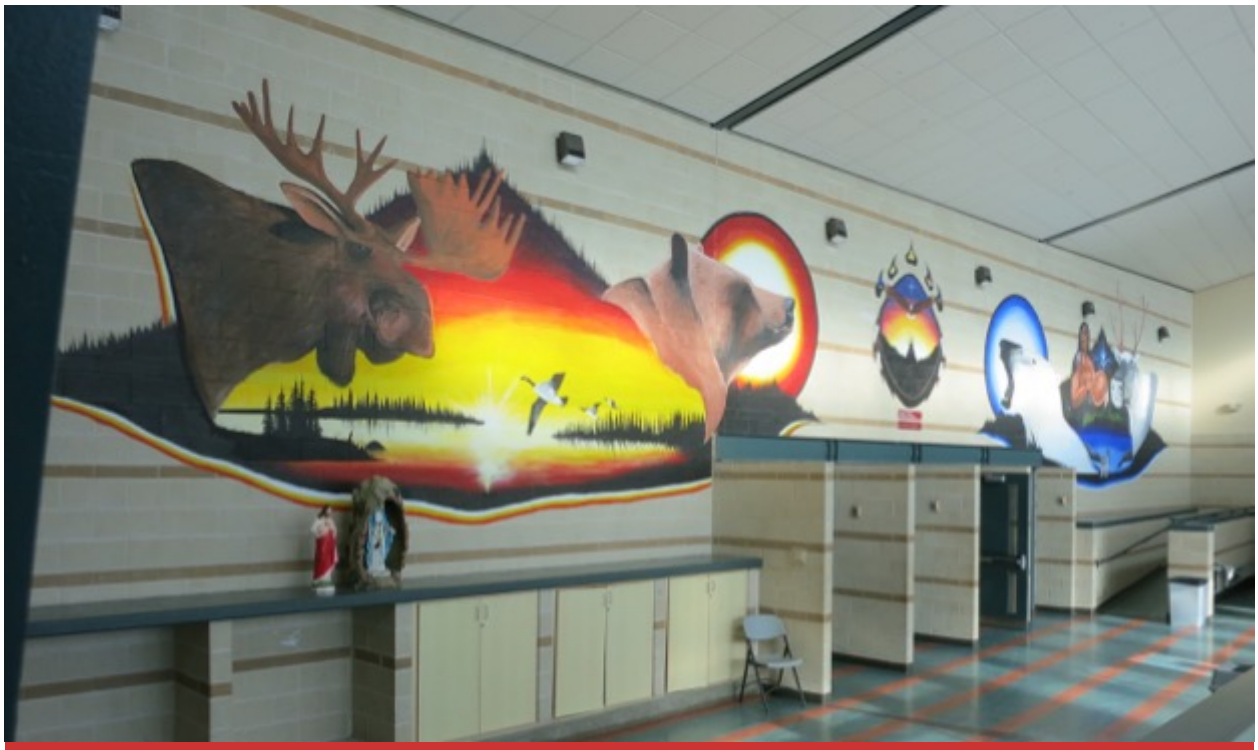

Northlands Dënesųłiné First Nation

Sustainable Development Strategy

Table of Contents

Introduction

This is the sustainable development plan for Northlands Dënesųłiné First Nation.

The Dene people have a tradition of self-reliance. For thousands of years, our ancestors accepted what the land had to offer and made a living that was passed from generation to generation. The 20th century brought huge changes. We are now setting a path to a new future.

The path to sustainability, self-reliance, and resilience in the 21st century is not to return completely to the old ways, rather to incorporate our teachings and values to solve contemporary problems. Globally, more and more communities are making sustainable development plans. Modern principles of sustainability and sustainable development echo traditional Indigenous concepts.

The Circle is an important principle shared by modern sustainability practices and by Indigenous worldview and belief systems. The circle represents interconnectedness, equality, and continuity. The continuous cycles of sunrise and sunset, the changing of the seasons, and the seasonal behaviours of the animals are all continuous; like a circle, they have no beginning and no end. There is no waste in nature; every output is an input.

Modern sustainability practices also seek to return to the circle; the recycling symbol forms a circle. To be sustainable, we know that nothing new is created. We need to respect mother earth again. We must not pollute or degrade her. We must stop taking more from nature than can be produced. We must take this responsibility if we wish to be able to pass a livable world on to our children and grandchildren.

The three pillars of modern sustainability focus on meeting environmental, economic, and social needs. We believe that this initiative to build systems and complete projects is not just for environmental sustainability but is also the best path to economic development and long term local employment in the community. Moreover, as people become engaged in this initiative, it has the potential to build a renewed sense of purpose, of belonging, and of hope for the future.

Northlands Sustainable Development Plan

This document contains the overall plan for moving the community of Northlands Dene First Nation towards sustainability and resilience. This document was created by Aki Energy Inc. and the Northlands Dënesųłiné First Nation. In developing this document, we have established the overarching vision and values of our community. We have defined the four Focus Areas that give structure and direction to implementation of the Plan. We have established a baseline understanding of current state and have set strategies, and priorities for moving us to our Vision.

This document has been developed for these purposes:

- To create a visioning document that frames where the community would like to be in the future
- To engage the community in a discussion of sustainable development goals, community priorities, and community planning.
- To clearly identify the priority project areas
- To guide leadership in future project development as resources become available

This is a living document. The community of Northlands Dënesųłiné First Nation will continue to adjust and build on the plan to meet the needs and expectations of our people as we work toward resilience and sustainability.

Aki Energy Inc.

Aki Energy Inc. has worked with Northlands Dene First Nation to produce this Community Sustainable Development Plan.

Aki Energy is an award-winning, non-profit First Nations social enterprise. Aki is governed by a Board of Directors consisting of representatives from the nations in which we work, including elders, council and community representatives. Our mandate is to work in partnership with First Nations to develop strong local economies through sustainable development initiatives.

Since our incorporation in 2013, we have worked with 4 First Nations to install $6 million worth of geothermal and solar thermal energy systems, working with Manitoba Hydro's innovative PAYS Financing model. The Province of Manitoba and Manitoba Hydro are making plans to expand this model based on success to date, quality of installs and delivered energy savings.

Aki Energy has partnered Garden Hill First Nation to launch Meechim Inc, a social enterprise that manages a commercial farm and bi-weekly healthy food market. The Meechim Farm raised, processed and sold 1500 chickens in 2015, training and employing local community members and partnering with the school to create educational programming oppourtunities for young people in the community.

Aki Energy is part of successful social enterprise movement across Canada that are making markets for green economy measures and hiring people with limited access to the labour market to do that work. One of these social enterprises is called BUILD which has won national business, employer and entrepreneurial awards for its work hiring from the Aboriginal community and delivering $5 million annual utility bill reductions in 14,000 homes. Aki, BUILD, and our other partners are headquartered in Winnipeg's 30,000 square foot Social Enterprise Centre in Winnipeg's North End.

Aki's mandate is to promote employment and "Grow Green Economies" on First Nations. We have mentored successful social enterprises at Peguis First Nation and Fisher Cree

Nation. We administer a social enterprise at Garden Hill First Nation called Meechim Inc. and we do direct installs at Long Plain First Nation and Sagkeeng First Nation. We offer regular training programs to transfer technical and business skills. We are thankful for the opportunity to partner with Northlands First Nation, and look forward to continuing to build our relationship.

This document includes the following sections:

1. **Background** - Some background and history of the community and people
2. **Current Reality** - An inventory and assessment of the current situation in early 2016
3. **Planning and Engagement** - An outline of the preparation and engagement for this plan
4. **Vision & values** - The shared vision and values of the community that shape the plan
5. **Focus Areas & Goals** - The framework of the plan
6. **Strategies** - Suggested approaches to move toward sustainability in the Focus Areas:
    a. Community Development - 6a. Local Green Jobs Strategy
    b. Energy - 6b. Energy Efficiency Strategy
    c. Energy - 6c. Diesel Transition Strategy
    d. Waste - 6d. Solid Waste Management Strategy
    e. Waste - 6e. Diesel Containment Remediation Strategy
    f. Food - 6f. Local Food Strategy
7. **Sustainability Principles** - The *Natural Step* sustainability principles.

1. Historical & Cultural Background

The story of the Dene people has five phases:

1) Before contact with Europeans, life for the Dene people followed patterns that carried them successfully for thousands of years.

2) In the early 1700s, contact was made between the Dene people and people from Europe. This meeting led to the establishment of Fort Prince of Wales (AKA Churchill) and the fur trade. This began a contact-traditional period where the people largely continued to live off of the land but traded with Europeans for some goods they otherwise could not have had access to.

3) In 1907 Northlands became Treaty 10 signatories.

4) The 1950s through 70s were very traumatic times for the Dene people and the Northlands First Nation as the contact-traditional way of life suddenly ended. Starting in 1958, relocations by the Federal government caused turmoil and hardship. Moreover, the peoples' lifestyle became progressively more sedentary. This process was brought about by a variety of specific factors and pressures. These included new government housing to supplement or replace the few existing log cabins, the monthly payment of family allowances and old age pensions, the availability of emergency rations, the establishment of a nursing station and a visiting nurse, a radio that permitted rapid contact to bring aircraft to remove the seriously ill, the establishment of a provincial elementary school (originally established for the non-Treaty Cree), a greater variety of goods at the Hudson's Bay Company, the presence of the mission, some periodic wage labor opportunities, and the threat of withdrawal of the family allowance if school-aged children were not enrolled. The last threat was of considerable importance, for the value was disproportionate to the amount; the regular cash income provided not only milk for children but also ammunition for hunting. Commercial fishing, was also beginning to be a significant economic factor."[1]

NOTE: The residential school experience added significant hardship and turmoil for all Indigenous people. Residential schools began operation in Canada in the 1840s. The last school closed in 1996.

5) The present day - See the next chapter "Current Reality".

6) A new era - 21st century resilience and self-reliance - represented by this plan.

[1] Helm, J., "*The Handbook of North American Indians, Volume 6: Subarctic*", (1981) Washington, D.C.: Smithsonian Institution, p. 853

Northlands First Nation

Lac Brochet is a lake in northwest Manitoba, Canada. The westernmost extensions of the lake reach almost to the border with Saskatchewan. The Cochrane River flows from Wollaston Lake through Lac Brochet on its way to Reindeer Lake.

The community of Lac Brochet is located on the north shore of Lac Brochet near the northern extreme of the boreal forest. It is the main community of the Northlands First Nation.

The community of Lac Brochet is the administrative centre of the Northlands First Nation2. The territories of the Northlands First Nation include five parcels of land: Lac Brochet 197A (contains the village of Lac Brochet), Sheth Chok, Thuycholeeni, Thuycholeeni Aze, and Tthekale Nu.

As of February 2013 the total membership of Northlands First Nation was 1,024 with 868 members living on-reserve and 156 members living off-reserve.3 The First Nation is governed by a Chief and six councillors and is affiliated with the Keewatin Tribal Council. The Keewatin Tribal Council with its head office in Thompson represents eleven First Nations in Northern Manitoba.

The community was formed in the 1970s when many of the Dene people who were then in the Cree community of Brochet relocated. Brochet is south of Lac Brochet on Reindeer Lake.

Dënesųłiné - Cultural & historical background[4]

The Dënesųłiné "people of the barrens" are part of the Dene Nation in the Subarctic region of Canada, with communities in Manitoba, Saskatchewan, Alberta and the Northwest Territories.

Northlands First Nation shares many cultural and linguistic similarities with neighbouring Dene communities. As of 2015, there were more than 23,000 registered members of Dënesųłiné First Nations. The 2011 National Household Survey recorded 12,950 speakers of the Dënesųłiné language. Dënesųłiné are closely associated with other Dene groups as well as northern Cree and Métis, who may share their communities and also speak Dënesųłiné. As such, population and language numbers are approximations.

Language, population and geography

The word “Dene” means “people” and serves many purposes. It is a collective term for people previously known as Athapaskans, and is often used as an equivalent to the Athapaskan language group. Dene may refer to the collective group (including Dënesųłiné, Tlicho, Slavey, Yellowknives and others) as well as the specific Dënesųłiné language. The 2011 National Household Survey recorded 12,950 speakers of the Dënesųłiné language. Many communities are attempting to revive the language through youth education programs.

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[2] Northlands First Nation is also known as Northlands Dënesųłiné First Nation

[3] AANDC (Registered Population) http://pse5-esd5.ainc-inac.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=317&lang=eng

[4] This background section is reproduced from The Canadian Encyclopedia, ***Dënesųłiné (Chipewyan)***, http://www.thecanadianencyclopedia.ca/en/article/chipewyan/

Approximately 11,000 people were registered as members of Saskatchewan Dënesųłiné nations, with more than 6,000 in Alberta and about 3,000 each in Manitoba and the Northwest Territories. These numbers are estimates, as they do not distinguish between communities that may feature significant Cree, Métis or other Dene populations. Additionally, these totals do not include Dënesųłiné people who may have lost their status through enfranchisement or other means.

Traditional life and European contact

Traditional Dënesųłiné socio-territorial organization was based on hunting the migratory herds of barren-ground caribou. Hunting groups consisted of two or more related families that joined with other such groups to form larger local and regional bands, coalescing or dispersing with the herds. Leaders had limited, non-coercive authority which was based upon their ability, wisdom and generosity. Dene spirituality reflects a worldview intertwined with the natural world. Catholic missionaries in the community converted the majority of Dene in the area, superseding traditional belief systems.

By the late 19th century most contemporary Dënesųłiné communities had settled in their current territories. Epidemics of European diseases decimated the population, with the first great smallpox epidemic occurring in 1781–82, and other epidemics continuing through the first half of the 20th century.

Colonial challenges and contemporary life

The Dënesųłiné established formal relations with the Canadian government through the treaty process beginning in 1876. They experienced a century of federal policies intended to destroy their culture through assimilation - especially through residential schools. Dënesųłiné ways of life were threatened especially in the 20th century, when they faced an increasing number of competing land uses, supported by federal and provincial government policies that encouraged the development of northern resource-based industries. As a result, it became increasingly difficult for Dënesųłiné to support themselves by their traditional hunting and trapping economies, especially after the Second World War, when government policies encouraged Aboriginal peoples to resettle in permanent administrative settlements, where most live today.

