Community Energy Plan

Hamlet of Fort Resolution 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 Fort Resolution:

- Community members and Councilors, who took the time and energy to participate
- Staff at the Hamlet of Fort Resolution office and the Local Housing Authority 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

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

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Executive Summary

The Hamlet Council of Fort Resolution has a vision to ensure a clean, safe, healthy, active and vibrant community. The mission of the Hamlet Council is to provide effective and efficient services to the community and to address community concerns within the mandate and jurisdiction of the community government and according to applicable legislation.

Values of honesty, cooperation, community partnerships, responsibility and accountability guide the Hamlet Council. Community residents respect their cultures, languages, traditional knowledge and their histories of sustainable living in harmony with the land.

In keeping with these values, community members and Council representatives have worked with Arctic Energy Alliance over the last three years to develop a Community Energy Plan that reflects Fort Resolution's energy sources, energy needs and traditions of sustainable living and respect for the land.

The initial Community Energy Planning groundwork was incorporated into the Integrated Community Sustainability Plan (ICSP) process. Community representatives and Arctic Energy Alliance representatives participated in the regional ICSP meeting that included the Community Energy Plan (CEP) as one part of the 4-part ICSP.

The CEP process will continue after March 31, 2010 to further develop and implement the goals and strategies that were identified at community meetings in Fort Resolution and at the South Slave regional ICSP workshop.

Overall Community Energy Planning Goal:

Fort Resolution will use an ongoing Community Energy Planning process to develop a Greening Action Plan which will consider economic, social and environmental costs and benefits.

Strategies to Achieve the Overall Community Energy Planning Goal:

Strategy 1: Complete energy audits on Fort Resolution's community government assets.

Strategy 2: Use the findings of the energy audit to plan projects under the capital plan to improve the existing infrastructure in the community.

Strategy 3: Incorporate Energy Standards into all contracts for new community building.

Strategy 4: Hire a resource to help manage the energy planning process and assist with providing public information on energy conservation to residents of the community.

The Hamlet Council of Fort Resolution wants to take proper care of the current infrastructure and make sure that future buildings are energy efficient.

The community also wants more information on the energy status of their buildings in order to make good decisions about capital and infrastructure planning.

There is also an interest in considering opportunities which will encourage reduced usage of fuel and water.

The community wants to research and develop plans to reduce energy consumption and also benefit the environment.

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

Introduction

The community of Fort Resolution (Deninu K'ue) is situated on a peninsula jutting into Great Slave Lake near the mouth of the Slave River delta.

The community has a long history as a traditional meeting and trading place for First Nations, Metis and non-Aboriginal peoples.

There is year round access by an all weather road, as well as an airport. There is no scheduled flight service. Fort Resolution relies on hydro power for electricity. The community has a backup diesel generator.

There are three governing bodies in the community. These are the Deninu K'ue First Nation, the Fort Resolution Métis Council and the Hamlet Council of Fort Resolution (January 2, 2010). Fort Resolution is part of the Akaitcho Territory.

The Community Energy Planning (CEP) process developed by Arctic Energy Alliance was somewhat modified in order to meet the March 31, 2010 deadline for gas tax funding.

Community and AEA representatives participated in an Integrated Community Sustainability Plan (ICSP) process that incorporated the Community Energy Plan (CEP) as one part of the 4-part ICSP.

The CEP process will continue after March 31, 2010 to further develop and implement the goals and strategies that were identified at community meetings in Fort Resolution 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 Fort Resolution 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 up till now, describes how energy is currently used, and outlines recommended strategies 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.

