2030 ENERGY STRATEGY
A Path to More Affordable, Secure and Sustainable Energy in the Northwest Territories
August 2017 | Draft for Public Comment
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The Northwest Territories (NWT) is large and sparsely populated, and is remote from much of the population of Canada. Long, cold, dark winters increase the amount of energy needed to stay safe and comfortable. Energy is required to heat and light our homes and businesses, to transport people and goods, and to power our industries. Our energy supply is highly dependent on imported fossil fuels—such as diesel and gasoline—at the same time that Canada and most nations have committed to reduce the use fossil fuels.

This draft Northwest Territories 2030 Energy Strategy (Strategy) sets out the Government of the Northwest Territories’ (GNWT) long-term approach to addressing affordability, security and sustainability of energy supply and use in the NWT. The goal of this Strategy is to guide the development of affordable, secure and sustainable energy for transportation, heat, and electricity, support energy efficiency and conservation, and promote renewable and alternative energy solutions for the NWT.

This Strategy was developed through extensive public engagement that included regional workshops with residents, communities, businesses, Aboriginal governments and other stakeholders across the NWT. What we heard is that we need to address climate change, address energy affordability, and develop the NWT energy potential.

For the Strategy to be successful, the GNWT and its partners—including utilities, governments, communities, residents, business, industry and non-government organizations—must work together, be flexible, and seek funding and investment opportunities.

By 2030, the NWT will have a secure, affordable and sustainable energy system that is less dependent on fossil fuels, and contributes to the economic, social and environmental wellbeing of the Territory and its residents. The GNWT will achieve this vision by following guiding principles in decision making that include shared responsibility, Aboriginal and community engagement, leading by example, as well as transparency and accountability.

This Strategy has six **strategic objectives** to reach the overarching and 2030 vision:

- Work together to find solutions: community engagement, participation and empowerment.
- Reduce GHG from electricity generation in diesel-powered communities by an average of 25%.
- Reduce GHG emissions from road vehicles by 10% per capita.
- Increase the share of renewable energy used for space heating to 40%.
- Increase residential, commercial, and government building energy efficiency by 15%.

**A longer-term vision:** developing the NWT’s energy potential, address industry emissions, and do our part to meet national climate change objectives.

The Strategy takes an adaptive approach to these strategic objectives, which will be re-evaluated after five years to ensure they represent what is achievable given new technology. The strategic objectives will be achieved through action and direction to be undertaken by the GNWT and its partners. The GNWT will develop and release a detailed energy action plan to be included in the final Strategy to ensure that the strategic objectives are achieved.

The GNWT will prepare annual reports on its activities and progress relating to the Energy Strategy, table those reports in the NWT Legislative Assembly, and publish them on the Department of Infrastructure’s website.
In 2016-17, the Government of the Northwest Territories engaged with the public in six regional centres across the Northwest Territories to discuss energy and climate change issues. We met to gather opinions and ideas that would contribute to the development of a new Energy Strategy, and the development of a Climate Change Strategic Framework for the Northwest Territories.

We heard—loud and clear—that we must set realistic and achievable emissions targets. We heard that future carbon tax revenues should be redistributed to those impacted. We heard that energy efficiency programs and financial incentives should be expanded and be more flexible.

This 2030 Energy Strategy reflects the Priorities of the 18th Legislative Assembly. The Government of the Northwest Territories supports the use of energy-efficient technologies, increasing the production and transmission of renewable and alternative energy, and implementing a strategy to mitigate and adapt to climate change in collaboration with other governments and organizations. To do this we are building stronger relationships with community governments and other stakeholders.

While we strengthen our relationships within the Northwest Territories, we fulfill our commitments to Canada and to the world. We work with our federal and Aboriginal partners within the Pan-Canadian Framework on Clean Growth and Climate Change to find alternatives to diesel use in remote communities, improve energy efficiency, promote biomass, and to develop and export our hydropower resources. These initiatives contribute to Canada’s commitments as signatory to the Paris Agreement to reduce greenhouse gas emissions.

These actions align with the goals set out in the Canadian Energy Strategy, including energy sustainability and conservation, technology and innovation and energy delivery.

We are challenged to change. Change can be unfamiliar and difficult. But well-managed change is the pathway to opportunity and growth. By following a strategic path and joining together to address our energy challenges, we can transition to a lower carbon economy, and build a secure, affordable and sustainable energy system to serve the people of the Northwest Territories now and for generations to come.

