Community Energy Plan

Gameti

March 2006

ARCTIC ENERGY ALLIANCE

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Acknowledgements

The Arctic Energy Alliance produced this **Community Energy Plan** together with the community. A **Community Energy Plan** shows how to use energy more wisely in the future.

- Use energy more efficiently
- Use more renewable energy
- Use less fossil fuels

We thank the following people who helped create the **Energy Plan**:

- The community, who took the time and energy to participate
- Fuel and electricity suppliers, who shared their data
- Mary McCreadie, NWT Literacy Council, who developed the Energy Plan template

To get copies of a **Community Energy Plan** or to find out more about how your community can get involved contact the Arctic Energy Alliance.

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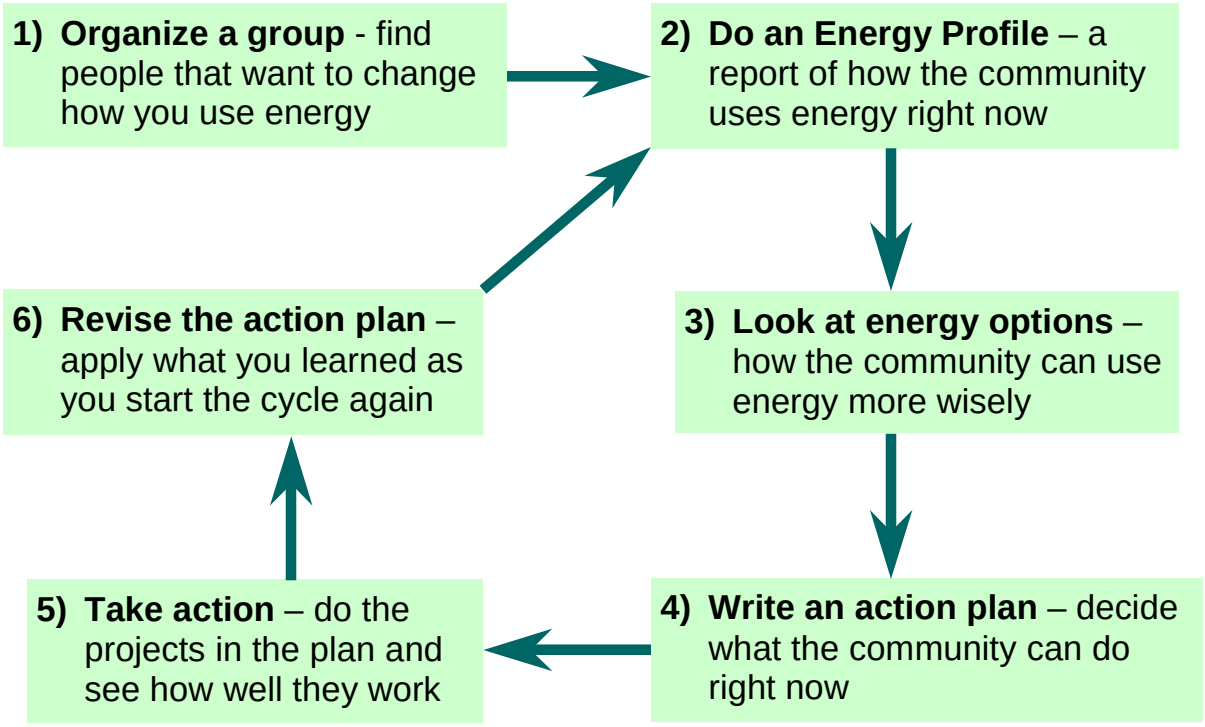
What is a Community Energy Plan?

An energy plan shows what a community decides to do, over time, to change how you use energy – to find better ways to make and use energy. A community decides to do things today because you have a vision of a better future.

The following six steps outline a process a community can use to develop an energy plan. This Community Energy Plan includes general and community-specific information for each step.



Planning is a cycle. With each cycle, a community may update the energy profile, focus on new options, and write a new action plan. With each cycle, a community has more information and makes new decisions, to keep working towards your vision of the future.

Why develop a Community Energy Plan?

Do you want your community to save money and create local jobs?

Do you want your community to have less pollution and produce less greenhouse gases?

Do you want your community to build healthy ways of living and help people learn new and creative skills?

A **Community Energy Plan** can help a community do all these things, and more.

People will always need and use energy. We live in the north. We need heat and light for our homes and other buildings in winter. Our modern world depends on electricity for many things besides light - things like appliances, machines, computers, TVs, radios, music, etc.

Today and in the recent past we get most of our energy from fossil fuels. Fossil fuels won't last forever. They get more and more expensive as time goes by and we know burning them causes climate change. We also know that in many ways our modern society encourages people to waste energy.

Many people dream that things could be different – that we can use less energy, save money, produce less greenhouse gases, use more renewable sources of energy, and live with respect for the land.

A Community Energy Plan can help realize this dream. A Community Energy Plan helps you take more responsibility and have more control over what energy you use and how you use it.

Step 1 – Organize a Group

A community often forms an energy committee when you start to develop an energy plan. An energy committee is a group of people that want to change how your community uses energy. You have a vision of how your community can find better ways to make and use energy more wisely. The committee uses the planning process and works towards a vision.

A committee works with other groups that can help you with your energy plan. You gather and share information, and make decisions. You coordinate the work to develop the plan. You watch over it and make sure things happen.

Gameti Energy Committee

Gameti Council passed a resolution on June 27, 2005 to create an Alternative Energy Committee. The committee members are:

- Eddie Chocolate
- Alphonse Apples
- Charlie Chocolate
- Charlie Gon
- Harry Simpson

The committee coordinator is Patrick Gargett.

Gameti Council passed a resolution on October 17, 2005 to work with the Arctic Energy Alliance to produce the energy plan. The Alternative Energy Committee worked with a $12,000 budget to produce the plan.

Create a vision

A vision is a short statement of what an energy committee sees in the future – an ideal picture of how you'd like things to be. The vision helps an energy committee always see the bigger picture of what you're working for – why you do the work you do.

During the planning process people sometimes get stuck because things don't always work out the way you want them to. Or you may not have enough money, or people, or other resources to make things happen. A vision helps the committee remember what you're working towards and what you care about, and encourages you to keep working, even when it's hard.

Gameti Energy Committee's vision

We moved to Gameti over 40 years ago – our community is 40 years old. What will our community be like in another 40 years?

Our community needs to use energy that is in harmony with our community and the land. We need to manage and use energy in ways that respect the land and honour future generations with a clean world.

We want to use clean, local sources of energy, such as wood, to heat our homes. We want to produce energy for heat and electricity in cheaper, cleaner ways than from diesel generators – for example from sun, wind, and hydro.

Step 2 - Do a Community Energy Profile

This section gives a summary of a Community Energy Profile. For more details, see the separate Community Energy Profile document.

What is a Community Energy Profile?

A **Community Energy Profile** describes:

- The different fuels a community uses to produce energy
- How much money a community spends on energy
- How much greenhouse gases each fuel produces
- How much energy a community uses in homes, other community buildings, and for transport within the community
- Some basic ideas a community can explore to use less energy, produce less greenhouse gases, and save money

The **Energy Profile** does **not** include energy related to air and truck transport that bring goods into the community.

A **Community Energy Profile** shows how a community uses energy for a certain year. It contains basic information that is easy to find and easy to find again in the future. A community can use an **Energy Profile** to keep track of how you use energy over time, if you gather the same information at regular time periods, such as every year or two.

How does an energy profile measure energy?

The **Community Energy Profile** measures energy with units called mega joules or MJ and giga joules or GJ.

- One MJ equals the amount of energy it takes to boil 2 ½ litres of water.
- 1000 MJ = 1 GJ

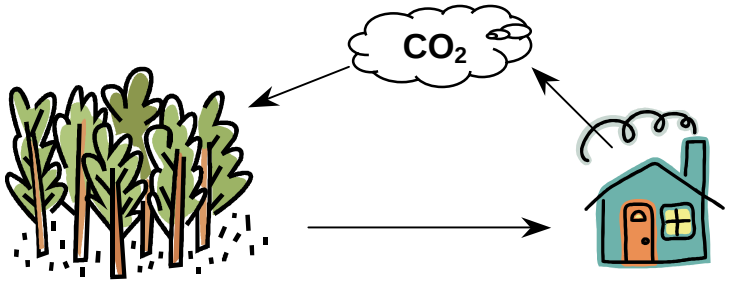
The **Community Energy Profile** measures energy based on different fuels a community uses to produce energy in a year. Business and government may provide information about fuels in units such as litres for gasoline or diesel, kilowatt hours for electricity, and cords for firewood. We convert all these units to MJ and GJ so we can directly compare different kinds of energy.

