and resources

Aboriginal and Northern Community Action Plan (ANCAP):

ANCAP is a four-year, federal government program – 2004 to 2008. The program offers funding and technical support for climate change and energy use projects, in Aboriginal and northern communities.

Contact the ANCAP Pathfinder through the Arctic Energy Alliance or go to the ANCAP website: www.inac.gc.ca/clc

“Arctic Climate Impact Assessment – Impacts of a Warming Arctic” 2004 Cambridge University Press
www.cambridge.org

Arctic Energy Alliance: Helps communities with all aspects of community energy planning.

- Build partnerships
- Find funding
- Write a proposal
- Manage a project
- Organize and facilitate a workshop
- Measure how much energy your community needs and uses
- Look at different ways to make and use energy in your community.

Phone toll free 1-877-755-5855 or 920-3333

Email: info@aea.nt.ca

Website: www.aea.nt.ca

“Advice on a long-term strategy on energy and climate change”

2006 National (NRTEE)

www.nrtee-trnee.ca/eng/programs/current_programs?Energy-Climate-Change/EEC-Wedge-Advisory-Note/ECC-Wedge-advisory-note_e.htm

Canadian Wind Energy Atlas

Website with easy-to-find colour maps and other information about average wind speed, for anywhere in Canada.

<http://www.windatlas.ca/en/index.php>

Capacity: Capacity is the knowledge, skills, people power, time, energy, money, and other resources that a person, group, or community has. We can increase capacity any time we increase any of these resources.

Carbon dioxide equivalent (CO₂ EQ): CO₂ EQ measures greenhouse gas emissions. Carbon dioxide is the most common greenhouse gas and we use it to show overall greenhouse gas emissions.

We measure greenhouse gas emissions as Tonnes CO₂ EQ.

One Tonne = 1000 kilograms.

Cogeneration: Cogeneration is a system and technology that takes waste heat from a diesel or natural gas generator and pipes it to a nearby building, to heat that building.

Commercial Building Incentive Program (CBIP): CBIP offers funding up to \$60,000 to help design and build new energy efficient buildings. The program also offers help with design standards. CBIP buildings must exceed the Model National Energy Code for Buildings by 25%.

Community energy plan: A community energy plan shows how a community changes how they use energy today, to meet their vision of how they want to use energy more wisely in the future. It shows the process and information the community uses to decide what they want to do, how they want to do it, and who will do the work.

“A Community Energy Planning Methodology – How to develop a long term strategic plan for your community”

Revised version June 2005

Federation of Canadian Municipalities

[http://kn.fcm.ca/ev.php?URL_ID=3055&URL_DO=DO_TOPIC
&URL_SECTION=201&reload=1](http://kn.fcm.ca/ev.php?URL_ID=3055&URL_DO=DO_TOPIC&URL_SECTION=201&reload=1)

“Community Energy Workbook - A Guide to Building a Sustainable Economy” 1995 Rocky Mountain Institute

EnerGuide for Houses Program (EGH): Shows people how they can use less energy and save money. An energy expert tests your home and measures how you use energy and where you waste it. They tell you what you can do to reduce your energy costs. For new homes, the energy expert looks at the drawings – before you build the house.

You may pay to have your house tested – but it’s worth it. If you make the changes the EnerGuide program suggests, you may be able to get a grant to cover some costs. After you make changes, an energy expert tests your house again. The

amount of the grant depends on what changes you made and the results of the new test.

In the NWT, contact the Arctic Energy Alliance to find out more about the program and to get your house tested.

Energy audit: An energy audit measures how a building uses energy and what you can change in the building, to save energy.

“Energy Aware Planning Guide” 1993 California Energy Commission

http://www.energy.ca.gov/reports/energy_aware_guide.html

Energy Conservation Program: The Department of Environment and Natural Resources, GNWT offers this program. The program has funding for capital projects that cause a long-term decrease in the amount of electricity, heat, or water people use. Communities and groups can apply.

Contact the Energy Programs Coordinator.

Phone: 867-873-7654 or www.enr.gov.nt.ca/eps/energy.htm

Energy efficiency: Energy efficiency means to use less energy and still do the same amount of useful work. An energy efficient vehicle uses less gas to go the same distance. An energy efficient refrigerator uses less electricity to keep things cold. Energy efficient habits are things people do that use less energy – such as turning off lights when you don’t use them, walking instead of driving, using a clothesline instead of a dryer.

Demonstration project: A demonstration project is something we decide to do once, to show that it works. For example, to do a

demonstration project for solar water heating we could install a system in a building like the nursing station. We'd keep track of things like how much money we save over one year, compared with when we didn't have the solar water heating system.

Feasibility / Pre-feasibility study: A feasibility study is when we learn things to find out if something is possible. For example, to do a feasibility study for a run-of-river hydro project, we'd pick one or more sites we think might be good. We'd measure things such as water flow and the height of a waterfall over a year or more.

A pre-feasibility study is when we learn things to help decide if we want to do a feasibility study. In the example above, we'd learn general things about run-of-river hydro and we'd decide which sites might be good to look at more closely.