Contemporary Dënesųłiné communities are regaining control over their communities and traditional lands by pursuing land claims and self-government agreements with the federal government. Dënesųłiné are reviving traditional hunting and trapping, as well as seeking to protect their culture and language and to re-establish traditional relationships with the land.

Socio-cultural situation in the 1960s

In 1967, as a result of the extension of the federal social services to the North, the Northlands band settled in their current location in the village of Brochet, Manitoba (J.G.E. Smith 1970, 1967-1976. 1978). The near final stage in the process of settling into a single, permanent townsite was brought about by a variety of specific factors and pressures. These included new government housing to supplement or replace the few existing log cabins, the monthly payment of family allowances and

old age pensions, the availability of emergency rations, the establishment of a nursing station and a visiting nurse, a radio that permitted rapid contact to bring aircraft to remove the seriously ill, the establishment of a provincial elementary school (originally established for the non-Treaty Cree), a greater variety of goods at the Hudson's Bay Company, the presence of the mission, some periodic wage labor opportunities, and the threat of withdrawal of the family allowance if school-aged children were not enrolled. The last threat was of considerable importance, for the value was disproportionate to the amount; the regular cash income provided not only milk for children but also ammunition for hunting. Commercial fishing, originally limited to Crees and a few Dene, was also beginning to be a significant economic factor.

While the Dene from the north were the new settlers at Brochet, the Cree were also present in roughly equal numbers. These had originally come as "Home Guard Indians" of the Hudson's Bay Company, hunting, fishing, and transporting supplies for the post. They were joined by others moving north to the sparsely inhabited and better hunting and trapping territories. Thus in 1967, the trading post-mission complex became a multi~ethnic village of some 300 Dene, 300 Cree (Treaty and non-Treaty), and a score of Euro-Canadians.

Dene reaction to village life was mixed. The advantages were offset by the necessity ·of men leaving their families behind while they hunted or spent lonely weeks or months on the traplines, without the efficiency of the traditional division of labor. Moreover, Brochet was geographically marginal to the normal range of the caribou, particularly with the decreased range resulting from the greatly reduced size of the herds (Kelsall 1968; ,Parker 1972). The distance made difficult the killing of large numbers and the transportation of the meat and hides to the village by the dog team and toboggan of limited carrying capacity. In addition, the traditional hostility of Cree and Dene was still present, although restrained. and interethnic tensions occurred. Even within the Dene community problems occurred as a large group, composed of several local bands, was concentrated for long periods of time. Traditional patterns of reciprocity and sharing began to break down under the influence of a cash economy and increasing emphasis on the individual and nuclear family (J.G.E. Smith 1970. 1978.)

The tensions eventually resulted in some families returning to the bush. In 1969-1970, several families returned to their traditional settlement at Misty Lake, and in 1972-1973 the local band had reconstituted itself at that point. In the summer of 1973, the Misty Lake band was relocated a few miles to the south at Lac Brochet, where they were constructing log cabin homes, a one-room school, and a nursing station. The Indian Affairs Branch of the government had agreed to provide, if possible, a teacher; a nurse was to visit regularly and a radio was available for emergencies. The local band subsistence economy was again substantially based on caribou, and its cash economy on fur and commercial fishing, for which a local band cooperative was successfully established. In the summer of 1973 the larger part of the Barren Lands band was dispersed in local bands along the northerly parts of Reindeer Lake, where they were engaged in commercial fishing in a very successful cooperative that had been greatly supported by the local Indian Affairs officials and the Oblate missionary. The village of Brochet was, at least for the summer. being avoided. By 1976 almost alt Dene had left Brochet and were at Lac Brochet (J.G.E. Smith 1978).

2. Current Reality

This “current reality” provides an overview of the situation in the community as of early 2016. This provides a background to help identify where we might best focus our efforts to realize our goals, and will help us measure the progress we make as we move towards sustainable development.

Governance

The Northlands Dënesųłiné First Nation is governed by a Chief and six councillors and is affiliated with the Keewatin Tribal Council. The Keewatin Tribal Council with its head office in Thompson represents eleven First Nations in Northern Manitoba. Northlands Dënesųłiné First Nation is a member of Manitoba Keewatinowi Okimakanak, the Assembly of Manitoba Chiefs and the Assembly of First Nations.

The village of Lac Brochet

The village of Lac Brochet is a reserve community and the administrative centre of the Northlands Dënesųłiné First Nation[5]. As of February 2013, the total membership of Northland First Nation was 1,024 with 868 members living on-reserve and 156 members living off-reserve[6]. The median age is just under 20 years old.

Community buildings and services

Petit Casimir Memorial School (A)

Petit Casimir Memorial was opened in late 1995. It was constructed in response to request from the community. It is a K-12 school with enrollment of about 260 in 2016. It is fairly unique for a northern, remote community to have a school that goes all the way to grade 12. In many other remote communities, students have to travel to Winnipeg or Thompson to complete their studies and to graduate high school.

There are 14 teachers in the school plus principal and vice-principal and about 20 support staff (e.g. teaching assistants, security, maintenance, bus driver)

[5] Northlands First Nation is also known as Northlands Dënesųłiné First Nation

[6] AANDC (Registered Population) http://pse5-esd5.ainc-inac.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=317&lang=eng

In addition to student classes, the school is used for a variety of community events and gatherings (e.g. Monster Bingo, sports clubs, funerals/memorials, rangers/junior rangers)

This is the largest building in the community. It is approximately 225 meters (540 feet) long and 76 meters (180 wide).

Daycare (Building B, “education buildings”)

Map showing major buildings in Lac Brochet

There is a daycare next to the school.

Health Programs Office (C)

There is a stand-alone resource office building located near the school. This building provides space for various band managed offices and service-providers.

Culture camp

Each year, starting in springtime, the Band Resource Worker sets up camp at Second Lake. Second Lake is a few miles from the townsite. These camps are intended to teach young people how to hunt, catch, and prepare traditional food. People attend these camps when they can, often on a drop-in basis.

Church (L)

A Roman Catholic Rectory associated with Oblates of Mary Immaculate (OMI) missionary Roman Catholic Archdiocese of Keewatin-Le Pas.

Band garage (W)

There is a building opposite the water treatment plant that provides space to perform maintenance and repair of vehicles. It is mostly band owned heavy equipment that is serviced here.

There are a number of derelict pieces of heavy equipment, semi-trailers, and shipping containers in the vicinity of this garage.

Lakeside cluster of buildings and services (O, Q, R, S)

There is a cluster of 10 buildings near the lake, which include:

- The Aboriginal Head Start Program building (O)
- The current nursing station (R)
- The nursing residence (Q)
- The two RCMP buildings (S)

Medical services (R)

There is an existing cluster of nursing station buildings and residences near the lake. This is where residents go to seek medical attention.

There is normally one nurse in the station at all times. Nurses typically rotate into the station from down south. A typical shift is 3-weeks in the community, 3-weeks away.

Construction of a new, larger nursing station closer to the school commenced in early 2016. (J)

Police (S)

There is no Royal Canadian Mounted Police (RCMP) or other permanent police presence in Lac Brochet. There are currently four “security people” in the community. The Band Council would like to get one or two people trained as town constables.

If there is a disturbance, people call the nursing station. This is partly done since the nursing station has a radio and someone on duty 24/7.

There is no accessible criminal holding facility. There are unoccupied RCMP buildings with a holding facility near the existing nursing station. However, since there is no one in the community trained to manage such a facility, it is locked and not accessible by anyone who is not an RCMP member.

Hockey arena / Band offices (T, U)

The arena has had ongoing problems with the heating system and with the ice making equipment.

Band offices are on the second floor / mezzanine of the hockey arena.

Northern Store (V)

Northern is the original core store banner of The North West Company. Today it consists of 127 food and general merchandise stores, serving remote, northern Canadian communities. There are about 25 Northern Store retail outlets in Manitoba. The Lac Brochet Northern Store has food, dry goods, a gas bar, a “Fun-2-go” beverage bar, and post office.

Prior to the Northern Store, there was the Antsenen Convenience Store. People liked this store because it was open on Sunday and longer hours than the Northern Store.

Fire (X)

The band has a relatively new fire truck. The fire truck is kept in its own garage. There is a phone list of volunteer firefighters in the band office. There is no 911 service. There have been tragedies due to house fires in the recent past.

Water treatment plant (Z)

The community relies on Lac Brochet for its water supply. The lake water is processed through a pressure filter treatment plant and chlorinated, then distributed through the community via a network of large diameter pre-insulated water-mains. All tap water in the community is potable.

Manitoba Hydro diesel generating station

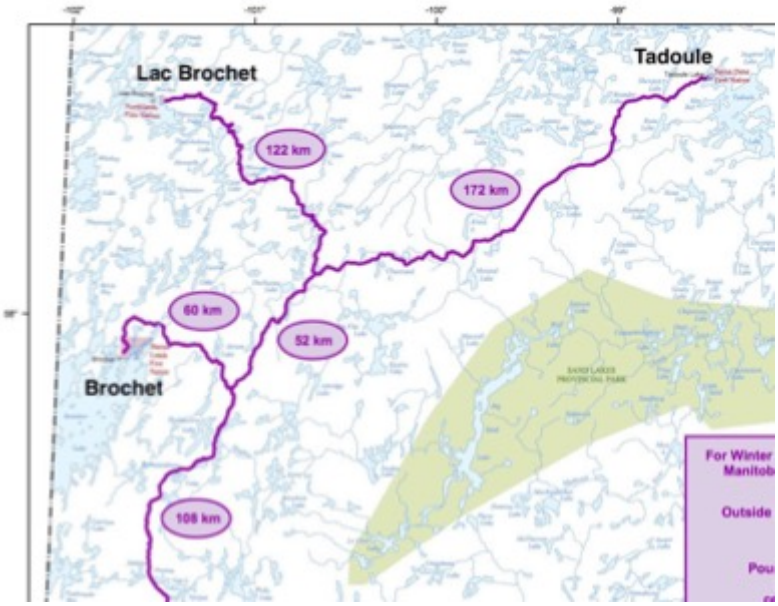
All electricity in the community is supplied by a diesel generating station located near the airport operated by Manitoba Hydro. This generating station is well constructed on a concrete pad and is well maintained. Diesel contamination concerns in the community are not centred around the Manitoba Hydro generating station, rather they are stemming from leaks associated with individual building tanks used for space heating.

Transportation and communication

Winter road

There are no all-weather roads connecting Northlands First Nation with other parts of Manitoba. A winter road connecting to Lynn Lake is constructed each year. Northlands First Nation shares a winter road with Brochet (Barren Lands First Nation) and Tadoule Lake (Sayisi Dene First Nation).

It typically takes around 24 hours of driving time to travel between Northlands and Winnipeg - roughly 10 hours on the winter road to Lynn Lake, and 14 hours between Lynn Lake and Winnipeg.



Map of winter road network from Lynn Lake to Brochet, Tadoule, and Lac Brochet

Airport

The Lac Brochet Airport is a key link to outside locations for the community. It serves both scheduled and non-scheduled air carriers, commercial and private aircraft operators, and the Government of Manitoba medevacs. The airport is served daily by Perimeter Airlines. The critical aircraft is the Metro Swearingen.

The airport has a 3,500 ft x 100 ft crushed rock runway. It is operational 24-hours a day, seven days a week, and is certified to day/night/FR, non-instrument standards. In 2013, the airport serviced almost 1,500 take-offs and landings with 6,000 passenger arrivals & departures and 950 tonnes of freight.

Internet

There is no wired connection to the Internet. Internet service is via satellite link. There are two key Internet providers:

- Broadband Communications North (BCN) is a non-profit community enterprise made up of First Nations, remote communities and other stakeholders, working to ensure that rural, northern and remote citizens have equitable access to high speed broadband services and the Internet.
- Xplornet Communications Inc. is Canada's leading rural broadband Internet provider. Subscriptions and individual dish installations are provided by an individual entrepreneur in the community.

Telephone

There is no wired connection to the continental telephone network. Telephone service is via satellite link. The service is provided and managed by Manitoba Telecom Services (MTS).

Energy

Diesel brought into Northlands on the winter road is the main source of energy for the community. It is used both to generate electricity at the Manitoba Hydro electrical generating station and also for space heating. Diesel-electricity is used primarily for lighting, running appliances, and to heat and pump water.

Diesel is also used to provide space heat in public buildings and in the vast majority of private buildings, via diesel furnaces with adjacent outdoor fuel storage tanks. These tanks are filled on an as-needed basis by the Band.

Newer model diesel day-tank

At present, only the tanks supplying the buildings associated with the nursing station are known to have double walls, and many diesel storage tanks are not built on cement pads. The fuel storage tanks are generally not attached to the buildings, and as a result the buildings and their adjacent day-tanks move independently from one another during seasonal freeze-thaw cycles, and can cause stress and leakage from the connecting piping. These factors contribute to diesel leakage and resulting soil contamination, as leakage is not contained and directly impacts the soil and surrounding environment.

Prior to 2010, most residences were heated with wood. Between 2010 and 2012 all residences were converted to diesel as part of a federal government initiative.

Fuel storage & distribution

There are a few diesel fuel storage and distribution centres. The largest facility is owned by Manitoba Hydro. These tanks are next to the Manitoba Hydro diesel-electric generating station. Also in this area are band-operated holding tanks for residential heating fuel. There are also large tanks near the Northern Store, the school, and the nursing station.

Diesel fuel for heating residences is managed by the band. The band owns and operates a distribution service to residences. Most residences have diesel fuel storage tanks outside their homes against an exterior wall.

A local individual provides repair services for residential furnaces. He was trained in the community.

Diesel contamination

As a result of factors listed above, diesel contamination exists throughout the community, particularly near and under residences and community buildings. This leakage is both through fuel handling error and through leakage resulting from season shifting between fuel storage tanks and adjacent buildings, stressing the tanks and connecting piping and causing fuel leakage. Due to sandy soil conditions in the community, diesel leakage can spread through the soil considerable distances, and as a result is not confined to the immediate location of the spill or leak.