How does an energy profile measure greenhouse gases?

The **Community Energy Profile** measures greenhouse gas emissions as carbon dioxide equivalent ($CO_{2\ EQ}$). Carbon dioxide is the most common greenhouse gas and we use it to show overall greenhouse gas emissions.

Each fuel has a standard formula to calculate greenhouse gases as $CO_{2\ EQ}$. We use this formula to calculate greenhouse gases for each fuel or energy.

The **Energy Profile** shows that wood has no greenhouse gas emissions. We count no greenhouse gases from wood because trees absorb carbon dioxide when they grow. This balances the greenhouse gases that wood produces when it burns.



Gameti Energy Profile 2004

Total cost: $1,470,000
Total energy: 33,800,000 mega joules

Diesel - Electricity
* 56% of Cost
* 36% of Greenhouse Gases

30% of Energy

Gasoline
* 15% of Cost
* 18% of Greenhouse Gases

17% of Energy

Fuel Oil & Diesel
* 25% of Cost
* 46% of Greenhouse Gases

37% of Energy

Wood
* 5% of Cost
* 0% of Greenhouse Gases

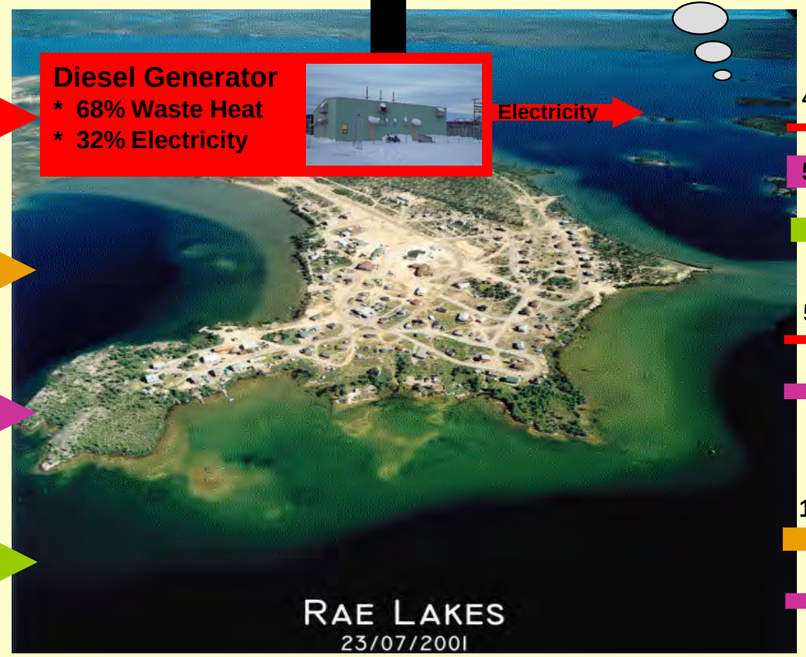
14% of Energy

Waste Heat

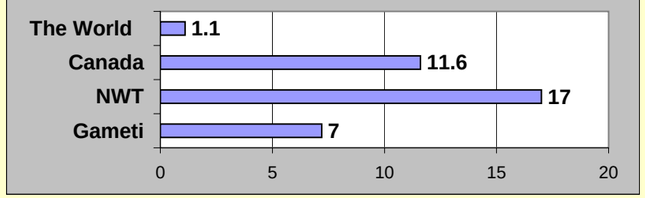
Greenhouse gas emissions 2,140 Tonnes CO_2 EO

Diesel Generator
* 68% Waste Heat
* 32% Electricity

Electricity



Greenhouse gases - Tonnes $CO_{2\ EQ}$ per person



47% of Electricity
50% of Fuel Oil
100% of Wood

Homes

53% of Electricity
25% of Fuel Oil

Other buildings

100% of Gasoline
25% of Fuel Oil

Transport

Five alternative sources of energy

1) Solar energy can heat water and buildings, and make electricity
2) 'Run-of-river' hydro can make electricity without flooding the land
3) Wind energy can produce electricity
4) Wood can be a sustainable fuel if we manage the forest well
5) Waste heat from diesel generators can heat buildings

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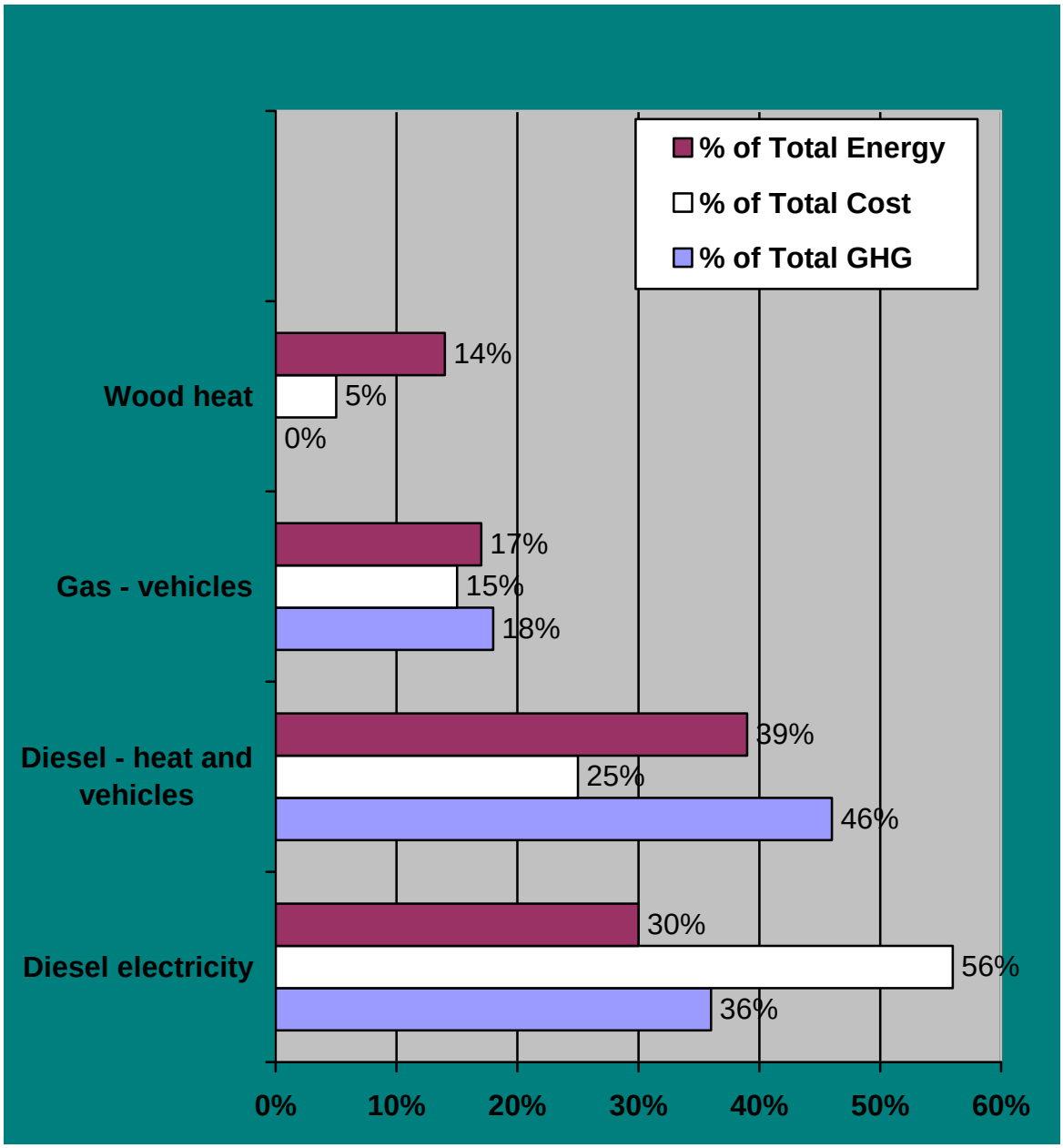
Top five ways to use less energy and save money

1) Develop everyday habits that save energy
2) Buy energy-saving appliances and other products
3) Buy a vehicle that uses less energy
4) Build energy-saving new buildings
5) Renovate older buildings so they use less energy

Gameti Energy Profile Summary

This chart shows how much energy the community gets from each type of fuel, and the percent of total cost and total greenhouse gas emissions for each type of fuel.



