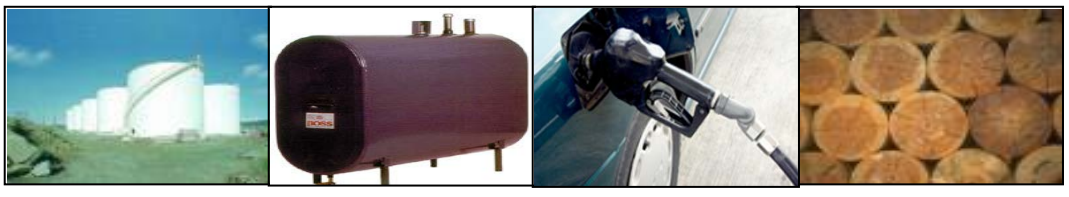
Community Energy Plan

Ka'a'gee Tu First Nation 2010

ARCTIC ENERGY ALLIANCE



Introduction and Acknowledgements

This Community Energy Plan explains what we did so far during the energy planning process, and outlines a work plan for what we need to do next.

We thank the following people who helped create this community energy plan for Ka'a'gee Tu:

- Staff at the Ka'a'gee Tu First Nation office
- Northlands Utilities Ltd, the Petroleum Products Division of the GNWT, and Environment and Natural Resources, who shared their data
- The Arctic Energy Alliance who facilitated the process

To learn more about energy planning in our community please contact:

Ka'a'gee Tu First Nation
BOX 4428
Hay River NT X0E 1G3
Phone: 867-825-2000
Fax: 867-825-2002

The Arctic Energy Alliance developed the template for the community energy plan, with help from Mary McCreadie, NWT Literacy Council.

Table of Contents

Executive Summary

The community of Ka'a'gee Tu is located on the shore of Kakisa Lake where the Kakisa River begins.

Ka'a'gee Tu has an all weather gravel road connecting the community to the NWT highway system. There is no airport. The community relies on diesel power to generate electricity.

Ka'a'gee Tu First Nation is committed to maintaining the delicate balance of our traditional lands and culture while ensuring a strong future for all members. This means quality leadership; responsible and accountable government; strong partnerships and the delivery of essential programs, services and core infrastructure within a healthy environment for all community residents. Community residents respect their language, traditional knowledge and history of sustainable living in harmony with the land.

In keeping with these principles and values, Ka'a'gee Tu First Nation representatives have worked with Arctic Energy Alliance over the last 3 years to develop a Community Energy Plan that reflects Ka'a'gee Tu First Nation traditions of sustainable living and respect for the land.

The initial CEP groundwork was incorporated into the K'a'agee Tu Integrated Community Sustainability Plan (ICSP) in November 2009. The CEP process will continue after March 31, 2010 to further develop and implement these goals and strategies.

Community Energy Planning Goal:

- Ka'a'gee Tu First Nation will manage and use energy in ways that respect the land and honour future generations with a clean and healthy environment.

Ka'a'gee Tu is a small community surrounded by natural resources. Careful management of energy and protecting the environment will ensure both a healthy present and a strong, healthy future for the next generations.

Strategies to Achieve the Community Energy Planning Goals:

- Determine current energy use levels and set targets for reducing energy use.

- Upgrade existing community buildings end improve their efficiency.

- Construct new energy efficient community buildings and purchase energy efficient equipment as per approved capital plan.

- Apply for funding to implement the Community Energy Plan

Ka'a'gee Tu First Nation wants to get an accurate picture of the kinds and amounts of energy the community is using. This will help to determine what actions can be taken to reduce energy use.

The community also wants to take good care of its buildings and make sure future buildings are energy efficient.

These strategies describe the direction to focus future actions. From here, we can move forward.

Introduction

Ka'a'gee Tu is located on the east side of Kakisa Lake where the Kakisa River starts to flow out to the Deh Cho (Mackenzie) River. The community is a member of the Deh Cho First Nations. Ka'a'gee Tu is a small, traditional community. In keeping with this, traditional economies such as hunting, trapping and fishing are very strong in the community. Tourism is also a seasonal activity.

There is one governing body in the community – the Ka'a'gee Tu First Nation. Responsibility for community buildings and infrastructure lies with the First Nation.