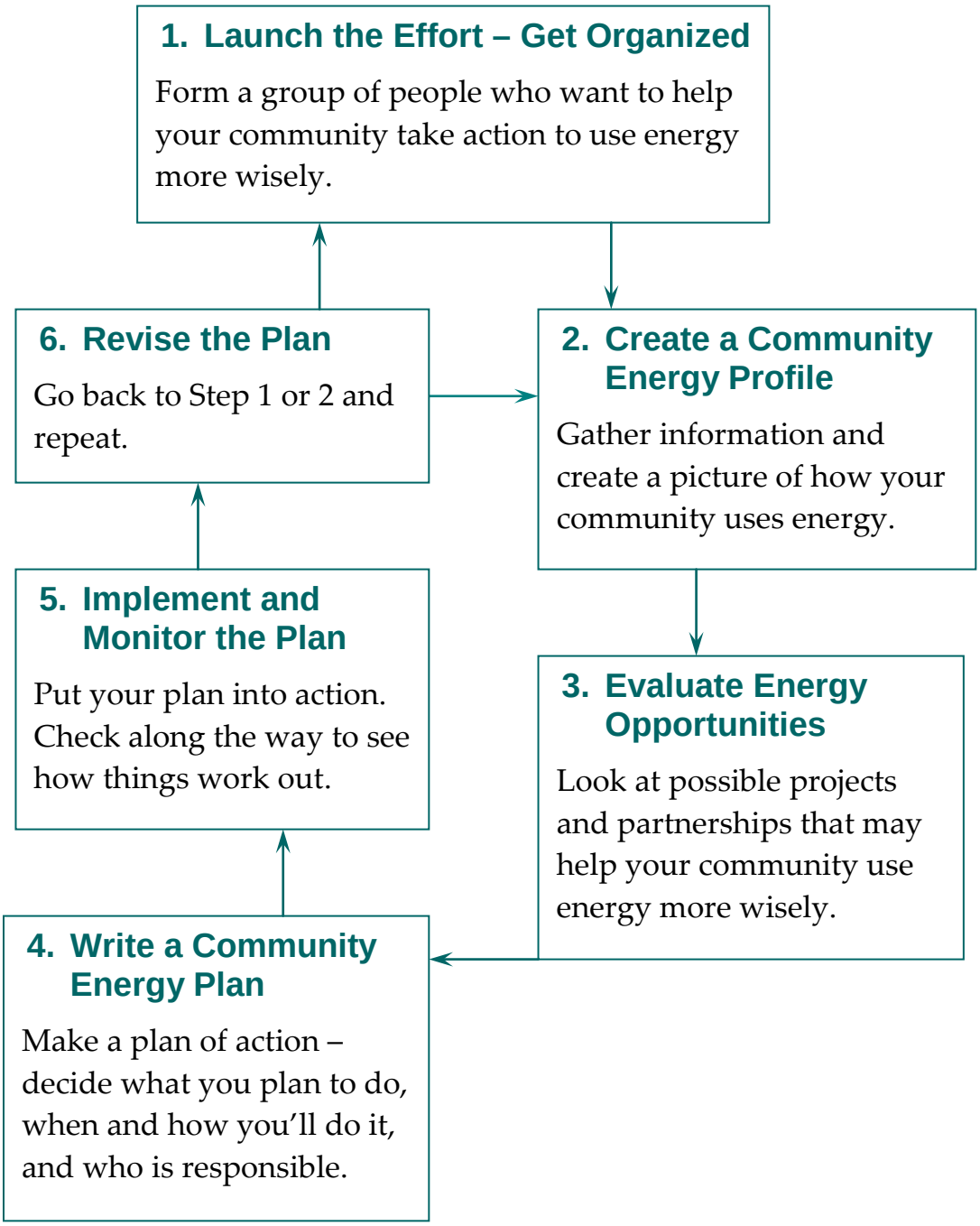
Energy planning is a cycle. The cycle might last for one, three, or five years. During each cycle, the community develops and carries out certain projects that make up the energy plan for that time period. At the end of the time period, a community reviews the energy plan, decides what other projects 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. As stated earlier, 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

Fort Resolution will use an ongoing Community Energy Planning process to develop a Greening Action Plan which will consider economic, social and environmental costs and benefits.