Total energy use, total cost, total greenhouse gas emissions

Community: Gameti **Year:** 2004

Location: On an island in Rae Lake, latitude 64° north, longitude 117° west, 177 kilometres northwest of Yellowknife

Population: 297 **Transport access:** Air, winter road

Total energy used: 33,800,000 MJ

Total cost: $1,470,000

Total greenhouse gas emissions: 2,140 Tonnes $CO_{2\ EQ}$

Where does Gameti use energy?

	Homes	Other Buildings	Transport
Diesel electricity	50%	50%	0
Diesel for heating and vehicles	50%	25%	25%
Gasoline for vehicles	0	0	100%
Wood for heat	100%	0	0

Step 3 - Look at Energy Options

Energy options give a community a list of ideas about how to use energy more wisely. Energy options are the alternatives available to a community - things you can do, if you choose.

During the planning process a community may decide to look more closely at one or more options. You can use information about options to help you decide where to focus your work.

This Community Energy Plan looks at two main kinds of energy options – energy efficiency and renewable energy.

Energy efficiency – How can we use less energy?

- Develop energy efficient habits
- Buy and use energy star products
- Use energy-efficient vehicles
- Build new buildings that save energy
- Fix up older buildings so they use less energy

Renewable energy – Where can we get clean energy?

- Solar water heating
- Solar air heating
- Solar electricity
- Passive solar heat
- Run-of-river hydro
- Wind turbines
- Efficient wood heat
- Cogeneration

How can we use less energy?

Develop energy efficient habits

How it works

- Learn about and do everyday things that save energy
- Choose to walk or bike, not drive
- Turn of lights, TV, vehicle, and water tap when not in use
- Use a time to turn things off and on – coffee maker, vehicle plug-in, furnace
- Use energy efficient things, such as compact fluorescent bulbs
- Use a clothesline, not a dryer

Benefits

- Use less energy and save money
- Pay little or nothing
- Help reduce greenhouse gas emissions

Limits

- Hard to change old habits
- People may lack information
- Stores may not carry products

How can we use less energy?

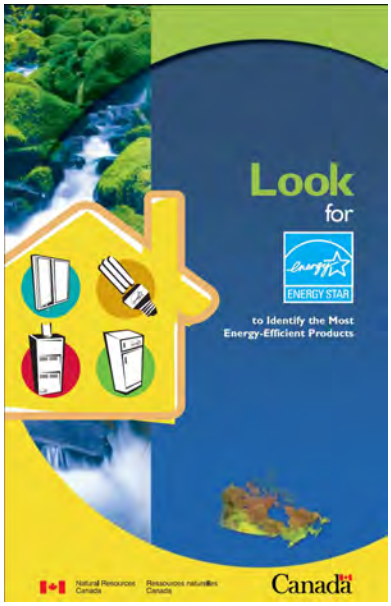
Use Energy Star products

How it works

- Look for a buy things that have the Energy Star symbol – it shows products that use less energy
- Replace things that use lots of energy with energy-efficient things

Benefits

- Use less energy
- Pay less to operate things
- Help reduce greenhouse gas emissions



Limits

- High cost to buy, but it pays off after a few years
- Stores may not carry Energy Star Products

How can we use less energy?

Use Energy-efficient vehicles

How it works

- Buy a vehicle that gets good gas mileage
- Buy a smaller, lighter vehicle or hybrid vehicle
- But a 4-stroke motor – they use less fuel

Benefits

- Use less polluting energy
- Pay less to buy and operate a smaller, energy-efficient vehicle
- Help reduce greenhouse gas emissions

Limits

- Local mechanics may not know how to fix a hybrid
- Smaller vehicles have less space

Energy Fact

A small pickup truck uses 1/3 less fuel than a large one.

		Gas mileage - highway	Annual fuel cost	Annual CO2
HYBRID	Toyota Prius	4.0 L/100 km or 71mi/gal	$820	1968 kg
DIESEL	VW Beetle TDI	6.2 L/100 km or 46 mi/gal	$1100	2970 kg
HYBRID	Ford Escape	6.6 L/100 km or 43 mi/gal	$1360	3264 kg
2X4	Ford Ranger	9.9 L/100 km or 29 mi/gal	$1740	4276 kg
4X4	F-150	16.7 L/100 km or 17 mi/gal	$2940	7056 kg
		not recommended - for comparison only		

A hybrid uses new motor and battery technology that uses less energy

How can we use less energy?

Build new buildings that save energy

How it works

- Build new buildings with good insulation and windows, energy-saving heatin, appliances, lights, etc.
- Apply the highest energy-saving standards to build new buildings

Benefits

- Use less polluting energy
- Pay less to build it right the first time
- Pay less to operate an energy-efficient building
- Help reduce greenhouse gas emissions

Limits

- People may pay about 10% higher construction costs – but it pays off after a few years

Energy efficient homes in Whitehorse, Yukon

How can we use less energy?

Renovate older buildings so they use less energy

How it works

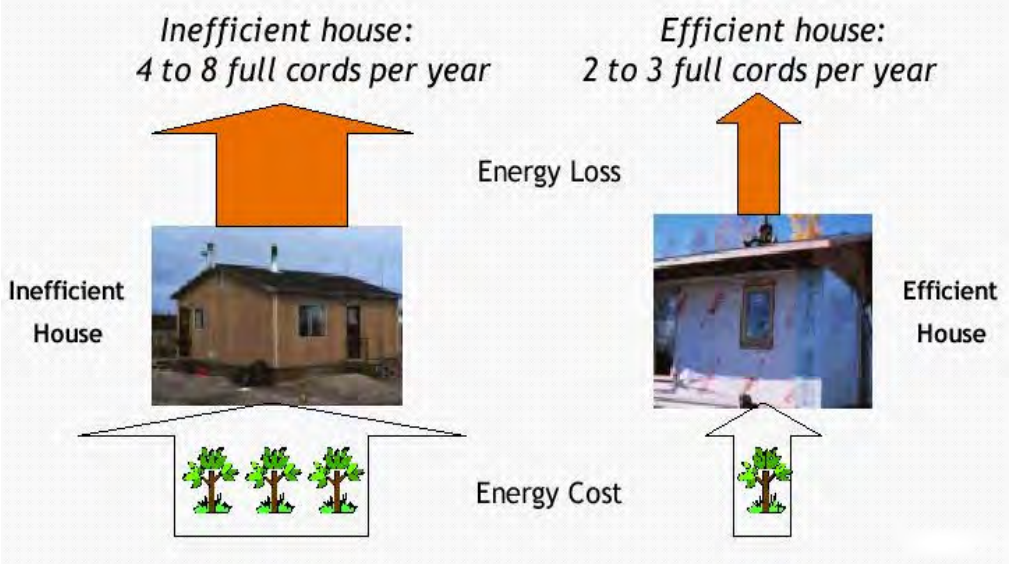
- Do an energy audit – find out how your building uses energy and what you can change to save energy
- Fix up your home or building so it uses less energy

Benefits

- Use less polluting energy
- Pay less to operate the building
- Help reduce greenhouse gas emissions

Limits

- People may pay lots to renovate – but it pays off after a few years



Where can we get clean energy?

Solar Water Heating

Elders building, WhaTi

How it works

- Put solar panels in a place where they get lots of sunlight
- The sun heats water as it flows through tubes in the solar panels
- Heated water goes to your hot water tank – for showers, baths, and dishes

Benefits

- Use less polluting energy to make hot water
- Pay less to make hot water
- Produce no greenhouse gas emissions from solar panels
- Easily maintain the solar panels

Limits

- Days with no sunlight produce no hot water
- High cost to buy – but it pays off after a few years
- Solar panels won't make all the hot water a northern building needs all year round

Energy Fact

A solar water heater can reduce annual energy costs by about 30% and annual greenhouse gas emissions by up to two Tonnes $CO_{2\ EQ.}$

Where can we get clean energy?