Representatives of AEA and Ka'a'gee Tu First Nation have met over the last 3 years to develop a Community Energy Plan. In order to meet the March 31, 2010 deadline for gas tax funding, the Community Energy Planning (CEP) process developed by Arctic Energy Alliance was somewhat modified.

Ka'a'gee Tu First Nation representatives participated in an Integrated Community Sustainability Plan (ICSP) that includes developing a Community Energy Plan (CEP). The CEP process will continue after March 31, 2010 to further develop and implement the goals, strategies and actions that were identified at community meetings and at the South Slave regional ICSP workshop.

What is a community energy plan?

An energy plan shows what a community decides to do, over a certain period of time, to change how energy is used – to find better ways to make and use energy.

The community of Ka'a'gee Tu decided to create an energy plan to gather information about how energy use can be improved. This Community Energy Plan (CEP) report explains the energy planning process, describes how energy is currently used, and outlines recommendations for next steps.

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.

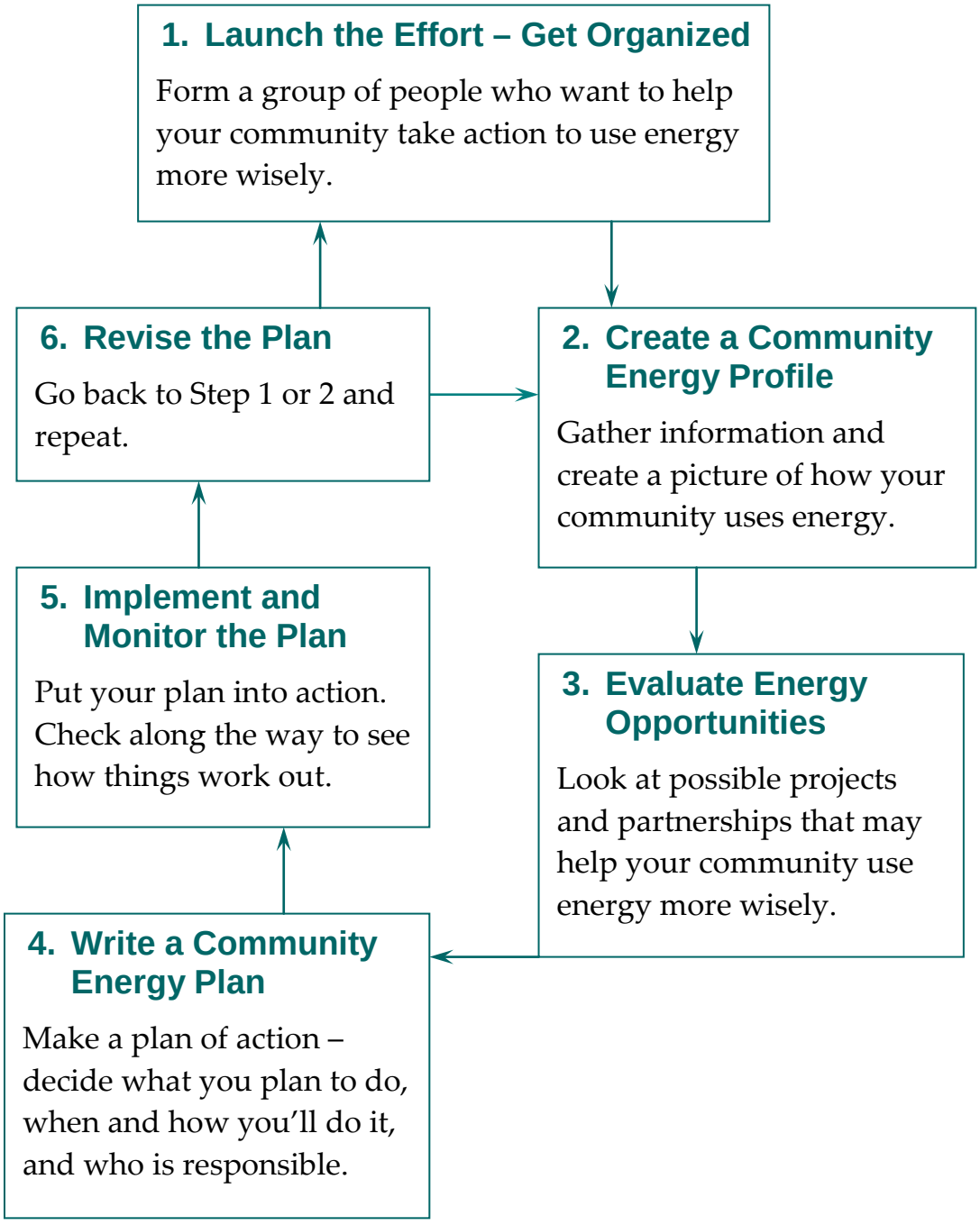
Energy planning is a cycle. The cycle might last for one, three, or five years. During each cycle, the community develops and carries out certain projects that make up the energy plan for that time period. At the end of the time period, a community reviews the energy plan, decides what other projects they can do, and continues to work towards their vision of a healthier, cleaner energy future.