Five sites in the community of Northlands First Nation and the surrounding area, identified in the map, have been identified as sites of significant diesel contaminated by Indigenous and Northern Affairs Canada.

Sites of significant diesel contamination

Food

There are three key sources of food in the community: purchases from the Northern Store, traditional food (hunting, fishing, gathering), and some gardening.

Purchased food

The local retail outlet is the Northern Store. Most of the non-perishable, frozen, and canned food comes up between mid-February and late March on the winter road. Some fresh produce and perishable food is brought in by air.

Some foods such as milk are subsidized. Residents interviewed are not happy with the cost of food.

Restaurants

There are no restaurants or cafés in the community. Everyone interviewed said they would love to have a café. There are currently few places in the community to meet and socialize.

Traditional food

Hunting

Most residents depend upon caribou for at least part of their diet for some of the year. If they can, each family may harvest 6 or more animals in a year. Many people share what they have harvested with others who do not have.

Most of the meat is smoked or frozen. Many households have built small smokehouses near their homes.

The migratory path of the caribou is quite variable. Some years the herd does not come close to Lac Brochet. People may need to go to Tadoule or Misty Lake or elsewhere to find them. There is also a lot of variation as to when they appear. In autumn 2015, they appeared near Misty Lake and people hunted by boat. In March of 2016 they were found some distance from Tadoule. In that case, people used snow machines to get to the herd.

People also occasionally hunt ducks and snare rabbits.

Fishing

Fish are plentiful in or near Lac Brochet. The most desired species are pickerel, trout, whitefish, and northern pike (jackfish). People also occasionally catch grayling, sucker (sauger), and turbot.

People use line or nets to catch fish in winter and summer. There is some ice fishing with lines and with nets.

Berry picking

Every year, many people gather local berries. Wild blueberries and cranberries are available from late summer until freeze up. Wild strawberries are available in June or July. Most of these are naturally available nearby. Berries can be eaten fresh. They can also be baked into pies and pastry. They can also be stewed. The most common preservation method is freezing.

Gardening

Northlands community members have gardened from time to time in the past. In 2014, Food Matters Manitoba brought compost into the community to support the development of gardens in the community. (See more in “Local Food Strategy”.)

Waste & contamination

There is a landfill about 1 kilometre north of town. End of life vehicles and some white goods scrap metal has been separated to this site. (See more in “Solid Waste Management Strategy” and “Diesel Containment Remediation Strategy”)

There is a wastewater treatment plant (Building “D” on the map). Wastewater collection and disposal is currently achieved via a piped gravity sewer system, followed by a Sequencing Batch Reactor (SBR) wastewater treatment facility. The wastewater treatment plant expels discharge into a marshy area to the west of the school.

3. Planning and Engagement

Indigenous and Northern Affairs Canada (INAC) and the community of Northlands Dënesųłiné First Nations have worked with Aki Energy to develop this Sustainable Development Plan and community consultation process. Aki Energy is a non-profit First Nations social enterprise. Aki energy works with First Nations to create local jobs and growing strong local economies through sustainable economic development.

Aki Energy operates a 13 acre farm, chicken barn, and healthy food market at Garden Hill First Nation. Aki has also worked with 4 First Nations to install $6 million worth of geothermal since 2013.

Aki Energy has conducted a review of the main Integrated Community Sustainability Planning processes that have been used in other Canadian towns and municipalities. The ***Natural Step*** process was adopted as a guide. Also, a survey of existing planning documents from other similar communities was conducted.

Community Meeting: December 1, 2015

Throughout the development of this report, Aki Energy has met regularly with Northlands Chief and Band Council members and members of the Northlands First Nation, shaping the direction and content of the report, presenting and accepting the recommendations contained in this report. Stanley Tssessaze was engaged as Community Coordinator for the project, managing the public consultation and engagement process and contributing to the development and review of the report.

Below is a summary of the major community consultations held in the development of this report.

Community meeting: December 1, 2015

On December 1, 2015, members of the Northlands Dënesųłiné First Nation community met to discuss directions the community might take to move toward a more sustainable future. The focus of this meeting was diesel contamination in the community and opportunities to replace diesel systems with alternative energy for heat.

Stakeholder interviews: December 17 - 20, 2015

Aki Energy interviewed members of the community and and students at Petit Casimir Memorial school. These interviews focused on community members understanding of the current challenges in the community, and visions for sustainable development in Northlands First Nation.

Public meeting: March 14, 2016

On March 14, 2016 a community consultation session was held at Petit Casimir Memorial School.

The afternoon event was attended by more than 30 people from the community. This included men and women, youth, adults, and elders. The event included an opening prayer by Elder Paptist Dettanikkeaze, drumming and songs. There was lunch of bannock and caribou stew and soup. Aki Energy made a presentation of "Vision and Values" and an overview of the Sustainability Plan. Elders told stories of traditional Dene resilience.

Public Meeting at Petit Casimir Memorial School 2016-03-14

People in attendance then formed groups to discuss their ideas for goals and objectives, and discuss specific strategies for sustainable development in the community. Comments made in these discussion group were recorded and informed the development of the Focus Areas and Goals chapter of this Plan.

Presentation to students: March 15, 2016

On March 15, 2016 Aki Energy presented and discussed the draft sustainable development plan to grades 4 and 5 students in the Petit Casimir Memorial School.

Community meeting: March 29, 2016

The final Northlands Sustainable Development Plan report was presented to the community at a community meeting held March 29, 2016. Comments and feedback were recorded and incorporated into the final plan. The Northlands Sustainable Development Plan was formally adopted by the community at this meeting.

Approval of Sustainable Development Plan by Chief & Council

Northlands Band Council received a complete draft of this plan in late March 2016. The plan was reviewed by Council, final adjustments were made, and the plan adopted.

4. Vision & values

Vision

"Northlands Dënesųłiné First Nation intends to be a community that provides for the long term social, cultural, and economic needs of its residents while protecting and respecting the natural environment that sustains us."

Values

The Northlands Dënesųłiné First Nation community sustainability plan is based on the values of its residents. As we move our community towards sustainability and plan for our future, our goals must reflect these values.

We believe that the residents of Northlands Dënesųłiné First Nation share the following community values:

Self-reliance

The Dene people have a tradition of self-reliance. For thousands of years, they accepted what the land had to offer and made a living that was passed from generation to generation. The 20th century brought huge changes. We are now considering a new future. How self-reliant and self-sufficient can Northlands First Nation become in the 21st century?

Respect for ourselves and each other

Respect for others and ourselves allows us to succeed as individuals, while providing a supportive and unified community for all residents. We believe that we share a collective responsibility to encourage and support all members of our community in realizing their personal potential and goals in a way that allows others to do the same.

Health

The health of all residents is an essential component of a successful and sustainable community. A physically and emotionally healthy population is the most important building block for the future of our community.

Knowledge & learning

We recognize the importance of formal and informal education and lifelong learning in building strong citizens and sustainable communities. Retaining traditional knowledge and acquiring new knowledge is critical to our future.

Dënesųłiné heritage & culture

The Dënesųłiné heritage, language, and culture are vital parts of the fabric of our community. These are integral to the past, present, and future of Northlands Dënesųłiné First Nation and are valued by all of our community members.

Respect for nature

A healthy natural environment is critical to our existence. It provides the clean air, land, and water that we rely upon for our very survival while supporting traditional lifestyles and providing sustainable economic opportunities and recreational activities. The water of Brochet Lake (Lac Brochet) is an especially important part of the natural environment for members of our community.

5. Focus Areas and Goals

In this section, we identify and define the Focus Areas that form the framework of the Northlands Sustainable Development Plan.

The four interconnecting Focus

There are four interconnected focus areas that will engage the community in this quest for sustainability, resilience, and self-reliance. The three focus areas of **Energy**, **Food**, and **Waste** are all enabled by **Community Development**.

We draw them as circles here because, in a sustainable world, they must function that way - not just within themselves but also between each other. Organic waste needs to be composted and its nutrients returned to feed new growth. Waste can also be used for energy. Energy is used to warm and give light to growing plants. Sustainable Development aims to re-create the natural cycles that turn waste into value, and by increasing self reliance to create sustainable economic development opportunities in the community.

Each focus area has broad goals that enhance the fundamental values identified in the Vision and Values chapter of this Plan and move the community toward sustainable development. Each focus area has specific objectives, that indicate future project development opportunities. These opportunities are further elaborated in Chapter 6 – Strategies.

Energy Focus

There are two general ways to reduce or eliminate reliance on diesel fuel – energy efficiency and fuel switching.

Diesel fuel is currently the dominant source of heat and electricity in Northlands First Nation. This energy source comes with a number of risks to the community; soil contamination and related health and environmental impacts, high costs and fluctuations in pricing, and lack of job creation opportunities.

Diesel fuel can be replaced by renewable energy options in an environmentally sustainable way, using renewable resources available in or within close proximity to the First Nation. Wind, solar, biomass, and geothermal (the earth's natural heat) are all examples of sources of renewable energy available in abundance that can be used instead of diesel fuel.

Some forms of renewable energy such as biomass (wood) has the potential to create long term employment and business development opportunities in the community. Northlands First Nation has an immense wealth of high quality dead wood located in forest fire sites within 25 kilometers of the community. Harvesting this wood to heat buildings in the community would create long term jobs collecting, harvesting, and processing this wood, while providing a safe, long term source of energy for the community. This is an example of sustainable development at work.

Increasing the energy efficiency of community buildings is another example of sustainable development. By increasing the energy efficiency of community buildings through energy efficient lighting, insulation, efficient shower and faucet aerators, energy star appliances and other common methods, Northlands could create local employment and reduce reliance on diesel fuel.

Goals

Goal 1: Energy efficiency- The most cost effective way to reduce diesel usage is to reduce the amount of energy consumed. This is called energy efficiency.

Community value: "Self-reliance"

We can measure improvements in local heat energy in these ways:

- A decrease in the consumption of all sources of energy per capita

Goal 2: Local energy for space heating - Northlands First Nation has been completely dependent upon diesel fuel imported on the winter road for heating its buildings. There are potential sustainable alternatives of heat energy from local biomass and geothermal sources. *Community value: "Self-reliance"*

We can measure improvements in local heat energy in these ways:

- A decrease in percentage of diesel fuel used for space heating purposes

Goal 3: Local electrical energy - Northlands First Nation is currently dependent upon the Manitoba Hydro diesel generating plant for all of its electricity. There are potential alternative sources of electrical energy in the area from solar, wind, and run-of-river hydro. *Community value: "Self-reliance"*

We can measure improvements in local electrical energy in these ways:

- Increase in the proportion of electricity supplied from renewable energy sources

Objectives

- Develop a district biomass heat system, using wood sourced locally from within 25 kilometers of the community. There is an abundance of burnt wood resulting from forest fires. A design plan is currently under development (completed July 2016) to use biomass energy to heat the Petit Casimir Memorial School and as a complementary back-up heat source for the lakeside building cluster.

- Future project opportunities could include the expansion of the biomass district system design to heat additional residential and community buildings in the community.
- Develop a district geothermal heating system. A design plan is currently under development (completed July 2016) to use geothermal energy as the primary source of heat and cooling for the lakeside building cluster.
- Improve heating efficiency in public and private buildings through
    - Insulation and building envelope retrofit
    - Building energy management (e.g. heating system optimization)
- Developing renewable electrical energy resources to replace diesel for electricity
    - Solar photovoltaic (PV)
    - Wind turbine on the Big Hill
    - Run-of-river hydro
- Investigate ways to capture waste heat from diesel generation (Manitoba Hydro generating station), or the ice plant at the arena. This waste heat could be used to heat a greenhouse or nearby buildings.
- Improve energy efficiency of lighting within public buildings
- Improve energy efficiency of home appliances such as wash machines and refrigerators.

Waste Focus

The Waste Focus will concentrate on goals that seek to reduce, reuse, recycle, or repurpose material of all kinds and sources. This group will reduce the amount of material that needs to end up in the landfill. This focus area includes remediation of contaminated soil and removal of existing waste.

Goals

Goal 1: Develop alternatives to landfill - Improper disposal of municipal solid waste contaminates the air, water, and land resources. Instead of landfill, we need to develop collection, sorting, storage, and transport systems for recyclable materials. We also need to establish connections with outside Product Recycling Organizations (PROs), southern recycling organizations with a mandate to provide recycling services to Manitoba residents, including Northern communities. *Community value: "Respect for nature"*

We will measure our success in meeting this goal in these ways:

- An increase in the amount of recyclable materials removed from the community

- A decrease in the number of End-of-life Vehicles (ELV) in the community
- An increase in the amount of electronic waste removed from the community
- An increase in the amount of organic waste that is composted
- Decrease in the amount of disposable but non-recyclable items (e.g. styrofoam cups) brought into the community

Goal 2: Remediate diesel-contaminated soil - There are several areas in the community that have been contaminated by diesel fuel spills. Some of these are localized on the surface through spillage and tank leakage. There are other areas where underground delivery pipes have been leaking - often undetected for some time. ***Community value: "Respect for nature"***

We can measure improvements in diesel contamination of soil in these ways:

- Decrease and eventually eliminate the number of reported diesel spill events
- Decrease and eventually eliminate the number of diesel storage tanks
- Decrease and eventually eliminate the number of buildings heated with diesel
- Replacement of underground diesel fuel delivery systems

Objectives

- Connect with waste diversion agencies in the south that have provincial mandates. Work with these agencies to develop waste-diversion systems that will enable collection and separation in the community and acceptance at the southern recycling facilities.
- Bring up a closed-cylinder composting system. These are used in the hog industry and can take virtually any organic waste and, if it's mixed properly with wood chips, turn it into soil.
- Remediation of contaminated soil within the community
- Address the source of contamination through replacement of diesel fuel for heating with safer renewable energy sources of heat.
- Train Northlands community members to do the soil remediation after diesel contamination. Until now, this work has been done by contractors from outside the community with no skills transfer or local employment opportunities.
- Determine the environmental liabilities of the existing landfill site.

- Provide easy-to-follow systems at the landfill to help ensure that users dispose of waste appropriately.