The Honourable Bob McLeod
Premier of the Northwest Territories
Today, we face the challenge of climate change. To reduce the impact of climate change on our land and people, our pathway to the future, to the year 2030 and beyond, must include our transition to a lower carbon economy.

As the world commits to lower greenhouse gas emissions and to increase the use of renewable energy, I reflect upon our accomplishments. I consider how we will use what we’ve learned to inspire and to sustain one another, and to build upon our successes to create our energy future.

Out of all of Canada’s provinces and territories the Northwest Territories places an impressive second in per capita installed solar electric capacity. A project in Colville Lake is Canada’s first of its type – high-penetration solar technology integrated with a new diesel electricity plant and battery storage. Reducing the community’s greenhouse gas emissions from electricity by 25 percent, projects like this contribute to our 850 kilowatts of installed solar energy generation.

In the installation of commercial-sized wood pellet boilers, we are Canada’s leaders. More than 20 percent of the space heating of government buildings is currently met with the use of biomass. Government leadership has spurred a local industry for wood pellet and pellet boiler supply, with many residents and commercial businesses switching to wood pellet biomass heat.

We are investing in the design of a two to four megawatt wind turbine for the community of Inuvik which, if constructed, could save 1.3 million litres of diesel fuel each year and reduce fuel use in our largest diesel community by 20 percent. A small liquefied natural gas (LNG) storage facility serves the power plant in Inuvik, where LNG successfully displaces 40 percent of the diesel consumed for power generation, lowering greenhouse gas emissions and air pollution.

Each year, we make available millions of dollars through the Arctic Energy Alliance — an organization that delivers programs that make it easier for residents, businesses and communities to invest in energy efficiency and renewable energy solutions. Programs that replace inefficient lighting with LED lights, that supply community woodstoves and provide affordable energy audits for buildings, effectively reduces energy consumption and costs in our communities.

We incorporate new technologies to support our transition to a lower carbon economy. This year in the community of Aklavik, to accompany a 52-kilowatt solar project, the Northwest Territories Power Corporation will complete the Northwest Territories’ first variable speed generator. This technology allows higher amounts of renewable energy to be supplied to the local electrical grid, and could significantly reduce power plant greenhouse gas emissions.

As we continue working towards better ways to generate, distribute and conserve electrical power, we will turn our attention to the energy that we use for space heating and transportation, while practicing conservation and adopting efficient energy technologies to meet our goals.

I look forward to working with our communities and with our industry and government partners to move toward a future of secure, affordable and sustainable energy for the Northwest Territories.

The Honourable Wally Schumann
Minister of Industry, Tourism and Investment
What is this Strategy About?

The Northwest Territories 2030 Energy Strategy (Strategy) sets out the Government of the Northwest Territories’ long-term approach to addressing the affordability, security and sustainability of energy supply and use in the Northwest Territories (NWT). The goal of this Strategy is to guide the development of affordable, secure and sustainable energy for transportation, heat, and electricity, support energy efficiency and conservation, and promote renewable and alternative energy solutions for the NWT.

Energy affordability, security and sustainability are the key goals to this Strategy. Energy affordability is relative, for example energy costs for lower income families can be a big factor in the cost of living. Energy affordability is also relative to southern Canada where it costs less to supply and transport energy. For this strategy affordability relates to either stabilizing energy costs or reducing energy costs over time. Energy security relates to having a supply of secure, resilient, reliable and locally produced energy. Reliability and resiliency are critical as even short interruptions in energy supply can quickly become a public emergency in our cold climate. Part of the high cost of energy in the NWT is due to the requirement to have a secure and reliable energy supply. Energy sustainability is not only related to reducing environment impact, including the urgent need to address climate change, but also local job creation, economic development, and local self-sufficiency.

This Strategy was developed through extensive public engagement that included regional workshops with residents, communities, businesses, Aboriginal governments and other stakeholders across the NWT, written submissions, and a survey. For this Strategy to be successful, the GNWT and its partners—including utilities, governments, communities, residents, business, industry and non-government organization—must work together, be flexible, and seek funding and investment opportunities.

We rely on energy in our daily lives. Access to secure, affordable, and environmentally sustainable sources of energy is essential to the prosperity of the NWT. Energy drives our economy. Energy is essential for everyday living in the North, and everyone in the NWT has a part to play in achieving a more sustainable NWT.

By supporting energy efficiency and conservation, we can reduce the amount of energy used, which results in lower energy bills and reduces environmental impacts.