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 helps to 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.

The diagram shown on the next page is a 6-step Community Energy Planning process a community can use to develop an energy plan. A modified process was followed in order to meet the ICSP deadline.

6 Steps - Energy Planning Process



Our community's Energy Goal

A goal is a short statement which describes where you want to get to and how you want things to be. It is realistic and achievable.

Our Energy Goal

- Ka'a'gee Tu First Nation will manage and use energy in ways that respect the land and honour future generations with a clean and healthy environment.

Our community's energy profile

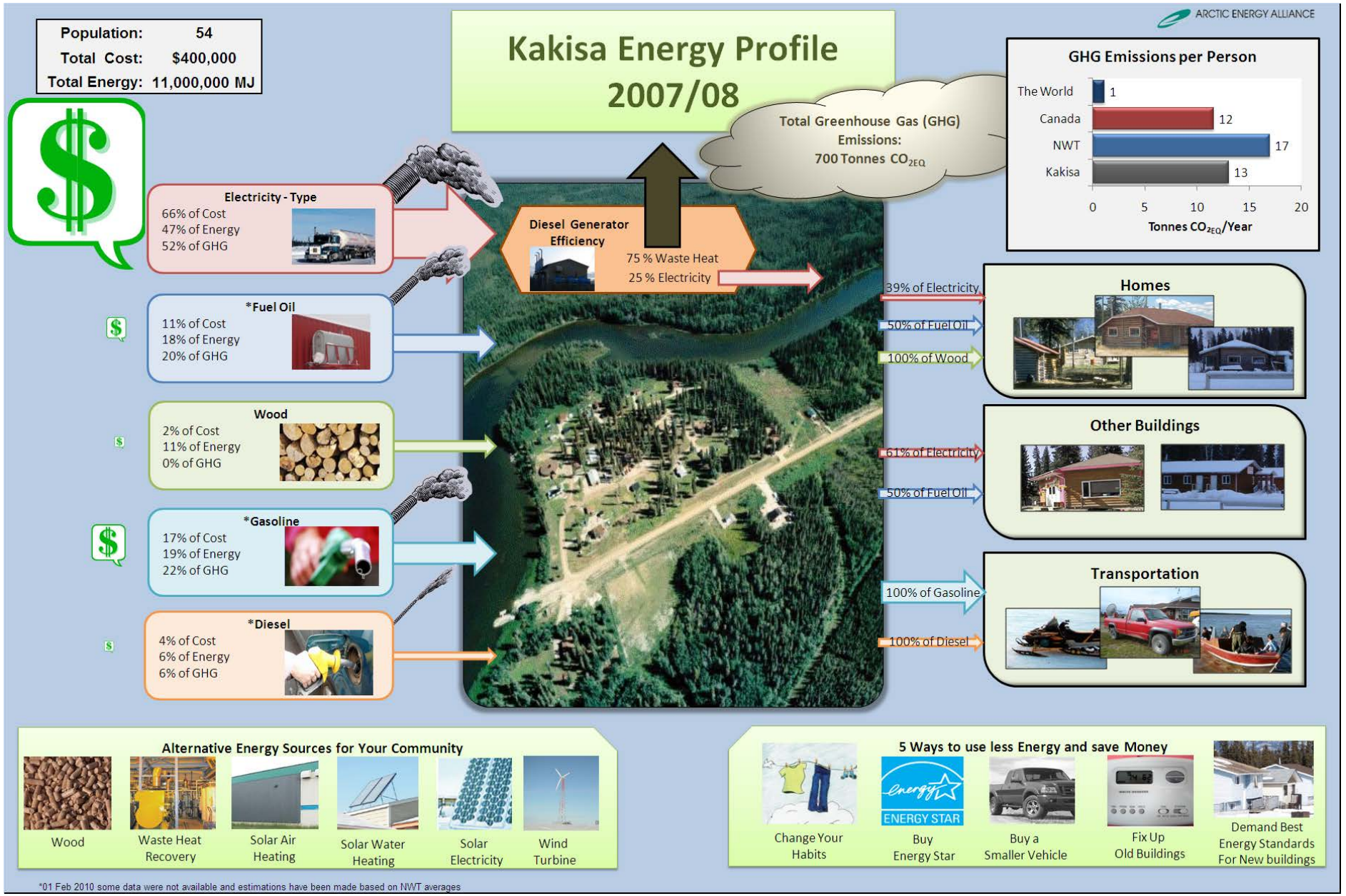
This section of the community energy plan gives a brief summary of our community's energy profile.