Our community's energy profile

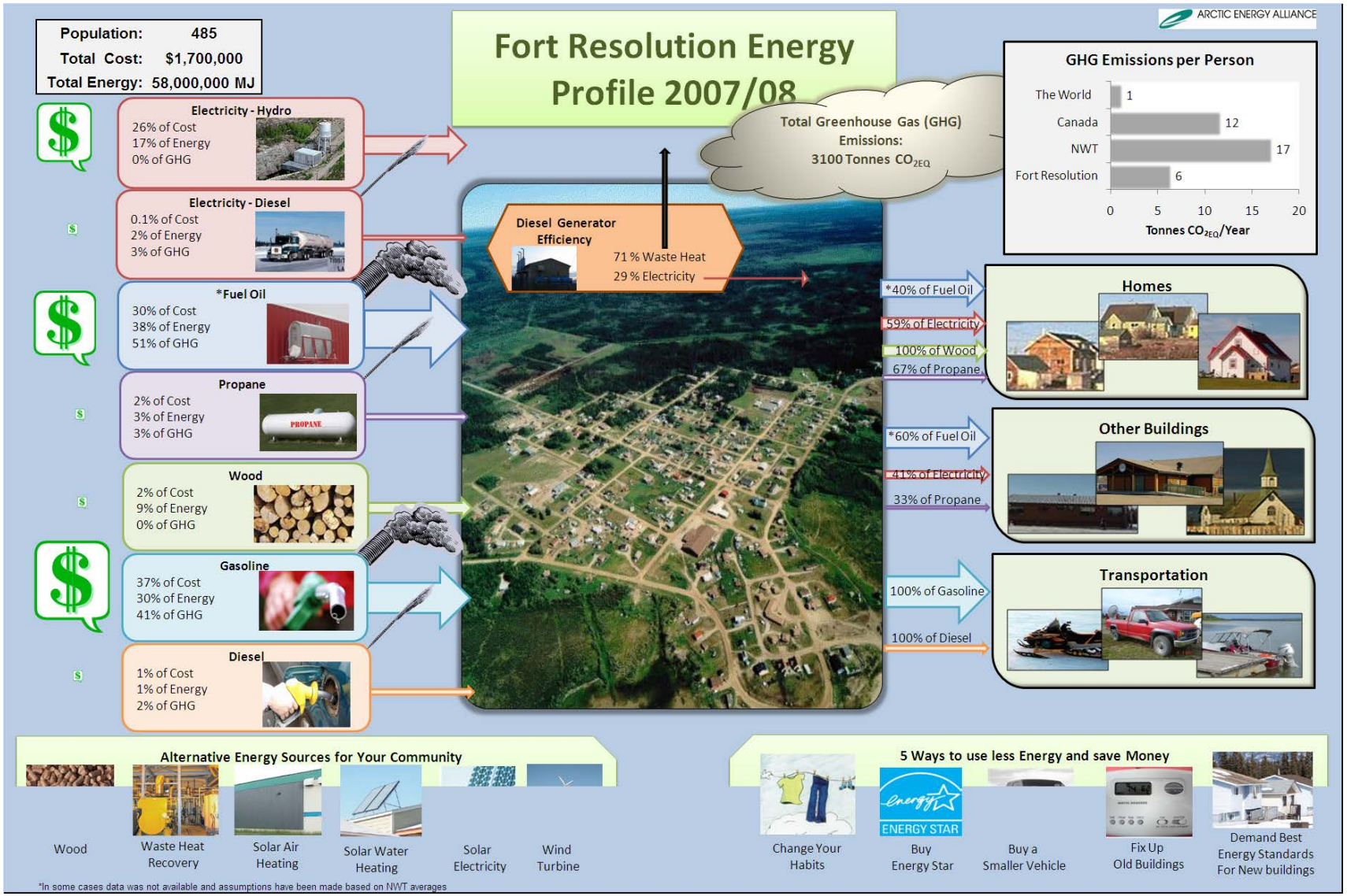
This section of the community energy plan gives a visual summary of our community's energy profile.

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: 485
Total Cost: $1,700,000
Total Energy: 58,000,000 MJ
Fort Resolution Energy Profile 2007/08
ARCTIC ENERGY ALLIANCE
Electricity - Hydro
26% of Cost
17% of Energy
0% of GHG
Electricity - Diesel
0.1% of Cost
2% of Energy
3% of GHG
*Fuel Oil
30% of Cost
38% of Energy
51% of GHG
Propane
2% of Cost
3% of Energy
3% of GHG
PROPANE
Wood
2% of Cost
9% of Energy
0% of GHG
Gasoline
37% of Cost
30% of Energy
41% of GHG
Diesel
1% of Cost
1% of Energy
2% of GHG
Total Greenhouse Gas (GHG) Emissions:
3100 Tonnes CO_{2EQ}
Diesel Generator Efficiency
71 % Waste Heat
29 % Electricity
GHG Emissions per Person
The World 1
Canada 12
NWT 17
Fort Resolution 6
0 5 10 15 20
Tonnes CO_{2EQ}/Year
*40% of Fuel Oil
59% of Electricity
100% of Wood
67% of Propane
Homes
*60% of Fuel Oil
41% of Electricity
33% of Propane
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
ENERGY STAR
Buy Energy Star
Buy a Smaller Vehicle
Fix Up Old Buildings
Demand Best Energy Standards For New buildings
*In some cases data was not available and assumptions 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.