Solar Air Heating

How it works

- Put a solar wall – a dark metal wall with small holes in it – on the sunny side of a building
- The wall heat the air, as the air enters the building

Recreation building, Fort Smith

Benefits

- Use less polluting energy to heat the building
- Pay little to operate a solar wall
- Produce no greenhouse gas emissions from a solar wall
- Easily maintain a solar wall

Limits

- Days with no sunlight produce no warm air
- High cost to buy – but it pays off after a few years
- A solar wall won't provide all the heat a northern building needs in the winter

Where can we get clean energy?

Solar Electricity

How it works

- Put solar panels in a place where they get lots of sunlight
- Solar panels change sunlight into electricity – at any temperature
- Also called photovoltaics or PV

Nunavut Arctic College, Iqaluit

Benefits

- Use less polluting energy to make electricity
- Pay little to operate PV panels
- Produce no greenhouse gas emissions from PV panels
- Easily maintain PV panels

Limits

- Days with no sunlight produce no electricity
- High cost to buy – but it pays off after a few years
- PV won't make all the electricity a northern building needs in winter

Energy Fact

If we replace diesel electricity with renewable energy, we can reduce greenhouse gas emissions by 2.3 Tonnes $CO_{2\ EQ}$ for each kilowatt of electricity.

Where can we get clean energy?

Passive Solar Heating

How it works

- Build homes and other buildings with windows facing south, to catch the most sunlight
- Sunlight enters the building through windows and heats the air, without any technology

Homes in Peanawayuk, Ontario

Benefits

- Use less polluting energy to heat your house – also provides lots of light
- Pay nothing for passive solar heating
- Produce no greenhouse gas emissions with passive solar heating

Limits

- Days with no sunlight produce no heat
- Windows provide much less insulation than walls – even good windows
- Windows – especially good windows - cost money.

Energy Fact

Passive solar heating can provide up to half the heat energy that a building needs, even in the north.

Where can we get clean energy?

Run-of-river Hydro

How it works

- Use moving water or a waterfall to make electricity, without a dam or flooding
- Water gathers in a pipe at the top of a waterfall
- Water fathers energy as it goes down the pipe to a turbine
- The turbine turns a generator, that makes electricity

Possible hydro site near WhaTi

Benefits

- Use less polluting energy to produce electricity
- Works very well if you have a good site
- Produce no greenhouse gas emissions from a run-of-river hydro system

Limits

- Need a good location close to the community, and lots of time and effort to build a run-of-river hydro system
- Community needs to watch and maintain the system
- High cost to buy the system – but it pays off after a few years
- A community might not get all the electricity you need from a run-of-river hydro system

Where can we get clean energy?

Wind Turbines

Wind turbine Rankin Inlet

How it works

- Use a wind turbine to make electricity
- The wind turns the turbine's blades
- The blades turn a generator, that makes electricity

Benefits

- Use less polluting energy to produce electricity
- Works very well if you have a good site
- Pay little to operate the wind turbines
- Produce no greenhouse gas emissions from wind turbines

Limits

- Need a good, windy site close to the community
- Community needs to watch and maintain the system
- High cost to buy the turbines – but it pays off after a few years
- A community probably won't get all the electricity you need from wind turbines

Wind farm in Ramea, Newfoundland

Where can we get clean energy?

Efficient Wood Stoves

How it works

- Use a wood stove that burns wood longer, cleaner, and more completely
- Try a pellet stove, if you have access to the special pellets fuel it needs

Efficient wood stove

Benefits

- Use less polluting energy to heat your home
- Use less wood to heat your home
- Produce less wood smoke
- Produce less greenhouse gas emissions

Limits

- Need to harvest wood or buy wood or pellets – may not be available everywhere
- To harvest wood forever, we need to manage forests so we always have trees to cut for fuel
- High cost to buy a good wood stove – but it pays off after a few years

Pellet stove and pellets

Where can we get clean energy?

Cogeneration

How it works

- Build a system to capture waste heat from a generator and pipe it to another building, to heat that building

Snowshoe Inn, Fort Providence

Benefits

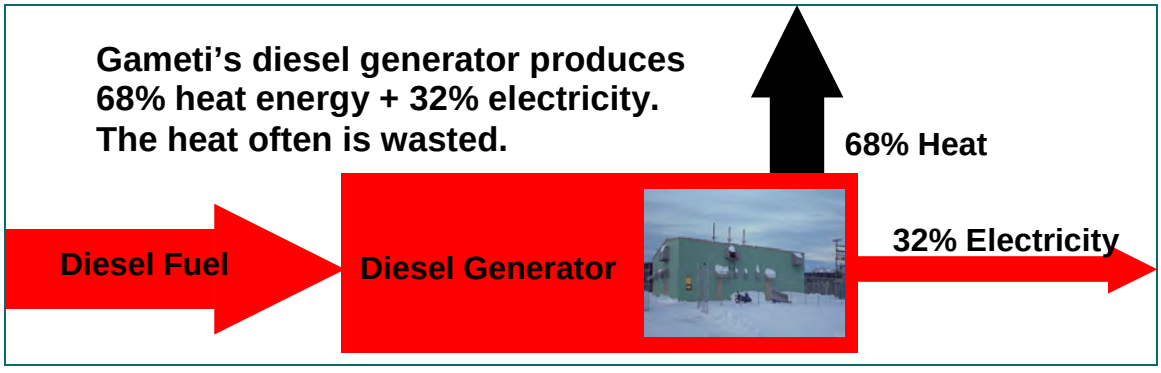
- Use less polluting energy to provide heat
- Save money – and don't waste heat energy
- Produce less greenhouse gas emissions

Energy Fact

The waste heat from the generator in Gameti has enough energy to heat more than half the homes and buildings that use heating oil.

Limits

- Hard to convert some existing engines to cogeneration
- High cost to buy the system – but it pays off after a few years



Gameti Options
A picture of cleaner energy in 20 years

Gameti could implement energy efficiency and renewable energy projects, and save money and reduce greenhouse gas emissions. This section offers a picture of what is possible with some clean energy options.

We compare total energy costs and greenhouse gas emissions under the following scenarios:

- No energy saving projects – Gameti keeps using energy the way you do right now
- Energy efficiency scenario
- Renewable energy scenario
- Energy efficiency and renewable energy scenarios together

We assume certain things for these scenarios:

- Each scenario accounts for population changes over 20 years, as defined by the NWT Bureau of Statistics.
- The price of oil stays the same over time. Most people believe the price of oil will keep rising, so there may be more savings than we show.
- In the energy efficiency scenario, total energy costs do not include things such as the money a person pays to fix up an older building. They do not include the money a person saves to buy a small vehicle instead of a large one.
- In the renewable energy scenario, total energy costs do not include the money a community pays to set up a hydro project or to buy efficient wood stoves.

Energy efficiency scenario:

- Home owners fix up their homes
- Community fixes up community buildings
- Everyone has energy efficient habits
- People replace old appliances with energy star appliances
- People switch to more energy efficient vehicles

All the actions in the energy efficiency scenario save money in the long term, and the savings add up. Together they can reduce both energy costs and greenhouse gas emissions by 1% each year for 20 years.