THE OPPORTUNITIES AND CHALLENGES

The NWT is large and sparsely populated and remote. Long, cold, dark winters increase the amount of energy needed to stay safe and comfortable. Energy is required to heat and light our homes and businesses, to transport people and goods, and to power our industries. Our energy supply is highly dependent on imported fossil fuels—such as diesel and gasoline—at the same time that Canada and most nations have committed to reduce the use fossil fuels. In this context providing affordable, secure and sustainable energy in the NWT is a challenge.

The national and international obligation to address climate change has created an opportunity. The technology needed to transition to a lower carbon economy—such as renewables and energy storage—is becoming less expensive, more secure, and more suitable for use in NWT communities. This changing landscape offers an opportunity to build a more secure, affordable and sustainable NWT energy system.

For communities, supporting energy efficiency and conservation can reduce the amount of energy used, which results in lower energy bills and reduces environmental impacts. By supporting community scale alternative and renewable energy solutions, we can protect against increasing energy
costs over time, make the energy system less reliant of imported fossil fuels, and reduce environmental impacts. These actions will lead to a more affordable, secure and sustainable energy system and help us meet our climate change commitments.

By pursuing larger scale initiatives—such as the Taltson hydroelectricity expansion to export power to the south—we promote economic development, job creation, Aboriginal partnerships, and we do our part to fulfill Canada’s GHG emissions reduction commitments. Transformative projects like the Taltson hydro expansion are a first step in a longer-term vision to connect the North and South Slave electricity grids with the North American electricity system, and—combined with the development of transportation corridors—to connect mines in the Slave Geological Province to renewable and sustainable energy to support industry.

**THIS STRATEGY**

This Strategy provides an overview of the NWT Energy System, including GHG emissions. It includes a summary of What We Heard in the regional public engagements. It then provides a Vision for the energy system in the NWT by 2030, with associated guiding Principles, Strategic Objectives, including targets, and Actions and Direction to achieve this Vision. A Short Term Action Plan will be part of the final strategy.”

### Key Linkages

**CLIMATE CHANGE STRATEGIC FRAMEWORK (CCSF)**

The CCSF set the GNWT’s overall approach to address climate change. It includes the long term approach to both GHG reductions and adapting to the impacts of climate change. This Energy Strategy is the primary mechanism for GHG reduction from energy in the NWT.

**PAN-CANADA FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE (PCF)**

The GNWT is a signatory to the PCF, which is the national plan to address climate change and grow the economy. The NWT has committed to do its part in reaching national GHG reduction targets that Canada committed to under the 2016 Paris Agreement. This Energy Strategy will help us meet our national commitments.

**CANADIAN ENERGY STRATEGY (CES)**

The CES was endorsed by provincial and territorial Premiers in 2015 and provides a common vision to enable a flexible and cooperative approach to sustainable energy development across Canada. This Energy Strategy supports the commitments the NWT made under the CES.
Our Energy Use: How Do We Compare?

The NWT Energy System: Energy and GHG Emissions

Having a secure energy system in the NWT has meant relying on imported fossil fuels—an energy source that contributes to climate change, and causes air pollution. Fossil fuels are generally expensive and the prices are outside of our control.

- Space Heating Mix
  - Natural Gas 99%
  - Other 1%

- Greenhouse Emissions per Capita
  13 Tonnes

- Electricity Mix
  - Hydroelectricity 95%
  - Diesel 5%
  - Solar less than 1%

- Heating Need
  - 7878 HDD

- Isolation means full back-ups

- Natural gas is inexpensive

- More energy options

- Economies of scale

- Natural gas distribution infrastructure

- EDMONTON

- Transmission lines mean more reliability

- Ordinary

- Heated

- Natural gas

- Natural gas oil

- Mixed

- Natural gas and oil

- Natural gas and solar

- Solar and wind

- Wind and biomass

- Wind and hydro

- Hydro and biomass

- Hydro and solar

- Solar

- Mixed

- Other

- Electricity Mix
  - Coal 51%
  - Natural Gas 39%
  - Wind 5%
  - Biomass 3%
  - Hydroelectricity 2%
Heating Degree Days (HDD)
A measure of how ‘cold’ a region is. An average house would use about half a liter of oil per HDD.

Electricity Mix
Sources of energy used to power buildings.

Space Heating Mix:
Sources of energy used to heat buildings.