What is a community energy profile?

A community energy profile describes energy sources and energy use in our community, for a year.

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

A community energy profile contains basic information that is easy to find and easy to find again in the future. We can update the profile and keep track of how our community's energy use changes over time, and if and how it improves.


Population: 54
Total Cost: $400,000
Total Energy: 11,000,000 MJ
Kakisa Energy Profile 2007/08
ARCTIC ENERGY ALLIANCE
Total Greenhouse Gas (GHG) Emissions: 700 Tonnes CO_{2EQ}
GHG Emissions per Person
The World 1
Canada 12
NWT 17
Kakisa 13
0 5 10 15 20
Tonnes CO_{2EQ}/Year
Electricity - Type
66% of Cost
47% of Energy
52% of GHG
*Fuel Oil
11% of Cost
18% of Energy
20% of GHG
Wood
2% of Cost
11% of Energy
0% of GHG
*Gasoline
17% of Cost
19% of Energy
22% of GHG
*Diesel
4% of Cost
6% of Energy
6% of GHG
Diesel Generator Efficiency
75 % Waste Heat
25 % Electricity
39% of Electricity
50% of Fuel Oil
100% of Wood
Homes
61% of Electricity
50% of Fuel Oil
Other Buildings
100% of Gasoline
100% of Diesel
Transportation
Alternative Energy Sources for Your Community
Wood
Waste Heat Recovery
Solar Air Heating
Solar Water Heating
Solar Electricity
Wind Turbine
5 Ways to use less Energy and save Money
Change Your Habits
Buy Energy Star
Buy a Smaller Vehicle
Fix Up Old Buildings
Demand Best Energy Standards For New buildings
*01 Feb 2010 some data were not available and estimations have been made based on NWT averages

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.

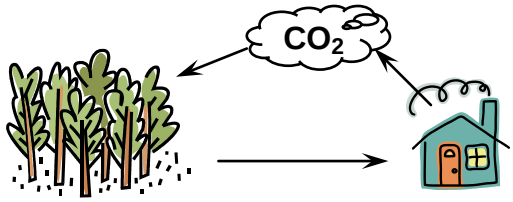
- One MJ equals the amount of energy it takes to boil 2 ½ litres of water.
- 1000 MJ = 1 GJ

To create an energy profile, we convert all units of energy into MJ so we can add up all the sources of energy and compare them. Other examples of units of energy supply include things such as litres for gasoline or diesel, cords for firewood, and kilowatt hours for electricity.

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.

Our community's energy plan

This section of the community energy plan lists recommended strategies that can be adopted by Ka'a'gee Tu First Nation as a Community Energy Plan. A list of potential future strategies is also included.

These strategies are based on two sources:

- information about K Ka'a'gee Tu First Nation energy use in the Community Energy Profile;
- participation in the Community Energy Plan during the ICSP regional workshop November 2009.

The Community Energy Plan is a part of the ICSP process because energy planning has implications for community infrastructure planning, strategic planning and human resource planning.

The strategies relate to:

- Energy efficiency recommendations *(how to use energy differently)*
- Renewable energy project recommendations *(how to get energy from a different source)*

The strategies are grouped under:

- Recommended strategies (doable in the next little while)
- Potential future strategies (for future consideration)

List of Recommended Strategies in our community energy plan

Community Energy Planning Goal:

- Ka'a'gee Tu First Nation will manage and use energy in ways that respect the land and honour future generations with a clean and healthy environment.