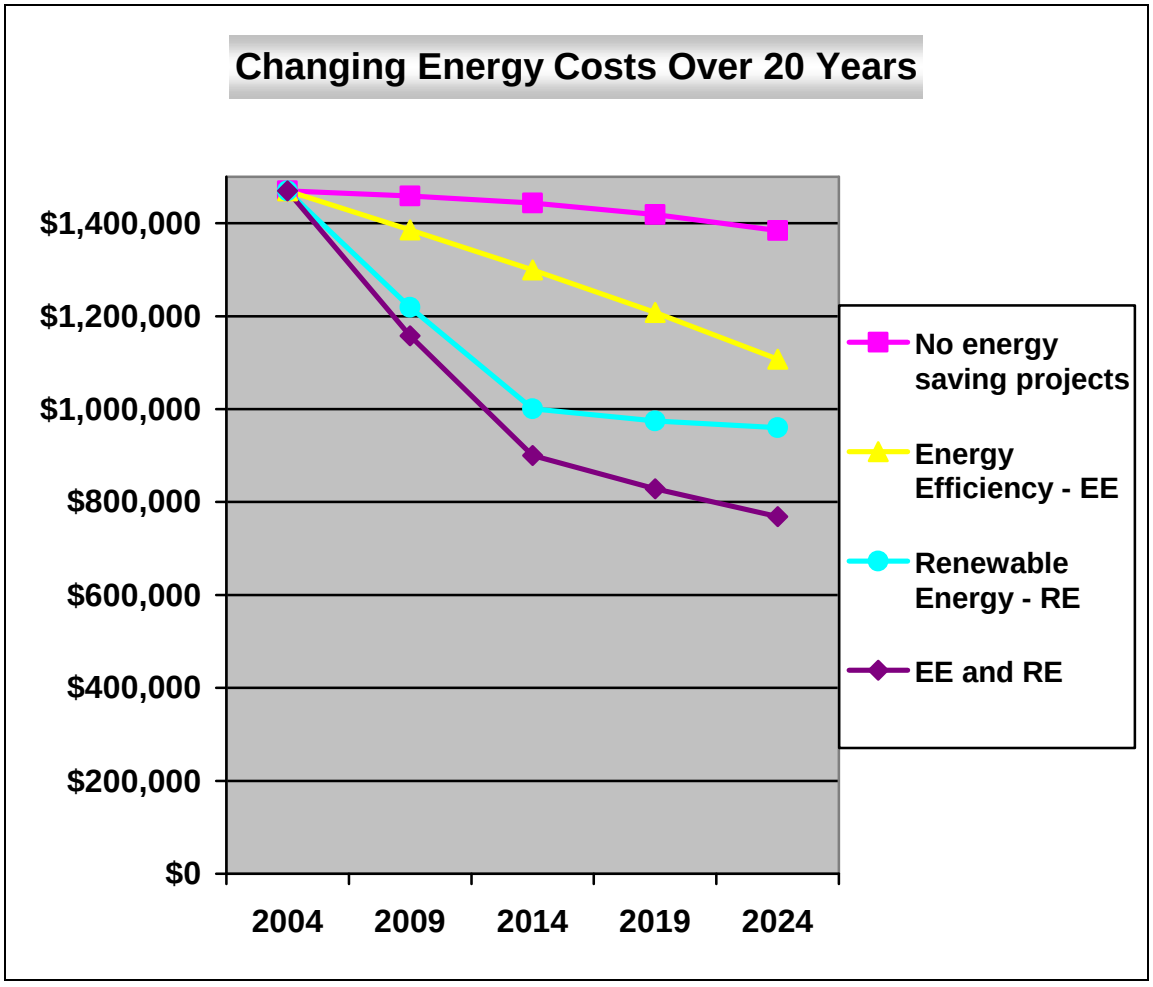
Renewable energy scenario:

- Start using hydro electricity in 2009. Provide all electricity from hydro by 2014. Assume hydro costs $0.50 per kilowatt hour.
- Replace oil and electric heat with efficient wood heat. Do 250 cords of wood per year until all heat comes from wood in 2019.

If Gameti applies the renewable energy scenario, the community can decrease energy costs by 35% and greenhouse gas emissions by 71%.

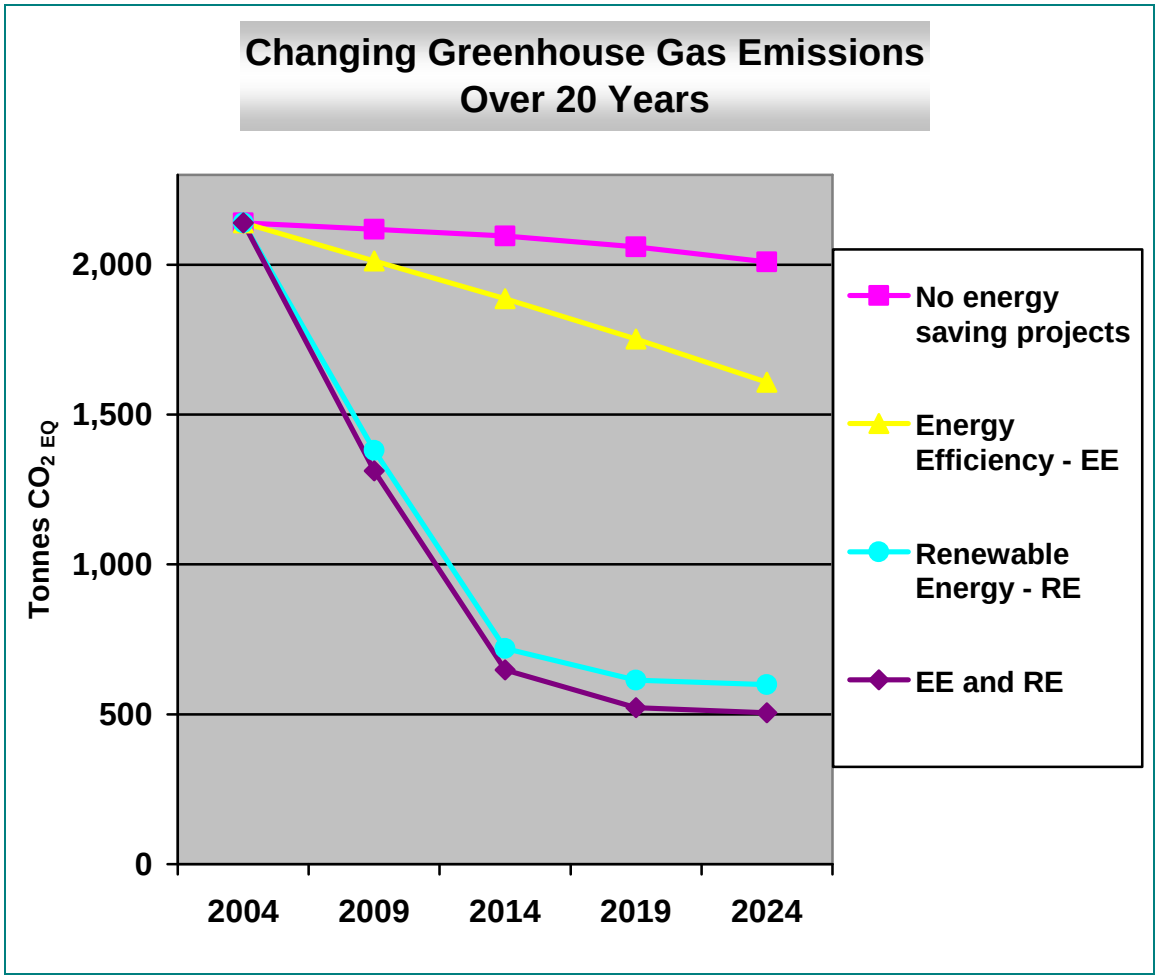
If Gameti applies both the energy efficiency and renewable energy scenarios, the community can decrease energy costs by 48% and greenhouse gas emissions by 76%.

The charts on the next two pages show how the four scenarios could affect total energy costs and greenhouse gas emissions over 20 years. It is not easy to predict the future. These scenarios are an educated guess, not a promise. We need more details to make the best guess for a clean energy future, and the best information.



This chart shows changes in energy operating costs every five years, for a total of 20 years, for four scenarios.

- No energy saving projects – Gameti keeps using energy the way you use it right now.
- Energy Efficiency – EE – the community applies the energy efficiency scenario described above.
- Renewable Energy – RE – the community applies the renewable energy scenario.
- EE and RE – the community applies both the energy efficiency and renewable energy scenarios.



This chart shows changes in total greenhouse gas emissions, every five years, for a total of 20 years, for four scenarios.

- No energy saving projects – Gameti keeps using energy the way you use it right now.
- Energy Efficiency – EE – the community applies the energy efficiency scenario described above.
- Renewable Energy – RE – the community applies the renewable energy scenario.
- EE and RE – the community applies both the energy efficiency and renewable energy scenarios.

Step 4 – Write an Action Plan

An action plan gives some details about what actions a community takes to reach your vision, over a certain time period. An action plan shows **what** a community wants to achieve, **how** you plan to get there, and **who** does the work.

- **What** a community wants to achieve is the end results. This may include things such as a target to reduce greenhouse gas emissions by 10% in 5 years. Or to explore two renewable energy sources, to see if they can provide electricity for the community.

- **How** a community plans to reach your targets is the details of the action plan. This may include things such as public education about how to use less energy. Or testing the wind on a hilltop close to town to find out how often it blows and how strong it is.

  A community decides to do certain projects. When you complete the projects, you find other projects to help you move closer to your targets or goals.