Food Focus

In Northlands, like in many remote and isolated communities, the high cost of food, lack of available healthy food potions and diet related diseases such as diabetes are all challenges. While these challenges are not easily overcome, there are significant steps that the community of Northlands can take to improve diet including:

a) increasing the intake of food from traditional local sources. As evidenced by absence of diet-related diseases such as diabetes in pre-contact era, traditional foods are healthy and reduce reliance on expensive foods imported from the South;

b) Increase local food production within the community via gardening, greenhouses and poultry production; and

c) also to replace imported unhealthy food with imported healthy food.

Goals

Goal 1: Increase local food production, processing, storage, and distribution A community in which all residents are able to meet an increasing proportion of their food from local sources. Grow more. Promote traditional hunting, fishing, and gathering. Share and sell food with each other. *Community value: "Self-reliance*"

We can measure improvements in food in these ways:

- increase in the percentage of food consumed annually from local sources.

Objectives

Food production

- Support households to create their own gardens
- Build a community garden
- Build a community greenhouse heated from renewable energy, such as biomass .
- Raise chickens, both "meat birds" and layers
- Community-run healthy food market, selling fruit, veggies and meat at cost on check days.
- Teach youth about harvesting traditional foods.

Food processing and storage

- Construct a community freezer
- Construct a community smoke house
- Construct a fish processing plant for local and commercial use.

Food distribution

- Each of the food production and processing objectives above could be sold within the community by local small business or social enterprise.
- Open a community café, ideally as a social enterprise or part of a social enterprise.

Community Development Focus

Sustainable Development means creating strong local economies that provide training and employment opportunities to people in Northlands First Nation. It means looking at how to keep money circulating in the local economy, supporting local people and businesses. Sustainable Development means increasing the quality of life for the entire community of Northlands First Nation through activities that support the healthy long term development of the community, in ways that honour the values of the community.

Goals

Goal 1: Local employment - Employment is essential to allow residents to provide for themselves and their families.

We can measure improvements in employment in these ways:

- An increase in the per capita income from employment or commerce

Goal 2: Training and Lifelong learning - We will work to promote a culture where people learn from each other both within and outside the community. Increasing community capacity through education, training, and skills development will support individuals in achieving their personal goals. We also recognize that building our knowledge and capacity plays a critical role in allowing us to meet our community goals. *Community value: "Knowledge & learning"*

Measures of success for this goal are:

- An increase in the passing down of traditional knowledge from Elders to youth. This applies to language retention, land, water, spiritual, food and ceremonial practices
- An increase in the number of apprentices and licensed, ticketed trades people
- An increase in graduation rates from high school

- An increase in the number of post secondary courses completed through university or college.
- An increase in the number of posted work opportunities filled by qualified local community members
- An increase in access to high-speed Internet connections

Goal 3: Promote health and healthy lifestyle - We will ensure that the suitable knowledge, programs, and facilities are available to residents to allow them to maintain active and healthy lives. *Community value: "Health"*

Measures of success for this goal are:

- Regular and annually increasing participation rate of residents, of all ages, in organized community activities and events.
- Eradication of tuberculosis
- A continuous decrease in the incidence of Type II diabetes and other diet-related diseases

Goal 4: Language & Culture - We will work as a community to promote the protection and preservation of the Dënesųłiné culture, heritage and language. Our language is an important part of our community's identity and maintaining our connection to and understanding of our reliant heritage will be an asset in creating a sustainable future. The traditional methods of providing food from local sources is an important part of our culture. *Community value: "Dënesųłiné heritage & culture"*

We will measure our success in meeting this goal in these ways:

- An increase in the number of Dënesųłiné language speakers, especially young people
- An increase in the number of kids who have experience in traditional Dënesųłiné hunting and gathering practices

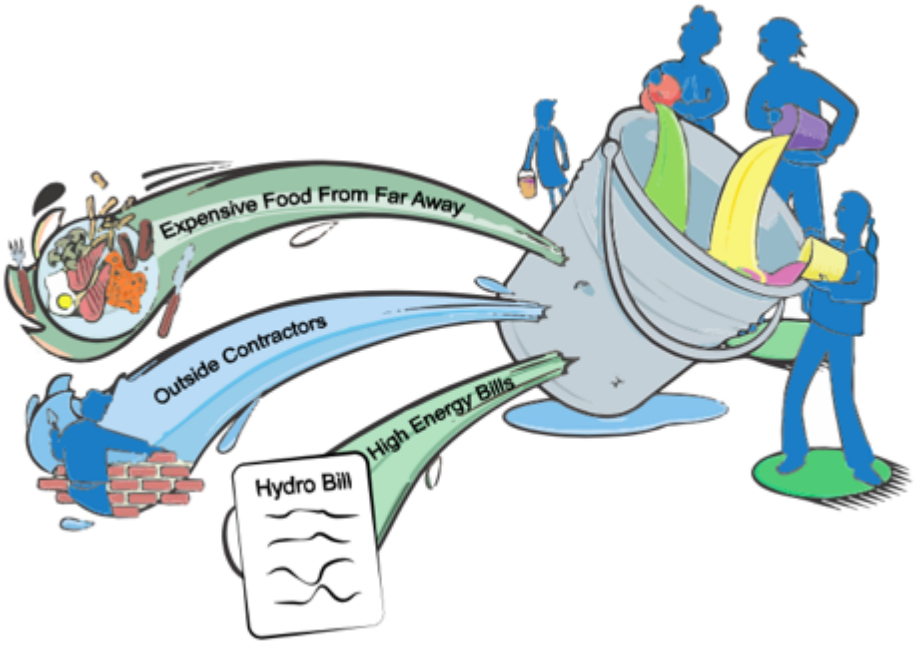
Objectives

- Align and integrate the band's training efforts to support the goals and objectives of the Focus areas.
- Promote and support the school's Dënesųłiné language classes and traditional hunting and gathering camps and training
- Support the development of local small business or social enterprise. For example, a community run food store and café.

6a. Local Green Jobs Strategy

In Northlands First Nation, like many First Nations communities, money that comes into the community doesn't stay in the community. Money doesn't circulate within the local economy, supporting local business, creating local jobs and prosperity. Instead, it flows right back out of the community again – through the high cost of energy bills, the high cost of food at the Northern store, the purchase of housing and services built outside the community. It's a "leaky bucket economy".

When money and these resources flow right back out of the community, they do not provide the lasting jobs or economic benefit that are essential to building a healthy local economy.



The "leaky bucket economy"

The Northlands Sustainable Development Plan creates a strategy to keep more money circulating in the local economy, supporting activities that create local jobs and support a healthy environment. We will build strong local economies that keep money in the local community.

- **Energy** - Why pay high bills to utilities when you could pay young people in the community to collect biomass, replace and maintain appliances, install efficient lighting, insulate buildings and fix broken windows – creating local jobs and lowering energy bills so households have more money to spend on other necessities?
- **Food** - Why pay high prices at the Northern store when you could support local harvesters using traditional knowledge to grow, hunt and harvest foods from the land? Or support local producers, who could raise chickens, grow potatoes, squash and beans right in the community? Or employ local residents to sell healthy imported food at cost to cut consumption of unhealthy imported food?
- **Waste** - Why allow everything that comes into the community to end up in the landfill? Why not pay people to sort, decommission, and transport materials that were once considered waste but could be recycled, repurposed, or reused?

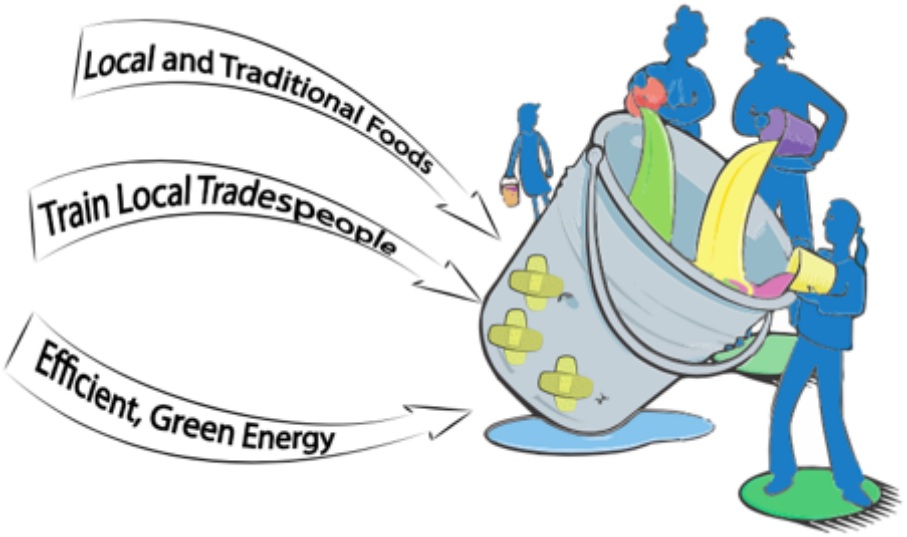
Northlands can repair its leaky bucket economy by building strong, sustainable local enterprises that create local jobs and build prosperity. When money and resources flow into a healthy economy, they stay in the community supporting local people and local projects.

Recommendation:

- **Every project and program we undertake to achieve any of our goals will be structured to maximize the short and long-term employment opportunities for the local people of Northlands First Nation.**

Social Enterprise for Community Development

A Social Enterprise is a modern business with Indigenous principles. Social Enterprises are more than just making money – it is about creating positive outcomes for the communities they operate in, and taking care of the planet. Unlike a traditional business the sole goal is to create profit for shareholders, a social enterprise has a 'triple bottom line' – people, planet and profit. This business model uses economic good sense to find solutions to problems such as poverty, high food prices, or building a healthier environment for future generations.



Plugging the leaks in the "leaky bucket economy"

This strategy provides several proposals looking at how to create business capacity and local training and employment opportunities through the sustainable development goals and objectives outlined in this document.

Opportunities to create local employment

Energy: Kónnn Inc

Currently, about $800,000 a year is spent on diesel that is used in Northlands for space heating. By some estimates, for every dollar spent on diesel, another dollar is eventually spent to clean up spills.

In early 2016, Northlands First Nation is working on a design plan to remediate diesel contamination around the Petit Casimir Memorial School Site and replace the current diesel

heating system with biomass (wood) energy. This project creates an excellent opportunity for Northlands First Nation to develop a social enterprise to operate and maintain the biomass energy systems, harvesting and processing local dead wood to heat the school building. In early discussions with community members, the name Kónnn Inc was suggested. Kónnn Inc. would create local training and employment opportunities, eliminate environmental and health impacts associated with diesel leakage at the site, and create revenues to support the expansion of the business.

Northlands First Nation would own the energy systems and other infrastructure developed according to this plan. Kónnn Inc. would be responsible for operating and maintaining them. It is important to note that Aki Energy and INAC can assist the Konnn to ensure successful operations. Aki already does this with 4 First Nation in Manitoba as capacity is being built over the long term.

Kónnn Inc. would deploy a job-creating utility model to deliver clean, renewable heat in a less expensive manner than is currently being used:

- Harvest and process waste wood to heat the school and the provide backup heat and water heat to the lakeside buildings. Note that payments to band members would only be paid upon delivery of biomass to the community.
- Negotiate the price for this heat with entities currently paying for that heat (school, nursing station, RCMP buildings, etc.). This can be done on a “10 percent less than is being paid now basis” and still be profitable
- Collect the payments for supplying the heat.
- Supply firewood for sale in the community.
- Create and maintain operating reserves from its revenues.

- Provide routine maintenance and repair on the biomass heating system and biomass storage buildings.

There are a number of options for how this firm would be structured.

We recommend that the firm be a social enterprise, so that the goals are to maximize benefit to the community, rather than to shareholders. We recommend that the goals of the firm be:

- To maximize the local benefit of money spent on heat
- To maximize local jobs.
- To maximize local economic development.
- To minimize and eventually eliminate the use of petroleum fuels.

As a revenue source, the energy management aspect of Kónnn could have current purchasers of diesel to heat their facilities enter into heating supply contracts with Kónnn as a supplier of heat from renewable sources. Kónnn should be able to supply heat at or below the current heating costs when you factor in the current costs of supplying diesel, maintaining diesel storage & delivery infrastructure, and the cost of remediating diesel contamination.

Aside from managing the harvesting and processing of biomass for wood heat, which would provide long term employment to community members, constructing and operating the renewable energy systems and implementing energy efficiencies represent significant opportunities for local jobs, and for economic and community development at Northlands. Biomass can also be imported in the beginning and as a reserve until such time as the community demonstrates its capacity to collect the biomass. This can also be done below current diesel costs.

Potential training and employment opportunities from these initiatives include:

- Site surveying and test harvesting of burn area trees
- Lake surveying and ice core measurements for the geothermal lake loop
- Heavy equipment operation (for trenching)
- Laying and insulation of district heating loop pipe
- Pouring cement for building floors
- Assembly of hoop or steel biomass buildings
- Building construction, Insulation, and retrofitting work

Much of the required work may initially need to be lead by installers with expertise in this work. However, an essential provision of their contract needs to be a requirement to provide training and employment to local people. Note that Aki has currently been contracted to work with Northlands on only two areas of the community. All buildings can eventually be converted. Also, there are over 60 First Nations in Canada that heat with diesel. There is a strong market for these skills going forward and Aki Energy has a fantastic track record training First Nation members to do this work. It is worth noting that the 3 largest residential installers of geothermal energy in Canada are

Aki Energy, Fisher River Cree Buildings, and Chief Peguis Construction. Aki is very proud of its record in doing quality work and training is a key component.

Recommendations:

- **Create a local social enterprise. (Kónnn Inc) This enterprise can manage all required training and commercial aspects of the Energy and Food Focus Areas. This entity may also supply some local waste management services not covered by FNWSC (See "Waste" below).**

Waste: Recycling and vehicle decommissioning and crushing

A study is currently underway to develop a First Nations Waste Solutions Cooperative (FNWSC) that would operate in the Keewatin Tribal Council area. The plan proposes to create a business entity to address critical waste management issues in three northern First Nations (Northlands, Barren Lands and Sayisi Dene). The proposal is for this entity to be First Nations owned and have a cooperative governance structure.