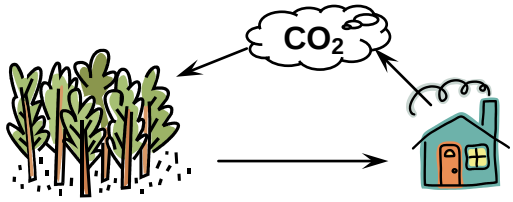
- One MJ equals the amount of energy it takes to boil 2 ½ litres of water.
- 1000 MJ = 1 GJ

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?

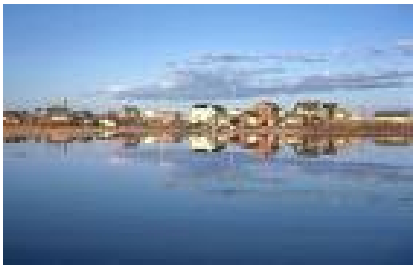
The community energy profile measures greenhouse gas emissions as carbon dioxide equivalent ($CO_{2\ EQ}$). Carbon dioxide is the most common greenhouse gas and we use it to show overall greenhouse gas emissions.

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 identifies recommended strategies that can be adopted by Fort Resolution Hamlet Council as a Community Energy Plan. A list of potential future strategies is also included.

The recommended strategies are based on three sources:

- information about Fort Resolution energy use in the Community Energy Profile;
- participation from community members; and
- participation on the Community Energy Plan during the ICSP (Integrated Community Sustainability Plan) regional workshop in late 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 recommended strategies relate to:

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

The recommended strategies are grouped under:

- Recommended strategies (doable in the next little while and identified in the ICSP process)
- Potential future strategies (for future consideration)

Recommended Strategies in our Community Energy Plan

- **Complete energy audits on Fort Resolution's community government assets.**

An energy audit yardstick can provide baseline information about energy related deficiencies in existing buildings. 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.

At the present time, the Arena is the only community government building in Fort Resolution that has had an audit completed. An energy audit yardstick can be done free of charge. 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 helps identify how energy efficient the building is and points out what can be done to improve the energy efficiency of the building.

- **Use the findings of the energy audit to plan projects under the capital plan to improve the existing infrastructure in the community.**

The energy audits provide the basis to determine what kinds of activities will be undertaken and implemented through the Community Energy Plan and Greening Action Plan.

- **Incorporate Energy Standards into all contracts for new community building.**

Adopting this strategy will mean that energy efficiencies are designed and implemented into all new community infrastructure projects.

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 building standards.

- **Hire resources to help manage the energy planning process and assist with providing public information on energy conservation to residents of the community.**

Once the community has a better idea of where its energy investments would be most effective, a resource person could be hired to focus on, support and implement energy related actions.

This resource person could also assist with providing public information to the residents of Fort Resolution about energy conservation activities and ideally, become a champion for energy information, awareness and activities in the community.

Potential Future Strategies

- **Create an energy committee**

This can involve interested people and reps from different groups in the community (including the Dev Corp, School, Band Council, Metis Council, Housing, Elders, Youth, etc.).

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 Fort Resolution.

- **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**

Fort Resolution 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. Fort Resolution is in a good location to consider this heating source because it is on a road 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.

- **Upgrade existing buildings to energy efficient standards.**

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 an energy audit yardstick on the structure.

- **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 that a list of recommended strategies has been identified, the next step is to develop an implementation plan for each recommended strategy. An implementation plan describes how each strategy will be carried out.

It is helpful to keep track of what happens to see how things work.

The following questions can be asked:

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 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.