Recommended Strategies

- **Determine current energy use levels and set targets for reducing energy use.**

The Community Energy Profile provides background information on the sources of current energy use and the amount of energy used. It is also important that records of energy use are kept for all buildings. This can provide background information for energy audit purposes.

- **Upgrade existing community buildings and improve their efficiency.**

Upgrading existing buildings makes sense where the cost of upgrading is less than the cost of replacing a structure. This can be determined by monitoring energy use and doing a yardstick energy

audit on the structure. There may be government rebate funding for some upgrading and equipment replacement.

An energy audit yardstick can provide baseline information about energy related deficiencies in existing buildings. The first step is to collect fuel and electricity bills for the last two years. These are compared against fuel and electricity costs for an average, equivalent size building in the NWT.

This information helps identify how energy efficient the building is and points out what can be done to improve the energy efficiency of the building. Using this information, it is possible to make informed decisions about whether to upgrade or replace existing structures. Capital or O&M activities may need to be identified to implement these decisions.

- **Construct new energy efficient community buildings and purchase energy efficient equipment as per approved capital plan.**

Ka'a'gee Tu First Nation wants to make sure future buildings are energy efficient. Adopting this strategy will mean that energy efficiencies are designed and built into all new community infrastructure projects. It also means that any equipment purchased meets Energy Star standards.

Arctic Energy Alliance has a ***Toolkit for Building Standards*** which can be used as a reference. The toolkit sets out building standards that can be included in a Request for Proposal and would require a contractor to build according to current energy efficiency standards.

- **Apply for funding to implement the Community Energy Plan**

In order to realistically and effectively implement the Community energy Plan, Ka'a'gee Tu First Nation will need both funding and human resources. This will ensure a focus on supporting and implementing energy related actions. It builds community capacity and gets information out to community members.

Potential Future Strategies

These are strategies that Ka'a'gee Tu First Nation may want to consider in the future.

- **Create an energy committee**

The energy committee could review the Community Energy Plan in more detail and provide get-up-and-go, ideas and continuity for ongoing energy awareness and conservation activities in Ka'a'gee Tu.

- **Involve community members and leadership to help implement the Community Energy Plan (CEP)**

Any plan of action has a greater chance for success if community members, leaders and groups are behind it. Energy sources, their use and costs affect everyone in the community. Having community support generates enthusiasm.

- **Research alternative sources of energy**

Ka'a'gee Tu First Nation could research and investigate the use of alternative energy sources such as wood pellet heating and ground source heat pumps.

There are a number of NWT community buildings that are using wood pellet boilers to heat community buildings. Ka'a'gee Tu is in a good location to consider this heating source because it is on a road system and close to a large wood pellet source in northern Alberta.

- **Maintain and use equipment and infrastructure wisely.**

Maintaining equipment and infrastructure can be challenging. Parts, familiarity with the mechanics of various heating, cooling, etc. systems and having the expertise may not always be accessible.

However, adopting this strategy and working towards ensuring parts and maintenance equipment are stocked in the community and that staff are trained to do regular maintenance will prolong the useful life of equipment and infrastructure.

- **Monitor energy use to make informed decisions.**

Keeping track of energy use and noticing unexpected surges or drops will give an early warning sign when there are problems. It also helps to identify possible future plans for replacing or upgrading structures.

- **Winterization Workshop**

The Winterization Workshop is a short term workshop for high school students offered by Arctic Energy Alliance. It is intended to provide students with the basic knowledge and skills to winterize a house – stopping leaks, covering windows with plastic, etc.

As part of their training, the students assist community Elders by winterizing their homes. The students earn school credit for their work and the Elders homes are winterized. This is provided free of charge.

Next steps

Now we have a community energy plan we're ready for Step 5 of the planning process. During Step 5, our community takes action to carry out the plan. This happens over the period of time for this energy plan.

As we take action, we keep track of what happens to see how things work. We 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?

When the energy plan is complete, the cycle starts again. A new community energy profile can be created and new projects can be identified. The learning from one cycle is applied to the next.

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 Yardstick

An energy audit yardstick 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.

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 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 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.