Since there is such a wide array of materials to be dealt with eventually, this plan has selected three initial phases as follows:

- Phase 1 - Focus on derelict vehicles
- Phase 2 - Electronic products
- Phase 3 - Blue Box items

Future phases will deal with compostables, construction waste, hazardous waste and for lack of a better term, garbage. In-depth, long range planning will need to be undertaken to process the entirety of the waste stream requiring extensive community input and participation, support from the various Product Recycling Organizations (PROs) and their respective processors – and ongoing financial support from the Province and the Federal governments to ensure these efforts are established and maintained for the long term.

This project would need to receive government funding but would also create revenues through the sale of metal, etc. and would create significant local employment. These are some potential employment opportunities:

- **Management** - The strategy is to work with the various PROs in southern Manitoba. It is worth noting that each PRO is mandated by provincial ministers who can dictate province-wide services. Each recyclable commodity has its own organization that manages the recycling of their material. Each organization has its own requirements and level of assistance that they will be willing to give. The relationship with these PROs will need to be managed and maintained. Since there are a number of waste streams, each will need to be managed to satisfy the requirements of the associated PRO.

- **Collection** - Each material will need to get to its collection point. This may be done by individual homeowners in the community or there will likely be a need for some level of collection service.
- **Sorting** - After collection, there may be a need for some sorting of materials at a central location.
- **Vehicle decommissioning** - End-of-Life vehicles need to be decommissioned before they can be moved. Fluids need to be drained and collected. These vehicles also contain components that need to be removed and diverted into other recycling steams (e.g. batteries, glass, tires, electronics). After all of this has been done the vehicle itself must be crushed and loaded on flatbeds for transport. All of this requires trained, responsible operators. While the value of the vehicles for scrap varies, one estimate is $300 each. It may cost more than this to get the vehicles to be recycled but we believe a majority of the cost can be covered by the value of the scrap.
- **Waste oil heaters** - Used crankcase oil from oil changes can be burned in specially designed waste oil heaters. There may be some installation and maintenance services required.
- **Shipping** - Since most of the recycled material will need to be prepared for shipment south on the winter road. There may be employment opportunities related to preparing the goods for shipment. There may also be employment in moving the goods.

Recommendations:

- **Work together with Barren Lands and Sayisi Dene First Nations to develop a First Nations Waste Solutions Cooperative (FNWSC).**

Food: Local food production, processing, distribution, and retail of healthy food

Food from the Northern Store is expensive and healthy options are hard to find. Some Northlands residents are looking at ways to supplement traditional foods with food grown in the community. Expanding local food production can create a local training and employment oppourtunities.

One example of a remote Northern First Nation in Manitoba creating jobs through local food production is Garden Hill First Nation. In 2014 Garden Hill First Nation partnered with Aki Energy to start a social enterprise called Meechim Inc. (Meechim is Oji-Cree for Food). Meechim is administered by Aki Energy and run by the community. Meechim has several components:

- **Chicken** – Aki has converted a shipping container into a brooder for 1,000 chickens, who live in the trailer when they are young and move to covered outdoor pens as they get older. The chickens are raised and sold for meat in the community, creating local employment for community members feeding, cleaning and moving chicken pens, slaughtering, processing and selling chickens. If 100 families in Northlands each consumed one chicken a week, this is a local market for 5,000 chickens a year – or 5 barns. Chicken can also be roasted (not fried) and sold commercially at a healthy food market (see below). If each chicken is

worth $20 (Northern Nutrition Canada subsidy plus value at Northern Store), roasting chickens represent a $100,000 local market.

- **Eggs** – Laying hens would also be a good fit for Northlands. Aki and Meechim are now operating a barn, also out of a shipping container, for 100 laying hens. This one barn will produce about 2,500 dozen eggs per year. Again, if each of 100 homes bought one dozen a week, this is a local market of 5,000 dozen a year. Assuming value of each dozen is $6 (includes NNC subsidy plus shelf price), this is a local market of $30,000 a year. Jobs would also be created through maintaining the flock, cleaning the barn, and collected and cleaned the eggs.
- **Greenhouse** - Building a greenhouse in the community would allow for the growing and sale of vegetables as well. Greenhouses can be inexpensively heated with biomass or geothermal. Growing food in a three season greenhouse would also create jobs, increase access to healthy local food, and create local economic development. Aki believes long hours of sunlight can be harnessed effectively in the north and that food can be grown (to meet local demand) economically in a greenhouse is the NNC subsidy is captured.
- **Healthy Food Market –** Aki Energy works with Meechim Inc at Garden Hill to offer a healthy food market three times a month. Healthy food is imported and sold at cost. We only offer about 12 items to keep costs down. Typical items include oranges, apples, grapes, lettuce, potatoes, tomatoes, pork, beef and chicken (from the farm). Some dry good are also sold such as sugar-free peanut butter and popcorn for snacks.
- **Healthy Food Canteen –** Aki also worked with Meechim at Garden Hill to take over the canteen at the Arena (which was selling a lot of pop and chips) and replace it with healthier options such as granola bars, juice, water, popcorn and chicken soup (from the farm). We are still ironing out the best way to deliver this option but we made good progress in our first year (2015-16)
- **Integrating School and Food Operations** – Aki has partnered with large foundation in Southern Ontario to hook up 5 classes from the elementary school to each have their own plot at the farm. At Northlands, this may mean a section of the greenhouse. The students are mentored by senior students from grades 11 and 12 for credit. We are just now piloting this initiative in partnership with the Four Arrows Regional Health Authority.
- **Cooking classes** - Some teachers have indicated an interest in teaching cooking classes. It would help students enable students to eat more healthy food if they know how to cook it and have experience with how good these foods can taste.
- **Preserves** - Local berries could be preserved and sold locally. They could be frozen or cooked and made into jams or other preserves.
- **Retail** - A community owned, staffed and managed café and general store to sell food and other locally-sourced goods. Aki Energy offers regular business courses to build local skills.

Recommendations:

- Develop an all-season greenhouse, heated through a connection to the district biomass system.
- The vegetables grown could be sold locally through the development of a food-focused social enterprise.
- Develop a chicken operation, raising birds for meat and eggs.
- Develop a social enterprise business to co-ordinate local food initiatives in the community.

When it comes to food, it is important to note that, with the exception of country foods such as caribou, the costs of food production are higher in the north. However, because food is flown in, it is more costly and therefore worth more than it would be in the south. So for example, tomatoes in Winnipeg may be sold for $1 a pound. In Northlands, the tomato will cost $1 per pound plus about $1 to transport it by air. This means locally produced food may be worth as much as twice what it would be in the south. Business opportunities must be evaluated both in terms of costs AND benefits.

There is one hitch however which needs to be overcome. Currently, the Nutrition North Canada subsidy program is freight-based. In other words, locally grown foods are ineligible for supports. Aki Energy is working hard to lobby the Federal government to address this injustice. Everyone recognizes it is blatantly unfair but rules take time to change, especially in the large Federal system.

Recommendations:

- See a complete list of recommendations in chapter *6f. Local Food Strategy*.

6b. Energy Efficiency Strategy

The transition of Northlands First Nation to sustainability is just a move away from decreasing dependence on imported fossil fuel and imported food toward more renewable sources. We must include a reduction in how much we consume. We need to become more efficient. In this chapter we consider ways to reduce the energy we require for space heating and for transportation.

In this strategy, we consider ways to reduce energy required for

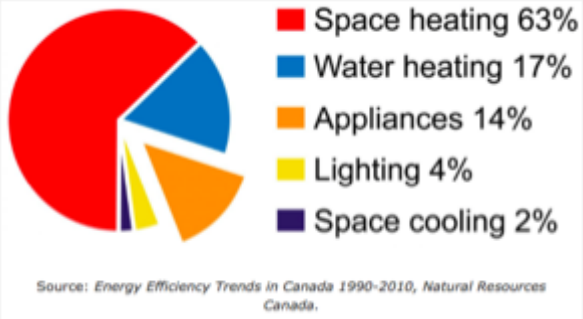
- Space heating - heating our buildings
- Other electrical energy uses - hot water, appliances, lighting
- Transportation - of people and goods, within the community and to outside

Space heating

Residential buildings

There to be about 140 homes in the community. All of these require energy for space heating, lighting, appliances, and hot water. In Northlands First Nation, some energy is also needed for drying and smoking food.

Elsewhere in this plan, we describe a framework to convert Northlands buildings from space heating with diesel to heating with biomass from burnt wood, geothermal and solar energy. This initiative concentrates on the school and the lakeside cluster of buildings. The infrastructure developed through the design plan is intended to be scalable and could be expanded to include additional community buildings and residences.



Residential energy use in Canada by activity

This section focuses on reducing the energy use of community buildings and residences, decreasing the amount of energy required to provide heat and power to the building.

Challenges

While improving the energy efficiency of community buildings and residential housing stock is valuable, there are several challenges to keep in mind:

- We estimate that the majority of the homes in the community are not well-insulated or well-sealed to modern standards.
- Many of the homes in the community have high levels of moisture and resulting mould issues. High levels of moisture are present due to a number of factors:

- Due to a housing shortage, households often have a high number of occupants. This increases the number of moisture generating activities in the home – showering, boiling water, etc.
- Many homes in the community do not have clothes dryers, and during the winter months, clothes are hung indoors to dry. This creates a lot of moisture in the house and
- There is a prevalent practice to open windows to manage temperature and moisture.

Households with high levels of indoor air contaminants, including mould, should not be insulated without remedial action to address contaminant sources. Without this, insulating a house will intensify existing mould and resulting health impacts. In all cases, a heat-recovery ventilator must be installed to ensure good ventilation is maintained in an insulated building.

Energy efficiency in new homes

We need to build new homes that have significantly reduced energy requirements. The route to achieve this is partly technical and to a certain extent, there needs to be a shift in understanding about household energy usage.

Here are several steps to reduce energy usage in buildings:

- Build community facilities that will move the moisture-generating activities out of the home (e.g. laundromat, community facility for preserving hides). Besides moving these moisture-generating activities out of individual homes, they will also become social-gathering places.
- Prioritize building new homes in the community and reducing housing occupancy levels.
- Build new homes a high standard of energy efficiency with good moisture removal.
- Phase the migration to these new energy efficient households at a rate that enables the cultural shift away from the desire to open windows to control temperature.

Recommendations:

- **Work with BUILD Inc. to get local people trained in building trades.**
- **Work with architects to develop building plans for sustainable housing that both works in Northlands and can be built locally.**

Retrofit of existing housing stock

Insulation: Noting the challenges with mould and other indoor air contaminants mentioned above, residential buildings in the community should be insulated to decrease energy leakage. It would be prudent to have standard energy audits conducted in a sample of homes. It is likely that

enhanced insulation in the attics, crawlspaces, and walls would be recommended. As well, doors and windows should be upgraded if of poor energy efficiency standards and broken windows and doors should be fixed or replaced. It is rare that an energy audit would recommend replacing windows but given the high cost of heating, measures not likely to be economic in the south may be advisable in Northlands. All homes should be weather sealed to decrease drafts and leakage.

The development of a community-scale building insulating program would provide significant opportunities for Northlands First Nation to provide training and employment opportunities to community members. BUILD Inc. is a social enterprise in Winnipeg that trains urban Indigenous people with barriers to employment to insulate low income housing in Winnipeg's north end, and could provide resources in developing a training program in Northlands First Nation.

Recommendations:

- **Work with BUILD Inc. to get local people trained in building trades.**
- **Work with Manitoba Hydro to finance and facilitate upgrade of homes.**
- **Ensure that all houses have functional Heat Recovery Ventilators (HRV).**

Hot and cold water

Hot water in the community is currently heated via electricity and therefore diesel. To reduce the amount of diesel used in the community, measures should be taken to reduce hot water usage and also to replace electric tanks with cost-effective renewable options. We recommend the following:

- Install aerated showerheads and faucets. New versions of these come with very high user satisfaction as aeration process makes it seem like there is no reduction in water usage. Aerated showerheads and faucets will cut water used by over 40 percent.
- If a community laundry-mat is not imminent (see below), replace all top-loaded wash machines with front loaded versions that cut water consumption by over 40 percent. They also get more water out of the clothes in the spin cycle and therefore will reduce drying costs and moisture issues.
- In households with high occupancy levels, solar thermal hot water heaters may be cost effective and provide significant savings in non-winter months where there are longer daylight hours. Manitoba Hydro has funded a pilot project of solar thermal hot water heaters in Peguis First Nation, and is considering including solar thermal hot water heating as an eligible measure under its PowerSmart for First Nations program.
- Biomass should eventually be connected to all buildings in Northlands. In some buildings, biomass will provide both space and water heat and in others, where space heating is provided by geothermal, biomass can provide heat for water.

Unheated water consumption can also be significantly reduced with measures discussed above such as aerated showerheads and faucets. However, we recommend that all 13 litre per flush

toilets also be replaced with new, highly rated 4.8 litre models. This will decrease energy used in water treatment and pumping costs. BUILD has done 14,000 water retrofits in public and non-profit housing in Winnipeg and can be of assistance in designing an effective program in Northlands.

Installation of these measures could be included in a community-wide retrofit program, as training to perform these measures is simple and cost-recovery is fast.

Recommendations:

- **Install water and energy saving devices as soon as possible.**
- **Make medium term plans to hook all buildings up to biomass system to provide energy for water heating.**
- **Investigate replacing all top-loading wash machines with front loaded Energy Star models.**
- **Investigate collaborating with Manitoba Hydro to install solar thermal hot water heating.**
- **Replace all 13 litre per flush toilets with 4.8 litre units.**

Community laundromat

The current ban on household clothes dryers has lead to residents hanging laundry to dry indoors, leading to high moisture levels in the house and associated development of mould. The construction of a community laundromat would provide a practical, effective alternative and would reduce mould issues in residential buildings.