- **Who** does the work describes the person, group, agency, or other body responsible to coordinate and do the work - to carry out the projects or actions. This may include things like going house to house to help people understand how to use less energy. Or finding the people you need to set up and use the equipment to test the wind on the hillside close to town.

Sample Action Plans

We used the information about energy options to show the '**what**' and '**how**' of some sample action plans. A community can use the samples to help create your own action plan, or change them to suit your community.

Five energy efficiency sample action plans:

- Develop energy efficient habits
- Use Energy Star
- Use energy efficient vehicles
- Build new buildings that save energy
- Renovate older buildings

Five renewable energy sample action plans:

- Look into solar heat and electricity
- Look into run-of-river hydro
- Look into wind turbines
- Look into efficient wood heating
- Look into cogeneration

The sample action plans offer ideas in the following general areas:

- Do public education – give people information they can understand and use
- Build capacity – for example go to a workshop or learn new skills
- Look for partners among other groups with skills in this area or funding for a project
- Lobby the territorial and/or federal government to create new programs, policies, or laws
- Give people financial incentives
- Make a community bylaw
- Do a demonstration project in your communit

Sample Action Plans
Energy Efficiency
How can we use less energy?

What: Develop energy efficient habits

How:

- Do public education about the habits people need to develop, to save energy. Encourage people to use those habits.
- Learn how energy suppliers can help, and lobby them to take action. For example, suppliers can put in special electricity meters to encourage people to use less electricity at peak times – such as when everyone is making dinner.
- Make a policy that people need to use energy efficient habits in community buildings. Put up signs so people know about the policy and follow it.

What: Use Energy Star appliances and products

How:

- Do public education about the Energy Star program and products.
- Work with the local store to bring in energy star appliances and products. Maybe put together a large order to make it cheaper.
- Offer people an incentive – money, a prize, etc. – if they buy Energy Star products.
- Lobby the Government of the NWT - ask them to give people a refund if they buy Energy Star products.

- Lobby the Public Utilities Board - ask them to order the Power Corporation to give refunds to people that use Energy Star appliances.
- Make a by-law to ban products and appliances from the community that use too much energy.
- Make a policy that the community must buy and use only energy efficient products and appliances for its own buildings.

What: Use energy efficient vehicles

How:

- Do public education to encourage people to not idle their vehicle, to buy smaller vehicles that use less gas, to use public transport, to share a car, and to walk and bike rather than drive.
- Work with the Department of Health to do an 'active transport campaign' - encourage people to be more active - to walk, bike, ski, snowshoe, etc. rather than drive.
- Make a community 'ride board' – a notice board to help people find others that drive to the same place at the same time.
- Lobby the territorial and federal governments – ask them to set higher standards for fuel efficiency in vehicles
- Support public transportation systems
- Make a policy that the community must buy the most efficient vehicles available.
- Set up a small or large public transit system.
- Make a community bylaw that people can't idle their vehicle

What: Build new buildings that save energy

How:

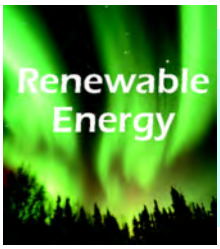
- Do public education about the federal government's EnerGuide for Houses program.
- Train local builders so they understand and use the highest energy efficiency standards.
- Work with the Housing Corporation or other housing agencies to develop higher standards for new homes. Use the EnerGuide for Houses program.
- Lobby the territorial and federal governments – ask them to set territorial and national energy standards for homes and other buildings.
- Make a community bylaw that all new homes must meet energy standards, such as those in the EnerGuide program.
- Make a community bylaw or resolution that all new buildings must meet energy standards, such as those in the Commercial Building Incentive Program - CBIP.

What: Renovate older buildings so they save energy

How:

- Do public education about how people and the community benefit if they fix up an older home or building.
- Train building maintenance people in the community about energy efficiency for older buildings.
- Lobby the territorial government for a funding program to renovate privately owned buildings.
- Lobby the territorial government for a funding program to help homeowners pay for energy efficient upgrades.

- Do an energy audit on each building the community owns. Save money and time - work with other building owners so everyone gets an energy audit at the same time.
- Encourage homeowners to use the EnerGuide for Houses test to find out what they need to do to fix up their home. The Arctic Energy Alliance can do the test.
- Ask the energy audit people to recommend things you can do that will pay back within 10 years, or the life of the building.
- Apply for 50% funding from the territorial government Energy Conservation program – a funding program for community owned buildings.
- Consider using money from programs such as the 'New Deal', 'Northern Strategy', and 'Gas Tax Funding' to fix up community buildings and reduce operating costs.



Sample Action Plans
Renewable energy
Where can we get clean energy?

What: Look into solar heat and electricity

How:

- Do public education about solar hot water heating.
- Learn about RETScreen – free computer software that can help evaluate solar energy projects. Ask the Arctic Energy Alliance to train local people to use RETScreen.
- Train local people so they can set up solar hot water panels and maintain them.
- Work with other agencies and the territorial and federal governments to define possible projects.
- Lobby the territorial and federal governments to set up funding programs for renewable energy systems that replace fossil fuels.
- Offer money to people or businesses that replace fossil fuels with solar technology or other renewable energy.
- Make a community bylaw that businesses must use some kind of solar technology or other renewable energy for part of their energy use.
- Make any new building lots face south, so they can apply solar technologies – including passive solar heat through windows.
- Work with another agency and set up a solar water heating demonstration project on a community building - the health centre, the school, or an elders' home.

What: Look into run-of-river hydro

How:

- Do public education about run-of-river hydro systems.
- Learn about RETScreen – free computer software that can help evaluate hydro projects. Ask the Arctic Energy Alliance to train local people to use RETScreen.
- Work with other agencies to do a feasibility study – to find out if a site can provide electricity for your community.
- Lobby the territorial and federal governments to set up funding programs for run-of-river hydro systems that replace fossil fuels.
- Make a community policy to provide a certain amount of electricity with renewable energy – to reduce the need for fossil fuels and the cost.
- Train local people so they understand the technology and can maintain it.
- Work with another agency and set up a run-of-river system, if possible.

What: Look into wind turbines

How:

- Do public education about wind power systems.
- Have a public meeting to talk about possible sites near the community.
- Send community people to a place that has a working wind system.
- Learn about RETScreen – free computer software that can help evaluate a wind project. Ask Arctic Energy Alliance to train local people to use RETScreen.
- Contact the Power Corporation and/or Energy and Natural Resources, GNWT. They have interest in and support renewable energy projects.
- Lobby the federal government for funding for wind projects.
- Do a quick study to find out if the community has a possible site, funding, and technology.
- Put up a tower to measure exact wind speed. Collect data for one year.
- Do a study to find out exactly how much the system costs and who can pay for it.
- Train local people to work on the project.
- Make sure all parties agree to go ahead with the project. Build and operate the wind system.

What: Look into efficient wood heating

How:

- Do public education about efficient wood stoves, wood pellet stoves, and how to heat with wood.
- Train people about how to properly use an efficient stove.
- Learn about RETScreen – free computer software that can help evaluate renewable energy projects. Ask the Arctic Energy Alliance to train local people to use RETScreen.
- Contact Environment and Natural Resources, Government of the NWT – they support renewable energy projects.
- Lobby the federal government for new funding programs for wood stoves that replace fossil fuels or electric heat.
- Offer people money or other prizes that change from fossil fuels or electric heat to an efficient wood stove or pellet stove.
- Make a community bylaw that says all wood stoves must meet certain standards and be efficient.
- Change heating systems in community buildings to efficient wood or pellet stoves.
- Find out if the community has a good supply of wood for fuel. Develop a forest management plan so the community can harvest wood forever.

What: Look into cogeneration

How:

- Do public education so people understand what is cogeneration and why it's a good idea. Have a public meeting.
- Talk to or visit other communities that already use cogeneration – such as Fort McPherson.
- Learn about RETScreen – free computer software that can help evaluate cogeneration projects. Ask the Arctic Energy Alliance to train local people to use RETScreen.
- Contact the Power Corporation and Energy and Natural Resources, GNWT – they have an interest in and support cogeneration projects.
- Look for buildings close to the diesel generator and measure the distance.
- Find out if it's possible to set up a cogeneration system with the community's diesel generator.
- Do a study to find out exactly how much the system costs and who pays for it.
- Train local people to work on the project.
- Make sure all parties agree before you go ahead with the project. Build the cogeneration system and operate it.