Fossil fuels: Fossil fuels include things like gasoline, diesel oil, and natural gas. Fossil fuels come from deep in the ground and they are a nonrenewable resource. Once we use them up, they are all gone.

Greenhouse gases and climate change: Greenhouse gases are part of the earth's atmosphere - gases such as carbon dioxide, methane, nitrous oxide, and others. Sunlight comes through the atmosphere and hits the earth's surface. Some light energy bounces back into the atmosphere as heat energy. Greenhouse gases trap the heat and keep it in the atmosphere. Many greenhouse gases come from nature. Human activity also creates lots of greenhouse gases – especially burning fossil fuels.

Over time, the earth's temperature should stay about the same if the amount of energy coming in from the sun is the same as

the energy going back into space. Right now we burn too much fossil fuels and produce too much greenhouse gases – we’ve upset the balance. This causes climate change.

Integrated Community Sustainability Plan (ICSP): A long-term plan the community develops, to identify and carry out sustainability objectives. Objectives relate to environmental, cultural, social, and economic sustainability. Communities must develop an ICSP to receive gas tax funding. In the NWT an ICSP must include a community energy plan.

“Inuit Observations on Climate Change” by G. Ashford and J. Castleden 2001 International Institute for Sustainable Development http://www.iisd.org/pdf/inuit_final_report.pdf.

Joules / mega joules: A unit of energy. It measures how much work a fuel or machine can actually produce. 1000 joules (J) = 1 mega joule (MJ). One MJ = the energy it takes to boil 2 ½ litres of water. We convert other units of energy to MJ so we can add up total energy use and compare different ways we use energy.

Kilowatts (kw): A kw is a unit of power, like horsepower. It measures how much useful work can be done per hour.

Kilowatt hours (kWh): A kWh is a unit of energy, like mega joules. It measures how much useful work can be done.

Leadership in Energy and Environmental Design (LEED)

A green building rating system tailored for Canadian climates, construction practices, and regulations.

Canada Green Building Council

http://www.cagbc.org/building_rating_systems/leed_rating_system.php

Northwest Territories Power Corporation (NTPC): NTPC is one of two electrical utilities that generate, distribute, and sell electricity to NWT Communities. The NTPC operates 28 power systems to provide electricity for 28 NWT communities.

They generate hydro electricity on the Snare and Taltson River systems. They use diesel generators in all other communities except Norman Wells and Inuvik. In Norman Wells, they buy power generated power from natural gas from Esso Resources Limited. In Inuvik, they generate power from natural gas.

For Yellowknife and Hay River, the NTPC sells electricity to local utilities that deliver and sell it to businesses and people there. The Power Corporation delivers and sells electricity in other communities.

Northland Utilities: Northland is one of two electrical utilities that generate, distribute, and sell electricity to NWT Communities.

Partners for Climate Protection program

Federation of Canadian Municipalities

www.sustainablecommunities.ca/Capacity_Building/Energy/PCP/default.asp

Office of Energy Efficiency (OEE), Government of Canada:

Programs and services to help people save energy, be more energy efficient, and reduce greenhouse gas emissions.

Website: <http://oee.nrcan.gc.ca/corporate/programs.cfm?attr=0>

Phone toll free: 1-800-387-2000

Petroleum Products Division (PPD): The PPD is part of the Department of Public Works, GNWT. They supply diesel and gasoline to many smaller NWT communities.

Public Utilities Board (PUB): The PUB regulates – oversees and controls – businesses that provide public utilities. Public utilities include things such as electricity and natural gas. The PUB regulates and approves how much utilities charge for electricity in each community. The utility that services your community calculates how much it costs to provide electricity. They present this information to the PUB for approval. People can participate in the PUB decision-making process.
www.nwtpublicutilitiesboard.ca

“Remote Northern Community Energy Planning Handbook”
(1985) Energy and Mines Branch, Government of Yukon

Renewable energy: Renewable energy is energy that comes from things that can last forever. Renewable energy is never all gone. Examples of renewable energy sources include the sun, wind, moving water, and wood.

“Renewable Energy in Canada's Remote Communities” (1999)
Natural Resources Canada
<http://cedrl.mets.nrcan.gc.ca/eng/publication/1999-27e.pdf>

RETScreen: RETScreen software organizes information into a database, to help show potential for solar, wind, and micro-hydro energy projects. Natural Resources Canada used RETScreen to produce a database with information about potential for renewable energy in 300 remote Canadian communities. www.retscreen.net/ang/11_4.php
Phone toll free: 1-450-652-5177
Email: rets@nrcan.gc.ca

“Statistics Quarterly” (2004) Bureau of Statistics, GNWT
<http://www.stats.gov.nt.ca/>

“Toolkit for Community Energy Planning in British Columbia”

(2001) <http://www.energyaware.bc.ca/toolkit.htm>

“The Atlas of Canada” 2004

<http://atlas.gc.ca/site/index.html>

“Wha Ti Community Energy Plan” 2004 Pembina Institute and Ecology North

World Mayors and Municipal Leaders Declaration on Climate Change

www.iclei.org/index.php?id=1575