If the proposal to convert the Petit Casimir Memorial School to biomass energy is implemented, the laundromat would ideally be situated adjacent to the school and would be connected to the biomass district system. This would also take significant pressure off the diesel-electricity system as likely 1/3 of electricity is used for heating water (17 percent of TOTAL household energy is to heat water)

Recommendations:

- **Determine whether or not the community could see value in a community-owned and run laundromat.**
- **Investigate construction of a community laundromat.**

Lighting

Transitioning lighting can reduce electricity use in residential and community buildings. Manitoba Hydro's PowerSmart for First Nations program offers incentives for First Nations to replace old

incandescent and CFL lighting with energy efficient LED lighting. Installation of new lighting could be performed by community members, and included in the development of a community-wide insulation program.

Recommendations:

- **Have local social enterprise work with Manitoba Hydro PowerSmart to finance and facilitate upgrade of lighting.**

Appliances

Every home and most commerical buildings have appliances. Refridgerators offer the best opportunity for energy savings as new fridges will cut energy usage by as much as 70 percent (depending on how old the existing fridge is). The age and efficiency levels of existing stocks should be evaluated.

Community buildings

There are 27 non-residential buildings in the community.

These buildings are not dissimilar to those in Garden Hill First Nation. In 2015, Demand Side Energy Consultants (DSEC) conducted a review of the non-residential buildings in that community.

The DSEC report incorporated building energy data from 14 facilities in Garden Hill First Nation. Over sixty measures were identified and the energy savings were summarized with payback periods from 3 to 21 years – note that this chart assumes commercial rates that are 8 cents per kWh compared to $2.50 in Northlands. Paybacks will be dramatically faster in Northlands:

Energy Conservation Measure Summary	*Avoided Energy (kWh/yr.)*	*Avoided Cost ($/yr.)*	*Est. Capital ($)*	*Est. Payback (years)*
Building Control System Upgrades	482,000	$21,900	$ 62,000	3
Building Envelope Upgrades	274,000	$13,700	$250,000	18
Energy Management System Activities	190,000	$ 9,500	$ 28,000	3
Arena Ice Plant Heat recovery Opportunity	190,000	$ 9,500	$200,000	21
Building Lighting Upgrades	121,000	$ 4,070	$ 27,000	7
Community Energy Management Awareness*	230,000	$15,000	-	-
Total Energy Conservation Bundle	1,257,000	$60,640	$582,350	10

*not included in totals for the finance bundle -

Energy conservation and payback for Garden Hill FN

The table above presents data from community buildings at Garden Hill First Nation, and the results are not directly applicable to buildings in Northlands First Nation. However, this data does demonstrate that there are a number of measures that can be implemented in community

buildings that are cost effective and will reduce energy usage. In particular, Building control system upgrades and lighting upgrades both offer significant energy reductions with quick paybacks.

Recommendations:

- Work with BUILD Inc. to get local people trained in building trades.
- Work with Manitoba Hydro to have a Commercial PowerSmart energy audit of all the non-residential buildings in the community conducted.
- Implement recommendations resulting from this energy audit.

Transportation

Due to the isolation of the community, transportation will be a more difficult topic to approach.

Destinations outside the community

In order to connect with the rest of the world, there are currently not many more efficient options available. The winter road is typically only open for a few weeks a year (mid-February until April) For the rest of the year, the only means of travel to and from the community is via Perimeter Airlines.

Recommendations:

- Investigate charter bus trips to Thompson (and perhaps Winnipeg) on the winter road for shopping. This investigation should also include checking into incorporating a freight trailer or other means to enable people to bring home goods they have purchased.
- Investigate partnering with Winnipeg-based ISO Polar Airships and Buoyant Aircraft Systems International (BASI) to use Lac Brochet to test shipment of goods by airship.

Within the community

Virtually all vehicles in the community are half-tons and four-wheel-drive crew cab trucks.

- For moving people and goods about within the community, it would be worth exploring use of small Gator or other All Terrain Vehicles (ATVs) with trailers.
- There may be interest in the community to use bicycles to get about. Besides avoiding the cost of gasoline, there would be additional health benefits to this. The Winnipeg Repair Education and Cycling Hub (WRENCH) has experience in refurbishing donated and discarded bicycles into completely road-worthy modes of transportation. Community members, especially youth, could be trained to repair bicycles.

Recommendations:

- Investigate what applications would be suitable for Gators and ATVs to replace trucks.
- Consult the community as to their appetite for bicycling. If there is a desire to consider bicycles, work with the WRENCH.

6c. Diesel Transition Strategy

Our sustainability plan is focused on moving our community away from imported fossil fuels and toward renewable sources of energy such as biomass, geothermal and solar.

These are the elements of our strategy for moving away from diesel in Northlands:

- In the short term, transition to biomass and geothermal at the school and lakeside building cluster
- Improve energy efficiency in new and existing homes
- Improve energy efficiency in other non-residential buildings in the community
- In the medium term, connect all buildings in Northlands to either geothermal and/or biomass.
- Explore electrical generation from renewable sources such as wind power, solar power, and run of the river hydro.

We have chosen to take a phased approach to this transition. Initially, we intend to install renewable, locally sourced energy to provide space and water heating for two sites in Northlands - the school and a cluster of buildings down by the lake. These two locations represent about 30% of the energy used for heat in the community.

There is also enthusiasm to replace the diesel-electric system with renewable options. We do not consider these options in detail in this report. We also fully recognize that there are more technical barriers that will make replacing the diesel-electric system more challenging than are present with replacing diesel used for space heating. We also know Hydro, INAC and Northlands have done a lot of work already investigating options. We are not privy to this information and will continue to focus on space heating opportunities.

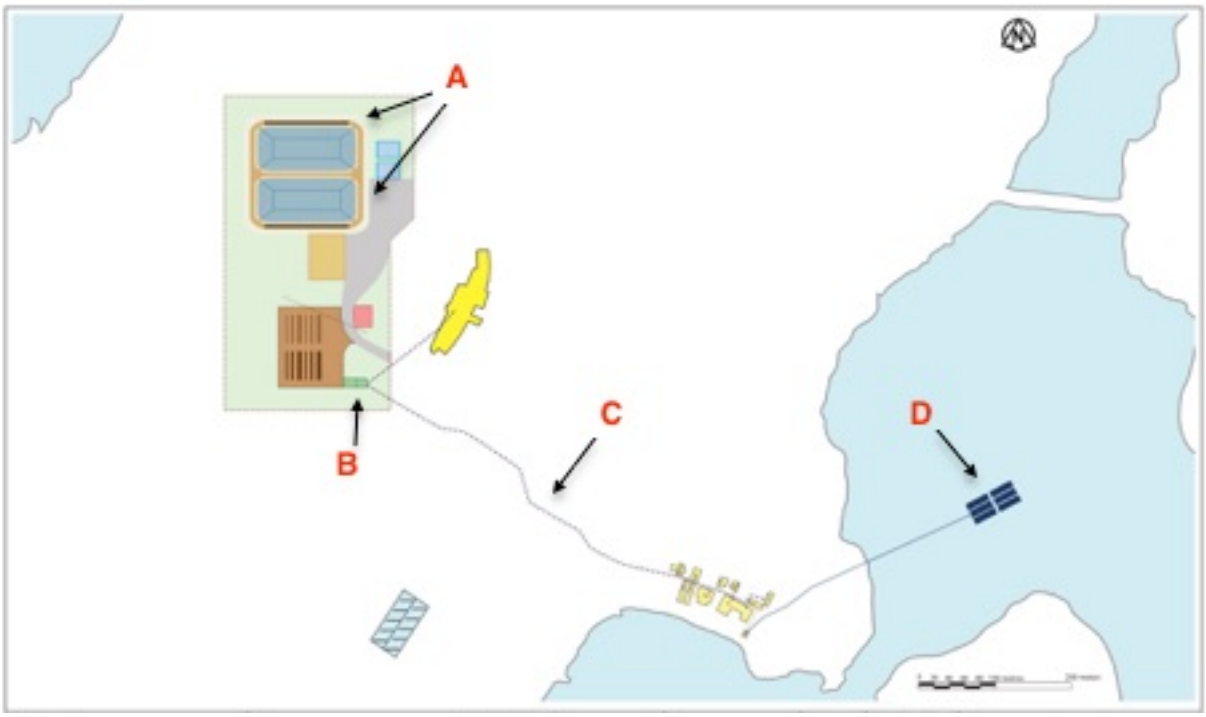
Renewable energy for heating

The Northlands Dënesųłiné First Nation has already taken a significant first step in transitioning the community away from a reliance on diesel power for heat, and towards the use of renewable, locally available energy sources.

In the fall of 2015 the community of Northlands First Nation held a public vote, deciding to proceed with the design of a renewable energy system for the school and the lakeside building cluster of buildings. This system design, scheduled for completion March 31 2016, will include the following:

- The installation of two biomass boilers (1000 kW, 500 kW) to heat the Petit Casimir Memorial School Building. The boilers will be housed in a small purpose-built building near the school, with heat piped into the school through insulated underground piping. The biomass system will also provide back-up heat for the cluster of buildings by the lake. *See map below*

- The installation of a district lake loop geothermal system to provide heating and cooling to the cluster of buildings by the lake, with biomass acting as a source of back-up heat. ***See map below***
- The installation of a 90KW solar photovoltaic system on the biomass building to provide electricity to power the biomass and geothermal system. The solar PV system will be tied into Manitoba Hydro's diesel micro-grid, as will the biomass and geothermal systems. The size of the solar PV system has been designed so that the entire system will be grid-neutral on an annual basis.
- The installation of a 160KW solar photovoltaic system on the berms of the new sewage treatment lagoon scheduled for construction, to provide power for sewage treatment operations.



A) solar berms connected to the proposed sewage treatment site, and mounted on the B) biomass boiler building, C) underground piping to the school and lakeside cluster of buildings, and D) geothermal district lake loop system.

Provided this project is approved to proceed to construction, the systems will be built in the summer of 2017 and commissioned by the fall of that year.

- Geothermal, Biomass and Solar system design complete (March 31, 2016)
- Tendering process (Fall 2016)
- First year harvesting biomass (Winter 2017)
- System construction (Spring 2017)
- Training and construction (Summer 2017)

- System commissioning – (Fall 2017)

This system will represent a significant step forward for Northlands First Nation, moving the community away from a dependence on diesel fuel and towards an increasing self-reliance on locally produced energy.

It is important to note that the renewable energy system for the Petit Casimir Memorial School and the lakeside cluster of buildings represents a first step. Moving forward, we recommend that a feasibility study is conducted to assess the potential of expanding the biomass and geothermal district systems to include all buildings in the community.

- Based on an assessment in Aki Energy's 2015 Pre-Feasibility Study, Northlands First Nation has access to plentiful biomass energy through dead wood from forest fire burn areas to provide a viable long term source of heat in the community.
- Where biomass energy is used for heat, it should also be used to heat hot water.
- The geothermal district lake loop system is scalable, with the potential to be expanded to include additional buildings.
- There is no technical reason why Northlands First Nation could not be entirely independent of diesel energy for heat.

Recommendations:

- **Install two biomass boilers to heat the school building.**
- **Construct a building near the school to house the boilers.**
- **Construct an insulated underground district heat piping system to distribute hot liquid to the school and lake cluster buildings.**
- **Install a district lake loop geothermal system to provide heating and cooling to the cluster of buildings by the lake, with biomass acting as a source of back-up heat.**
- **Install a solar photovoltaic system on the biomass building to provide electricity to power the biomass and geothermal system.**
- **Install a 160KW solar photovoltaic system on the berms of the new sewage treatment lagoon.**
- **Ensure that this system is scalable. Consider extending it to laundromat, and other community buildings.**

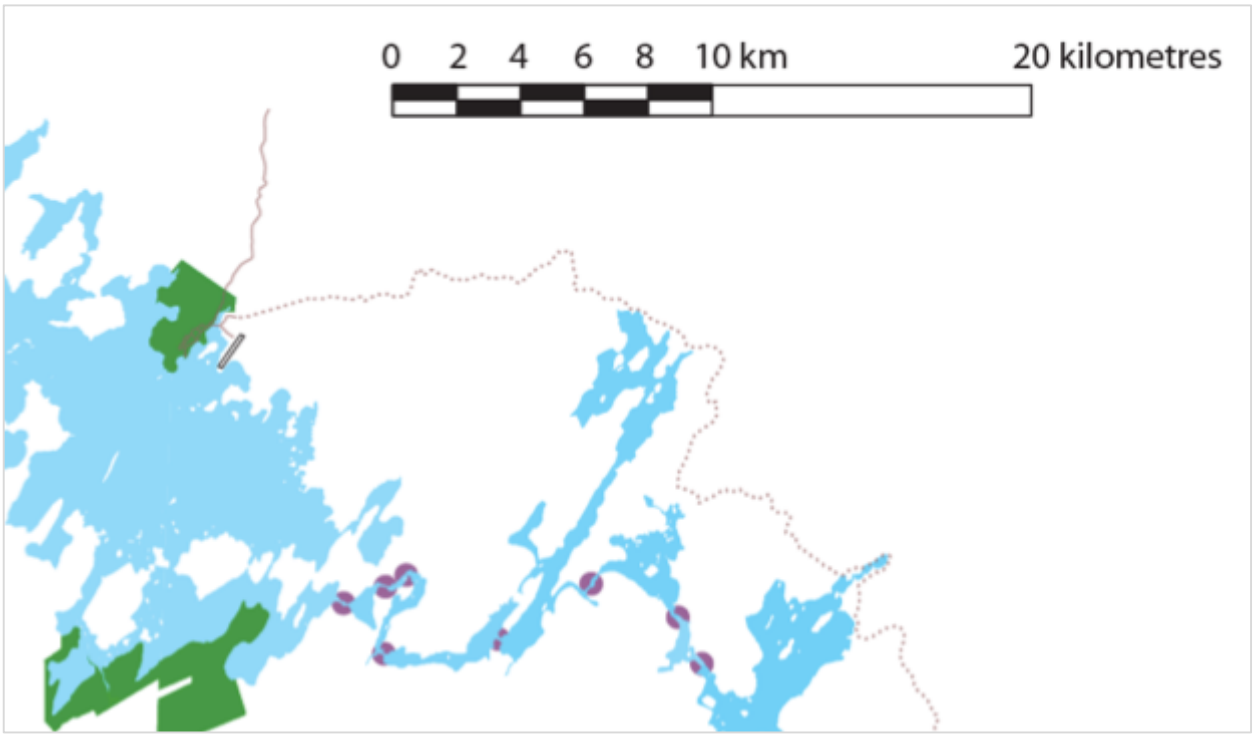
Improving energy efficiency

Improving the energy efficiency of residential and community buildings is another key element in Northlands Diesel transition strategy. By using less energy to heat and power buildings, Northlands First Nation will reduce the amount of diesel fuel needed today, and reduce the load on renewable

energy systems in the future. For more detailed information on Northlands Energy Efficiency Strategy, please see section 6b. Energy Efficiency Strategy.