Action Plan March 2006
Gameti Energy Plan

The action plan shows **what** to do, **how** to do it, and **who** does the work or coordinates it.

An action plan may also give background information about what a community wants to do. This information may come from previous energy work in the community, from sources outside the community, or from community wisdom and knowledge.

Communities need to be honest and develop a realistic action plan. Look at how much time, energy, money and people power you have, and decide what you can do right now, to move towards your vision.

A community's action plan may include many different actions that happen over several years, before you reach your final target.

The Gameti action plan shows actions the Energy Committee decided to take for 2006. The energy committee and the community council need to regularly review the action plan and revise it.

Gameti Action Plan - March 2006
General Projects

What: Keep the Gameti Energy Committee going.

How:

1) Have a committee meeting every month.
2) Find money to pay committee members an honorarium.

Who:

1) Energy committee, Alphonse Apples, and Patrick Gargett.
2) Gameti community government.

What: Measure how much energy Gameti uses.

How:

1) Do a study to collect information from all homes about how people use energy. Tell people how to save energy.
2) Add the information to the Community Energy Profile.

Who:

1) Alphonse Apples.
2) Arctic Energy Alliance.

What: Tell community people about the Energy Plan and ask for their comments.

How: Hold a community public meeting.

Who: Alphonse Apples and Gameti Energy Committee

Gameti Action Plan – March 2006
Energy Efficiency Projects

What: Do EnerGuide for Houses – EGH - tests on community homes.

How:

1) Pick ten seniors houses to test. The seniors don't pay for the test.
2) Organize for Arctic Energy Alliance to do the tests. Encourage other people to do EGH tests at the same time. It costs $125 for each test. Show people how they can save money if they take the test.
3) Do the tests. Use the results to advise other people with similar homes.

Who:

1) Gameti Energy Committee
2) Patrick Gargett
3) Arctic Energy Alliance

What: Demonstrate energy efficient light bulbs.

How:

Replace all regular light bulbs in senior's homes with energy-efficient fluorescent light bulbs. Ask the Power Corporation for free bulbs – contact Chris Zorica at 874-5207 or Randy Patrick in Yellowknife.

Who:

Patrick Gargett.

Gameti Action Plan – March 2006
Renewable Energy Projects

What: Explore possible sites for a small hydro project.

How:

1) Apply to the Aboriginal and Northern Communities Action Plan. Ask for $5000 funding for a 'desktop study' on four locations: Rae / St. Croix, St. Croix / Taka, Rae / Taka, Margaret Lake / Hardisty – Wopmay River.
2) Hire a consultant to do the study.
3) Ask the Government of the Northwest Territories for basic information about how a hydro project affects fish.
4) Look for possible funding to do more fish studies and to visit a community that has a working run-of-river hydro system.
5) Visit the two best sites, based on the study. Measure the height drop at each site. Take a hydro engineer if possible.

Who:

1) Patrick Gargett. Council approves the budget.
2) Patrick Gargett manages the contract. The community decides who to hire.
3) Arctic Energy Alliance.
4) Patrick Gargett.
5) Alphonse Apples, Patrick Gargett, and Arctic Energy Alliance. Alphonse coordinates the visit.

Background:

The Gameti Energy Committee suggests the community could use a rapid between Lac St. Croix and Taka Lake for a small hydroelectric plant. The Power Corporation did a study in 1985 that looked at two other sites.

The Arctic Energy Alliance did a quick study that shows:

- A small – 20 kilowatt - hydro plant at the Lac St. Croix / Taka Lake site would be expensive and it would not produce much power because the height of the rapid is only four feet.
- A small – 200 kilowatt - hydro plant at the Rae Lakes / Lac St. Croix would produce enough electricity to shut off the diesel plant most of the time and it might be cheaper than diesel power.

The community needs more information:

- Study exactly how high the rapids are and how much electricity they can generate.
- Measure exactly how much electricity Gameti uses.
- Confirm all the costs - equipment, transmission line, roads, etc.
- Study how the hydro system affects the fish. The Camsell River has important fish runs. Community members say that whitefish and trout come up the river in the spring and go down in October.
- Consult with the community.

What: Find out if it's possible to connect to Snare hydro system.

How:

1) Ask the NWT Power Corporation to study the cost of putting a transmission line from the Snare Lake hydro system to Gameti.
2) Ask the Tli Cho government if there is any power available from the 'Cascades' part of that system.

Who:

1) Arctic Energy Alliance.
2) Patrick Gargett.

Background:

The Snare Hydro System power plant is about 97 km south of the community. With all the twists and turns to get around swamps, lakes, and rivers, the power line would be 115 to 120 km. The TliCho government owns the 'Cascades' part of that system.

The Energy Committee is interested in the jobs that would be created to maintain the transmission line (brush cutting).

The community needs more information:

- Find out if the Snare system has enough electricity to sell to Gameti.
- Measure exactly how much electricity Gameti uses.
- Confirm all costs - equipment, transmission line, roads, etc.
- Consult with the community.

What: Find out if the community has a good site for wind turbines.

How:

1) Finish pre-feasibility study.
2) Get funding to monitor the wind on top of the hill on the north side of Gameti.
3) Find funding to visit another site with operating wind turbines.

Who:

1) Arctic Energy Alliance.
2) Patrick Gargett.
3) Patrick Gargett.

Background:

The Gameti Energy Committee suggests that the hills near the community could be used for wind energy. The hills are 150 to 200 meters higher than the land around them. High locations usually have more wind than low ones and there could be enough wind to make electricity.

The Arctic Energy Alliance did a quick study of the location and the study shows:

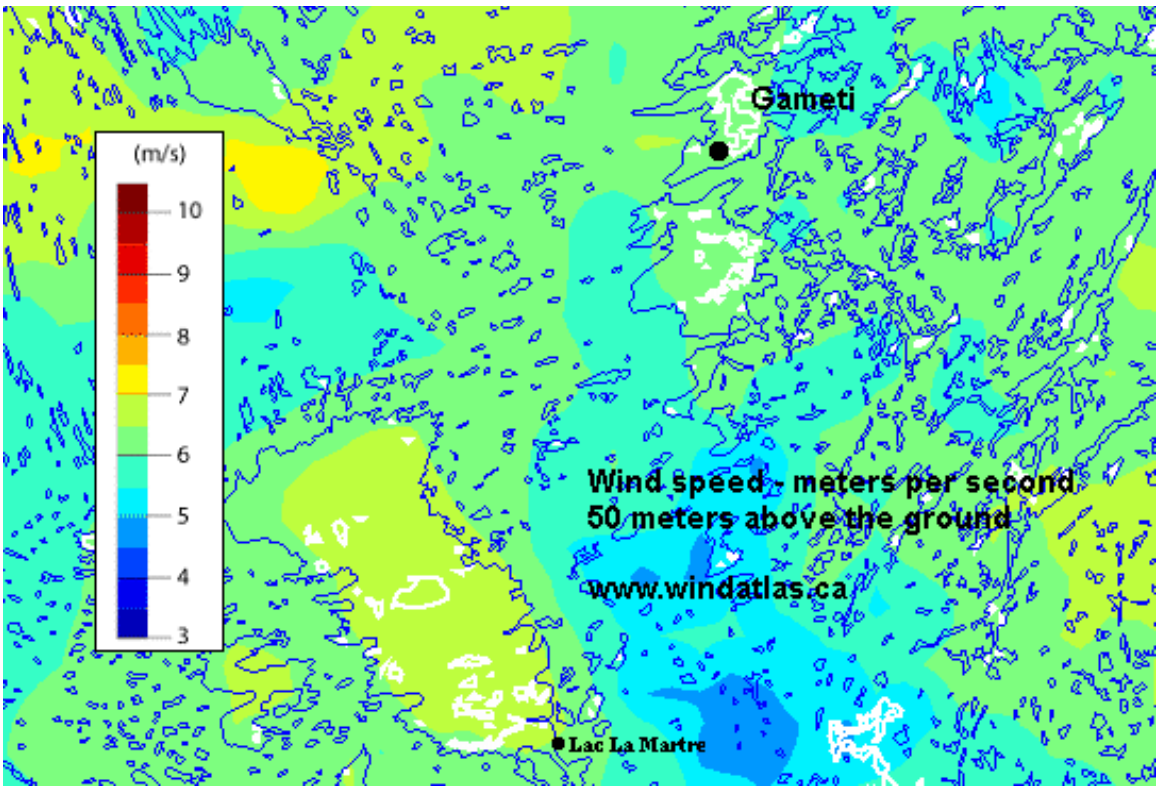
- A group of wind turbines might be able to produce electricity cheaper than the diesel generator.
- Wind turbines would not produce enough electricity to shut down the diesel power plant, because the location is not always windy.