Exploring feasibility of wind power and small scale hydro

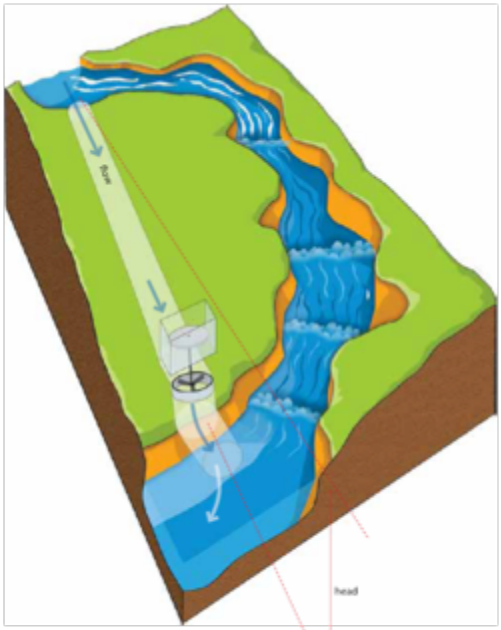
An alternative energy pre-feasibility study of Northlands First Nations, conducted by Aki Energy in



Mapped Water Disturbances (Rapids or Falls) Near Northlands

the fall of 2015 contains three recommendations that are relevant here:

- A feasibility study of wind generation, including costs and likely benefits, along with options for power transmission, be conducted.
- A wind monitor be installed on the top of the "big hill" as soon as possible, and one year of wind data be collected. Ideally, the equipment needed could be brought up on the winter road in the next season.
- A feasibility study be conducted to determine water flows, potential energy production, and turbine options could for the section of the Cochrane River immediately below Lac Brochet. The feasibility of integrating the transmission of power from this hydro site into the potential power transmission from the nearby potential wind site should also be examined.



Run-of-the-River Small Hydro

Wind monitoring:

Should funding become available to support the development of a wind monitoring station on Big Hill, aside from working with Manitoba's Department of Energy and Manitoba Hydro, Northlands First Nations should work closely with the Government of Manitoba's Department of Infrastructure and Transportation, "Northern Airports and Marine Operations" unit. This unit us responsible for operating the airport.

We will want them to:

- Participate in discussions on what kind of wind monitoring system we put up on top of the big hill.
- Provide us with detailed wind data from the last five years from the airport, and for the period coming up when we are doing wind monitoring on top of the big hill. This data can be correlated with new data collected.
- Agree to our putting up wind turbines on the big hill and nearby hills, if the wind monitoring provides us with the kind of results we expect.
- This should be acceptable to them, because the hills are more than 10 km from the airport.

Wind turbines

Recommendations:

- Work closely with the Government of Manitoba's Department of Infrastructure and Transportation, "Northern Airports and Marine Operations" unit and Manitoba Hydro to determine the feasibility of installing a wind turbine on the Big Hill.
- Consult with the community to determine their willingness to pursue small hydro. If acceptable, work with the University of Manitoba and Manitoba Hydro to determine the feasibility of run-of-river hydro generation.

6d. Solid Waste Management Strategy

Today, all waste produced in Northlands First Nation ends up in the community landfill. This situation is concerning for a number of reasons:

- Recyclable products are not being properly separated and processed
- Hazardous materials such as batteries and paint cans are not properly disposed of, resulting in possible contamination of soil and water.
- The current landfill site is unlicensed, leading to concerns related to proper containment of materials.

In developing a strategy for the proper disposal of waste materials, Northlands First Nation is not only protecting the soil and groundwater for contamination due to the leeching from waste materials, the community is also creating an opportunity for training and employment creation.

As discussed in 6a Local Green Jobs strategy, waste recycling and disposal creates an opportunity for the creation of local jobs and employment. In this section, we will present a strategy for for dealing with the following waste streams:

- Waste from vehicle operation and maintenance
- Derelict vehicles, appliances, & other metal waste
- Product recycling
- Organic waste - this includes sewage sludge

Phased approach

Since there is such a wide scope of materials to be dealt with, this plan has selected three initial waste recycling phases as follows:

- Phase 1 – End of life vehicles
- Phase 2 - Electronic products
- Phase 3 - “Blue Box” product recycling

Future phases will deal with, construction waste, hazardous waste, compostables and for lack of a better term, “garbage”.

In-depth, long range planning will need to be undertaken to process the entirety of the waste stream requiring extensive community input and participation, support from the various Product Recycling Organizations (PROs) and their respective processors – and ongoing financial support from the Province and the Federal governments to ensure these efforts are established and maintained for the long term.

Waste streams

Derelict vehicles, appliances, & other metal waste

There is an opportunity and potential funding to develop a plan for removing derelict vehicles and other metal waste from three Northern Manitoba communities. Northlands First Nation is one of these communities.

Work is underway to develop a detailed plan to capitalize on this opportunity. The current direction of plans is to set up a social enterprise that would take on this project. Initially, this enterprise may focus on these three communities in concert with the hope that it would expand to other communities in future years. However, this plan is still in development.

The process for dealing with derelict “end-of-life” vehicles is this:

- **Collect the vehicles** - Move them to a collection area where they can be dealt with. Most of the derelict cars in Northlands have already been collected together in an area of the landfill. There are also a number of pieces of construction equipment near the Band Maintenance Yard.
- **Decommission the vehicles** - The vehicles must be made safe to transport and items within them that are recyclable need to be segregated. Fluids need to be drained and properly managed, electronics, batteries, glass, tires, etc also need to be removed and managed for delivery to the appropriate PRO.
- **Crush the vehicles** - A mobile crusher could be employed. Sharing of this equipment is one of the motivations for working with the other northern communities.
- **Transport the vehicles** - Typically, the flattened vehicles are loaded onto flatbed trailers for transport.

There is going to be a need for training. Safety certification is required. There is also specific training on the steps required to decommission vehicles, and on dealing with coolants in refrigerators, and freezers, and on dealing with appliances that might contain mercury switches.

Another Manitoba First Nations community that is implementing a plan to deal with end-of-life vehicles. There may be an opportunity to learn from their experience.

There are also a few appliances in the area to the west of the Northlands community that need to be collected, but that could be done fairly easily.

Recommendations:

- Develop a business plan to capitalize on the end-of-life vehicle opportunity.

Waste oil

Waste oil is produced whenever the crankcase oil is changed in a vehicle. The most practical way to deal with waste oil in Northlands First Nation would be waste oil heaters. Because modern waste oil heaters burn the waste oil at a very high temperature, they burn cleanly. There is almost no smoke or smell. There is only a small amount of ash that needs to be dealt with. (Some jurisdictions consider this ash to be a hazardous waste. Others consider it safe for landfill. We will need to ascertain this for Manitoba.)

Energy Logic waste oil furnace model 140

The Manitoba Association for Resource Recovery Corp (MARRC) is responsible for managing waste oil. New waste oil heaters cost about $15,000 plus shipping and installation. As part of their incentive program, MARRC will pay the community $7,500 upon installation of a waste oil unit. Thereafter, they will pay $750 per year for 10 years. So, ultimately the heater is free and provides free heat as long as it is in service.

Recommendations:

- **Work with MARRC to install a waste oil heater in the Band Maintenance Building.**

Product recycling

There are 13 Product Recycling Organizations (PROs) in Manitoba. These are non-profit organizations, run by the businesses that create recyclable products, who are required by law to help Manitoba communities recycle their products, including northern communities. The main products that can be recycled include:

- vehicle batteries
- vehicle tires
- thermostats and other mercury-containing switches
- pop bottles
- electronic waste
- cell phones
- batteries (other than vehicle batteries)

- old medications

So far, the PROs have concentrated primarily on the larger communities. The product recycling organizations are not currently fulfilling their mandate to serve Northern communities.

If Northlands First Nation developed a program to collect, sort and store recyclable materials for transportation South on the winter road, the product recycling organization are mandated to provide assistance and support. Aki Energy believes that the product recycling organization could be approached for financial assistance in covering transportation costs, as well as the purchase of shipping containers for the storage of recyclable materials.

Recommendations:

- **Work with the PROs to develop a system for continuous collection and periodic transport of "blue box" recyclable and other such material (e.g. electronics) out of the community.**

Organic waste

One of the longer-term opportunities is to find ways to recycle organic waste, turning this waste into compost. The waste that could be treated would include the following:

- household waste
- material left over from cleaning fish
- material left over from caribou
- food waste from the Northern store, school and medical centre

We probably can't do an open compost system, because:

- composting microbes don't function well lower temperatures
- open systems aren't good at handling animal materials
- an open compost system will attract animals.

Instead, we would need to bring up a closed-cylinder composting system. These are used in the hog industry and can take virtually any organic waste and, if it's mixed properly with wood chips, turn it into soil. This compost product could be used in small gardens, or in greenhouses. (See Local Food Strategy)

Recommendations:

- **Investigate bringing up a closed-cylinder composter.**
- **Develop a system for collecting organic waste and delivering it to the composter.**
- **Develop a system for making use of the resulting compost.**

Brome Composter - closed composting system

Depending on the size, these composters cost between $15,000 and $35,000 plus shipping. It also requires a small amount of electricity to operate. The system could be locally operated.

Sewage sludge

Another source of organic waste is the solid residue from treating sewage. A new sewage lagoon is proposed in another aspect of planning for Northlands. This lagoon system includes aeration. The two output elements from this new treatment process would be a) a water effluent that would have very little residual contaminants, b) a solid or semi-solid sludge.

This sludge could be mixed with wood residues and composted to provide soil for new tree plantings.

Alternatively, it could also be introduced to the closed-cylinder composting system. Composting in one of these units is at a sufficiently high temperature that any pathogens in the compost are killed during the process. While the remnants of treated human waste are safe to use as compost, it would be up to the community to decide if this would be an appropriate use of the material in Northlands First Nation.

Recommendations:

- **Consult the community about using sewage biosolids in the compost system.**

6e. Diesel Containment Remediation Strategy

Diesel contamination of the soil in multiple sites in Northlands First Nation have resulted due to leaks in diesel storage tanks and piping and spillage occurring during transportation of fuels. These contaminated sites represent a health and environmental risk to the community, and remediating these sites is a priority.

Northlands First Nation Sustainable Development Plan is focused on moving our community away from imported fossil fuels and toward locally produced renewable sources of energy. Therefore, this strategy is linked with the "Diesel Transition Strategy" and "Energy Efficiency".

In terms of remediation, there are currently five sites in the community that have been identified by Indigenous and Northern Affairs Canada as being contaminated by diesel spills and leaks:

1. School Area
2. Lakeside Cluster
3. Current Band Tank-farm
4. Band Maintenance Yard
5. Landfill Site

There are significant health and environmental risks associated with diesel contaminated sites, and it must be a priority to remediate these sites, and investigate the potential of additional contaminated sites throughout the community.

Remediation Design Options

A number of remedial options exist to address hydrocarbon-impacted soil and groundwater. Brief descriptions of three different approaches to the address the impacts are provided in the following subsections and individual treatment techniques within each approach are presented in more detail in the section "Remediation Options Evaluation", below.

It should be noted that it is anticipated that the School tank-farm, currently present, will be removed prior to undertaking any remedial activities on this site.

The two options for treatment are in-situ and ex-situ:

- **In-situ treatment** methodologies involve the treatment of impacted soil and/or groundwater in place (i.e. no excavation). The effectiveness of in-situ treatments often depends on the soil matrix, soil permeability, and the contaminant distribution. In-situ treatments usually require longer treatment times and may require follow-up testing and monitoring.
- **Ex-situ treatment** methodologies involve the removal of impacted soil from its location either permanently or temporarily while it is treated. Impacted soil may be treated on-site and placed back into the excavation or hauled off-site for treatment at a land-farm facility. The removal of impacted soil provides a relatively fast and immediate solution to address decontaminating a given site, however, ex-situ options may be more costly in the long-run due to hauling costs, tipping fees, infrastructure construction and maintenance, treatment time, and final disposal costs.

Current approaches to diesel contaminated sites remediation is reliance on the use of outside contractors for all aspects of the soil sampling and remediation. Given the extent of the contamination in Northlands, and necessity of repeated treatments using either in-situ or ex-situ approaches, there is the potential to train local community members to perform some of these testing, monitoring and remediating tasks.

New Tank-farm Design Recommendations:

The current band tank-farm is one of the contaminated sites identified by Indigenous and Northern Affairs Canada. The design of a new tank-farm is currently in development, and the reduction of diesel contamination risk should be a primary concern.

SD Consulting Group has been hired to complete a feasibility study on the potential to include diesel spillage from the new tank-farm site into the new sewage lagoon system scheduled for completion as part of the eco-industrial site development. Provided feasibility is confirmed, the new tank-farm should be co-located with the eco-industrial site and designed to include a liner that would direct any spillage to the sewage lagoon for proper treatment.

Recommendations:

- **New tank-farm designs should be co-located with the proposed eco-industrial site to facilitate integration of a drainage system into the sewage treatment lagoon.**
- **Remediation of the 5 identified contaminated sites must be a priority.**

Recommendations:

- **Develop an all-season greenhouse, heated through a connection to the district biomass system.**
- **The vegetables grown could be sold locally through the development of a food-focused social enterprise.**

6f. Local Food Strategy

Food and culture are linked, and central to the core of this strategy are supporting and expanding traditional food practices in Northlands First Nation, while reducing reliance on expensive imported foods through an expansion of local food production.

In addition to the development of a robust local food system, this strategy also looks at ways to develop a local fishing co-operative that could harvest and process fish for Lac Brochet. Sustainable harvesting and processing of fish stocks for sale to southern retailers would provide a source of employment for local fishers. Specialty retailers like Winnipeg's Neechi Commons have a mandate to support First Nations suppliers, and experience in working with northern co-operatives.

There are four aspects of food considered in this strategy:

- production
- processing
- storage
- distribution & retail of healthy food

Local food production

Northlands is probably too far north to successfully grow many vegetables outdoors at a large scale. However, because food is flown in, it is more costly and therefore worth more than it would be in the south. So for example, tomatoes in Winnipeg may be sold for $1 a pound. In Northlands, the tomato will cost $1 per pound plus about $1 to transport it by air. This means locally produced food may be worth twice what it would be in the south. Greenhouses, therefore, may well be cost-effective in Northlands.

Outdoor Gardening

- In 2014 Food Matters Manitoba helped to initiate some gardening in the community. People who participated in that program were pleased with the result and seem keen to do it again.

- Existing soils could be fortified with local compost. (See Organic Waste above) In additional to compost comprised of food waste, waste products from fishing (fish guts, bi-catch) are an effective locally sourced compost. Long summer days are ideal for root crops but the growing season will need to be extended with plastic heat retention sytems.
- Some gardeners complained that dogs ate their harvest and so any outdoor gardening will have to consider this.

Greenhouse

- An all-season greenhouse would enable the community to grow edible foods throughout the year. Food grown in the greenhouse could be sold through a community social enterprise to community members, providing a source of fresh foods grown in the community. The greenhouse could also be a valuable site of educational programming through partnerships with the Petit Casimir Memorial school. Aki Energy is currently working with a large foundation to connect high school and elementary students with its farm at Garden Hill.

Chicken Farm

- Garden Hill First Nation has pioneered an approach to raising chickens for meat in northern and remote communities. The chickens are raised in a retrofit shipping container, outfitted as a brooder with heat lamps, roosts, and chipped wood bedding. Soiled bedding is cleared weekly and can be used as compost on community garden sites. A large water container mounted on the roof of the shipping container provides a gravity fed watering

system to the chickens, and the system can be powered through a small solar array with battery back-up. Built on to the side of the container is a small chicken processing facility, consisting of a double sink, chicken plucker and countertops for processing. Production is seasonal, with chicks flown up every 10 weeks from spring to fall.

- Using this system, Garden Hill First Nation has been able to raise 1,200 chickens per year, which are sold to community members through a community-run social enterprise called 'Meechim Inc.". Meechim Inc. has agreed to make the design plans for the chicken brooder freely available to other communities interested in raising chickens.
- Garden Hill is also pioneering a 100 hen barn that will produce 30,000 eggs a year. There is every reason to believe that this could be success in Northlands with barn, feed and materials shipped up on winter road to reduce input costs.
- Local chicken production at Northlands First Nation could create local training and employment opportunities, provide a healthy and affordable source of locally produced food.

Recommendations:

- **Raise chickens in Northlands, based on the model developed at Garden Hill First Nation.**
- **Development of a social enterprise to sell processed chickens, eggs and value added products such as soups.**

Local food processing

Fish processing

The development of a fish processing plant would allow fish harvested from Lac Brochet to be centrally processed for sale outside the community, providing a source of income for fishers. Product could be niche marketed and sold through retail locations such as Neechi Foods, which has a mandate to support the development of First Nation suppliers. The development of a fishing co-op would allow local fishers to market product collectively, and create a structure for the operation and maintenance of the fish processing plant.

Recommendations:

- Development of a fish processing plant
- Development of a community fishing co-operative
- Sale of fish products to southern retailers.
- Fish waste could be composted and incorporated into community gardening projects.

Community smokehouse

- When combined with the development of a fish processing plant and a local fishing co-op, the development of a community smokehouse would allow Northlands fishers to add value to their product, which could then be sold at a higher rate of return to retailers in the south.
- A community smoke house could be an incentive to draw people towards a central meat processing facility and activity.

Local food storage

Community Freezer, Cut-and-Wrap Facility

The development of a community freezer and cut-and-wrap facility would support food security in Northlands First Nation by providing a secure location to process and store traditional foods harvested through individual or community hunts. The community freezer could be run by Chief and Council or a local association of harvesters.

The development of a community freezer could also support the development of a fishing co-op by providing a location to store flash-frozen fish for transport and sale, as well as providing a location to store frozen and processed chicken for local sale.

Recommendations:

- Development of a community freezer and cut-and-wrap facility.

Local food distribution & retail of healthy food

Community Café

There is significant community interest in the development of a local café. This would provide a source of employment, foster local economic activity and provide a public gathering place in the community. The Café could also see healthy options at the Arena and at community events.

There are a number of options in terms of the ownership structure of the café. The café could be run by a social enterprise run by a Board of Directors, through Chief and Council, through the

supported efforts of a local entrepreneur, or through a partnership agreement with the Northern store. Local ownership of the café would maximize local economic development benefits.

Recommendations:

- Development of a local café serving coffee, healthy food, and other locally-sourced goods. Café would be "deep fryer free zone" and serve only healthy options
- Ensure the café has adequate seating to provide a community gathering place.
- Use of multi-use mugs would reduce waste associated with disposable coffee cups

6g: Housing Strategy

Houses in Lac Brochet are predominantly small, crowded, and in poor repair. There is link between the number of inhabitants in a home and tuberculosis. We need to increase the number of homes in the community and increase the energy efficiency in all homes.

There is a multifaceted benefit to improving housing conditions in our community. Elsewhere in this sustainability plan we have focused on the environmental, resilience, and self-sufficiency benefits that can be achieved by a shift away from our dependence upon fossil energy. With improvements to our housing - by meeting our need for more houses with high efficiency homes, by shifting away from diesel as the fuel source, and by repairing and upgrading the existing housing stock, we can not only achieve our energy goals and provide significant local employment opportunities, we can also improve our people's health.

Housing and health

We need to improve our housing to improve our health. In October 2009, the world became aware of a tuberculosis epidemic in Lac Brochet. Our community, along with some other remote Manitoba communities, have recorded some of the highest TB Infection rates in the world since the 1970s. Outside agencies took notice and some initiatives begun. Among them was a study in 2010 by Linda Larcombe of the University of Manitoba. She studied the housing situation in Lac Brochet and published "Housing conditions in 2 Canadian First Nations communities" in the International Journal of Circumpolar Health. The study found a significant association between the number of permanent residents in the house and the presence of TB.

The Larcombe study found that houses in Lac were small (average 882 sq.ft.) compared to the Manitoba average (1,200 sq.ft.). Crowding was evident with an average of 1.1 persons per room [ppr] as compared to a provincial mean ppr of 0.5. More than two-thirds of houses had absent or nonfunctional heat recovery ventilation (HRV) systems. Mould was observed in 44% of the houses.

The need

We need to reduce the persons per room average for Lac. As we move in this direction, we need to build new homes and renovate existing homes so that they have a significantly reduced energy requirement and have much better moisture control.

In 2010, AECOM completed a project to develop a Preferred Community Development Plan. As part of this plan it was determined that Lac Brochet would require an additional 153 housing units to meet the community's housing requirements to the year 2032. A Band Council Resolution (BCR) was issued in October 2012 to adopt the Preferred Community Development Plan. In 2014, this plan was enhanced, slightly modified, and divided for phased implementation.

Suggested approach

The route to achieve this is partly technical and to a certain extent, there needs to be a shift in culture. Our fundamental strategy for housing is this:

- Working through the Kónnn social enterprise and Aboriginal trades training companies, train and employ as many local people as possible to implement our strategy.
- Build community facilities that will move the moisture-generating activities out of the home (e.g. Laundromat). An added benefit of moving these moisture-generating activities out of individual homes, could be an increase in social-gathering places.
- Reduce the number of people per house by building new homes. This means incorporating passive solar energy management, above-code insulation, very well-sealed envelope with heat-recovery ventilation.
- Renovate existing homes that are worthy of renovation. Replace those that are not.

Improving existing homes

There are approximately 140 homes in the community.

In 6c. Diesel Transition Strategy, we describe how we are working on converting from space heating with diesel to heating with biomass from burnt wood. This initiative concentrates on the school and the lakeside cluster of buildings. This source of heat can be expanded to include more community buildings.

However, we would prefer not to include too many homes in this system. Improving energy efficiency and moisture control of existing homes is essential.

Challenges

As mentioned in 6b. Energy Efficiency Strategy, there are a number of factors that make it difficult to improve energy efficiency in homes in Northlands First Nation:

- We estimate that the majority of the homes in the community are not well-insulated or well-sealed to modern standards.
- Insulating a home without improving its vapour seal is not effective. Many of the homes in the community suffer from moisture and mold issues. This moisture is due to a number of factors:
- Due to a housing shortage, there are too many people living in each home.
- There are moisture-generating activities in these homes such as water boiling, clothes drying, and drying of animal hides
- There is a prevalent practice to open windows to manage temperature and moisture.

Noting the challenges with mold and other indoor air contaminants mentioned above, residential buildings in the community should be insulated to decrease energy leakage. Attic, crawlspace, and wall insulation is all recommended, as well as replacing broken or damaged windows and doors, and weather sealing where drafts are present.

Given that most households in the community are of similar standard design and are estimated to be completely uninsulated, energy audits are not required. A standard program of insulating, draft proofing and weather-sealing and the installation of heat recovery ventilators will have significant impact on the energy usage in these residences.

The development of a community-scale building insulating program would provide significant opportunities for Northlands First Nation to provide training and employment opportunities to community members. BUILD Inc. is a program in Winnipeg that trains urban Indigenous people with barriers to employment to insulate low income housing in Winnipeg's north end, and could provide resources in developing a training program in Northlands First Nation.

Recommendations for existing homes:

- Work with Aboriginal trades training companies to get local people trained in building trades.
- Work with Manitoba Hydro to finance and facilitate upgrade of homes.
- Ensure that all houses have functional Heat Recovery Ventilators (HRV).

New housing

In 2014, AECOM completed a study to update the 2012 Preferred Community Development Plan. The updated plan added detail to the 2012 version and included a proposal for phased implementation.

High energy efficiency construction standards

The climate of Lac Brochet is extreme. It does not make sense to build homes in the north to the same minimal level of insulation as homes in the south. It only makes sense to build new homes to a higher standard of energy efficiency. The Passive House design standard is one example of such high efficiency housing design (http://www.passivehouse.ca)

Passive House includes building orientation to achieve passive solar energy management, above-code insulation, very well-sealed envelope with heat-recovery ventilation. New homes built to

Passive House standard have such low energy requirement that they would not need to be tied to the biomass/geothermal district heating system.

Typically homes built to Passive House standards have about an 8% premium on material costs. In Northlands First Nation, this premium will be easily recouped in energy savings. In addition, these homes are extremely comfortable. With a properly functioning HRV, moving moisture generating activities out of the homes, and appropriate occupancy levels there should be no need to open windows in winter.

The first certified Passive House is being built in Sandy Hook near Gimli. Sustainable Building Manitoba has been working with the Canadian Passive House Institute and Manitoba Hydro to train Manitoba building professionals on this approach. If Northlands First Nation works with these agencies, we could become leaders in this field and turn this challenge into an opportunity.

Recommendations for new homes:

- New housing developments should not be designed with diesel as a heating fuel source.
- New homes should be designed to a high standard of energy efficiency, and with heat recovery ventilators. Passive house design should be used as a possible model.
- Work with Aboriginal trades training programs to get local people trained in building trades.
- Work with Sustainable Building Manitoba (SBM) and Manitoba Building Envelope Council (MBEC) to get local people trained in Passive House.
- Work with architects to develop building plans to Passive House standard that are suitable for construction by locally trained tradespeople.
- New housing development design should include district renewable energy systems to provide heat. District biomass energy, lake-loop or vertical bore geothermal systems should all be considered for household heat and hot water.
- New homes should be situated on an east/west axis to take advantage to opportunities for solar energy integration.
- Renewable energy for electrical generation should be considered in all new housing developments to reduce reliance on Manitoba Hydro's diesel grid.

Renewables for heat

Chief and Council at Northlands First Nation have made it clear that the community wants to transition away from diesel fuel, with its associated health and environmental risks. All new housing built, including the proposed 153 unit subdivision development scheduled for phased implementation to 2032, should be designed with integrated renewable energy systems for heat.

The development of the new subdivision provides an opportunity to integrate a renewable energy district heating system, with biomass energy, lake-loop or vertical bore geothermal energy providing the heat source. All buildings should be situated east-west to create opportunities for rooftop solar integration.

7. Sustainability Principles

The Dënesųłiné people have long had an intrinsic, traditional understanding of sustainability. The community considers the sustainability principles found in the Natural Step process to be in general alignment with that traditional understanding.

The Natural Step Sustainability Principles

The concept of sustainability includes the ability of people to meet their basic personal needs. These needs include the infrastructure and resources that allow people to live comfortably and to achieve and maintain their physical and emotional health and well-being.

It is equally important that these personal needs are met in a way that does not make it more difficult for others to meet their own needs. This includes the needs of future members of our community and of society in general.

We are all dependant on nature to provide the basic necessities of life including clean air and water. As well, nature provides the food we eat, the raw materials that provide shelter and many of the objects that enhance our lifestyle.

There are limits on the ability of nature to provide these necessities, and too often we damage nature beyond its capacity to renew itself. For generations the people of the Northlands area lived within the limits set by nature. To be truly sustainable today and in the future, society must re-learn how to exist within the natural cycles of the planet we live on.

Sustainability Objectives

Based on Natural Step sustainability principles, our community sustainability objectives are to:

- **Reduce extraction** - Minimize and eventually eliminate our contribution to the accumulation of substances extracted from the earth
- **Reduce waste** - Minimize and eventually eliminate our contribution to the accumulation of substances produced by society
- **Preserve nature** - Minimize and eventually eliminate our contribution to the physical degradation of nature
- **Meet our needs** - Ensure that all residents are able to meet their own needs and realize their full potential, in a way that does not reduce the ability of others to do the same.