The community needs more information:

- Put up a tower on the top of the hill to measure the wind exactly.
- Measure exactly how much electricity Gameti uses.

- Confirm all costs - equipment, transmission line, roads, etc.
- Consult with the community.

The Canadian Wind Energy Atlas has maps that show wind speed for all of Canada. The following map from the Atlas shows wind speed for Gameti at 50 metres above the ground.



What: Find out if it's possible to use solar water heating on the nursing station.

How:

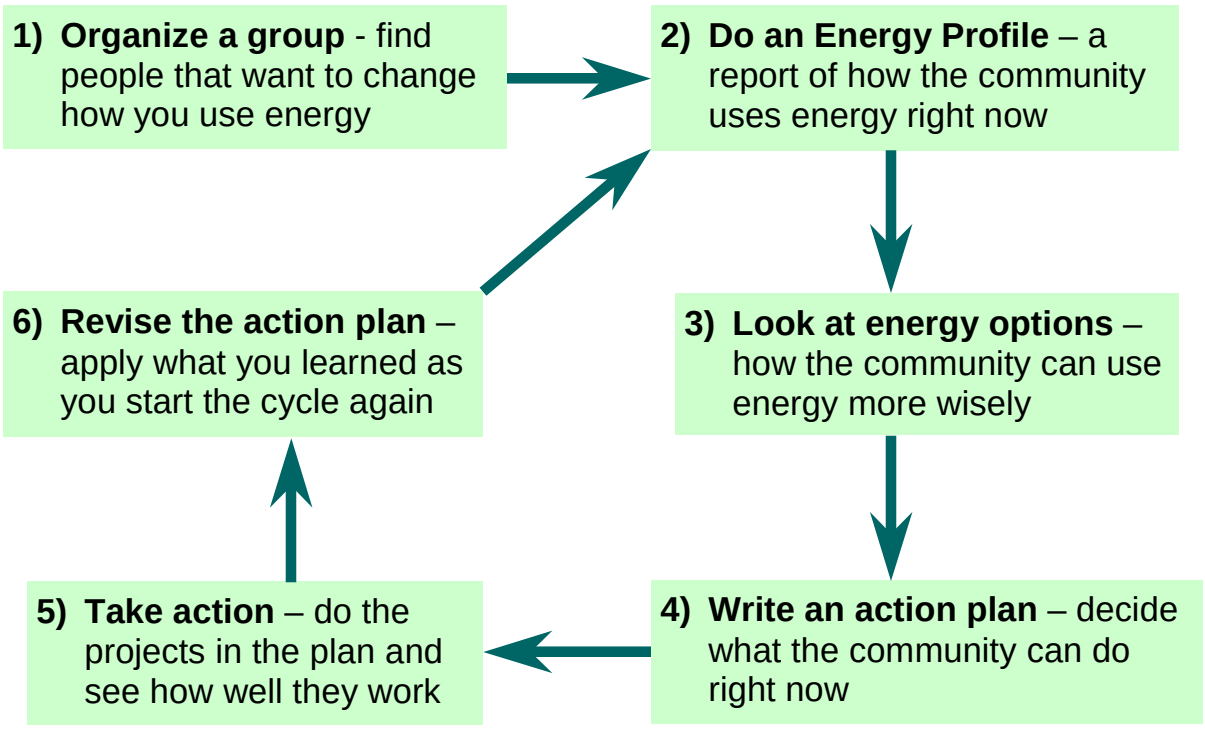
1) Find the RETScreen for the Wha Ti nursing station and update it.
2) Look for partners and funding, to set up a solar hot water heating system at the nursing station. Look in the 'Main Contacts and Programs' section at the end of the Gameti Energy Plan for ideas.

Who:

1) Arctic Energy Alliance.
2) Patrick Gargett.

Steps 5 and 6 - Take Action and Revise the Action Plan

Your community is ready for Steps 5 and 6 of the planning process after you decide **what** you want to do, **how** you plan to do it, and **who** will do the work.



During Step 5 of the planning process, a community takes action to carry out the plan. This happens over a certain period of time – it may be one year, three years, five years, or whatever time period the community decides. As you take action, you keep track of what happens to see how things work.

You answer questions such as:

- Did we complete all our projects?
- How do we know the projects are done?
- What things went well as we did our work?
- What things do we need to change in the future?

During Step 6 of the planning process, your community revises the action plan. You apply what you learned during the planning cycle and start the cycle again.

Next Steps – Gameti Energy Plan 2006

This Community Energy Plan is the first cycle of energy planning for Gameti. During the next year, the Gameti Energy Committee will carry out Steps 5 and 6 of the planning process.

As the Gameti Energy Committee completes the 2006 projects, you apply what you learned and begin the planning cycle again. You create a new action plan that helps you move closer to your vision of a cleaner energy future.

Key Words

We encourage you to understand and learn to use some key words about energy planning.

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.

$CO_{2\ EQ}$ - Carbon dioxide equivalent

$CO_{2\ EQ}$ 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 $CO_{2\ EQ}$.

One Tonne = 1000 kilograms.

Cogeneration

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

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.

Energy audit

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

Energy efficiency

Energy efficiency means to use less energy and still do the same amount of 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.

Pre-feasibility study and Feasibility study

A pre-feasibility study is when we do research to see if a project is possible. It answers the question – 'Do we want to do more research and look further into this project?' A pre-feasibility study looks at information that already exists and is easy to find. It should not cost more than $10,000.

A feasibility study is when we do research to see if something is worth spending lots of money on. It defines the details of how a project could work and how much it costs. A feasibility study includes a business plan – how to pay for the project, who pays for what, and when they have to pay.

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. They are called "fossil fuels" because they are made from

plants and animals that died and got buried millions of years ago. 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 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.

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.

Main Contacts and Programs

Get more information and get involved.

ANCAP – Aboriginal and Northern Community Action Plan

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

AEA – Arctic Energy Alliance, Yellowknife, NWT

AEA is a not- for- profit society established in 1997 to assist communities, the territorial government, business and consumers to work together to reduce the costs and the environmental impact of energy use and utility services in the NWT

Helps communities with all aspects of community energy planning. They can help you:

- 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

Canadian Wind Energy Atlas

This website has easy-to-find colour maps and other information about average wind speed - for anywhere in Canada.

Website: http://www.windatlas.ca/en/index.php

Commercial Building Incentive Program - CBIP

The Commercial Building Incentive Program – 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%.

EnerGuide for Houses Program - EGH

The EnerGuide for Houses program 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 reduce your energy costs.

The EnerGuide for Houses program works for new homes and older homes. 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 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

www.enr.gov.nt.ca/eps/energy.htm

RETScreen

RETScreen is free software that can be used to do *pre-feasibility* studies on clean energy projects such as solar, wind, cogeneration and micro-hydro energy projects. The software runs in a Microsoft Excel spreadsheet and can be used by anyone who knows how to use Excel. It is available for free from www.retsecreen.net .

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

Office of Energy Efficiency, Government of Canada

The Office of Energy Efficiency – OEE - has programs and services to help people save energy, be more energy efficient, and reduce greenhouse gas emissions. The OEE offers funding and other resources such as workshops, information and technology to interpret data.

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

Phone toll free: 1-800-387-2000

Northwest Territories Power Corporation - NTPC

Northwest Territories Power Corporation operates 28 power systems to provide electricity for 28 NWT communities.

NTPC generates hydro electricity on the Snare and Taltson River systems. They use diesel generators to produce electricity in all other communities, except Inuvik and Norman Wells. In Inuvik, they generate electricity from natural gas. In Norman Wells, they buy electricity from ESSO. ESSO generates the electricity from natural gas.

For Yellowknife and Hay River, the NWT Power Corporation 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.

To learn about NTPC go to their website: www.ntpc.com

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 decides things such as how much people pay for 'public' services. People can participate in the PUB decision-making process.

To learn more about the PUB go to their website.
www.nwtpublicutilitiesboard.ca