Greenhouse Emissions per Capita
- Yellowknife: 18 Tonnes
- Fort Good Hope: 10 Tonnes

Space Heating Mix
- Yellowknife: Heating Oil 99%, Solar less than 1%
- Fort Good Hope: Heating Oil 67%, Biomass 21%, Propane 12%

Heating Need
- Yellowknife: 9,137 HDD
- Fort Good Hope: 5,025 HDD

Remote means higher costs

More energy options
Transmission lines mean more reliability

Economies of scale

Natural gas distribution infrastructure
The NWT Energy System: Energy and GHG Emissions (continued)

Most GHG emissions in the NWT are from fossil fuel use. The highest emissions are associated with industrial activity. Other emissions are from heating, transportation, and electricity generation. See figures 1 and 2 for energy use by sectors and GHG emission by sector for the NWT for 2015. Of note is that 12% of the total energy used is electricity; however it represents about 9% of total GHG emissions. This is because most electricity is generated through hydropower. For our remote diesel powered communities, and all other sectors, a heavy reliance on fossil fuels is unsustainable in terms of cost of living and the environment.

Overall energy use in the NWT has increased by about 25% since 2005. In terms of energy use trends by sector, there is a lot of variability in the industrial sector as a result of inconsistent levels of activity in mining and oil and gas sectors. However, total energy use within the industrial sector has increased by approximately 50% over 2005 levels. Energy use in the Residential and Transportation sectors has also increased during this period, while the Commercial, Institutional and Public Administration sectors have exhibited reduced energy use since 2005. It is unclear why this is, although GNWT leadership in reducing energy use is a factor. See Figure 3 for energy trends by sector from 2005 to 2015.

Consider that between 2005 and 2015, energy use in the NWT has increased faster than population growth. This means our energy use per person has increased, which is contrary to the Canadian trend.
WHAT WE HEARD

The GNWT engaged Northerners in all NWT regions throughout the Fall and Winter of 2016/2017 to gather input on the NWT Energy Strategy and the NWT Climate Change Strategic Framework. Workshops were held in Inuvik, Norman Wells, Fort Smith, Yellowknife, Fort Simpson, and Hay River. Summary reports on the regional engagement can be found here. The GNWT also ran an online survey and received written submissions. A one-day workshop was also held among industry, regulatory and government officials to discuss specific Strategy considerations for the electricity sector. Here is a summary of What We Heard:

Maintain Affordability and Help Northerners Make Better Energy Choices

The key message we heard is to maintain affordability. There is broad support for the expansion of renewable and alternative energy, and the use of energy efficiency and conservation practices, but such choices are generally seen as much more expensive. NWT power rates are already high. There is support for setting emissions targets, as long as they are achievable and do not increase energy costs for consumers. Common suggestions we heard to achieve this are:

- Redistribute carbon tax revenues to those impacted and direct the rest into renewable energy projects
- Provide up-front financial incentives to assist consumers in making more energy-efficient purchases
- Expand and increase the flexibility of energy efficiency programs and services

Involve Communities in Energy Development

Participants told us they want more information and involvement in energy decisions. For some people, this means receiving additional information about energy options and why our energy choices matter. For others, it means being a partner in energy planning and decisions, by understanding the choices, contributing traditional and local knowledge, evaluating options, and having a meaningful role in decisions. For some, it means partnering with community and Aboriginal governments and businesses to deliver local energy conservation and efficiency programs. For others, it means they want to be the ones generating energy. The GNWT has heard that more communication and outreach is needed to support all of these aspirations for greater involvement and understanding.

Design Locally Appropriate Solutions

Northerners expressed strong support for local and renewable energy projects and biomass-based heating projects. Recent successful GNWT-funded community-based projects have helped build this support. For example, the Colville Lake Hybrid Solar-Battery project, the Lutsel K’e and Fort Simpson Solar Energy Projects, and the Inuvik Liquefied Natural Gas (LNG) Project. These are proven technologies that enable communities to reduce their environmental impacts. These projects were tailored to the conditions and needs of the community, with considerable community involvement. On the other hand, we heard concern and uncertainty about the economic and environmental impacts of large scale hydroelectricity.

Look Beyond the Communities

Past GNWT energy plans have focused on electricity use. If this Strategy is to set targets for emissions reductions, then we must look beyond community power generation and government energy use and also target fossil fuel used for heating and transportation across all sectors. We must engage the major energy users—the transportation and industrial sectors—as key partners in setting and achieving targets. While our large area, small population, limited infrastructure and remoteness offer challenges, these sectors represent the largest potential to impact energy use. Industry representatives have stated their commitment to support the transition to a lower carbon future and to a constructive partnership, but they need government support. Some suggest making the carbon tax revenue neutral within each sector, and establishing targeted funds for innovation, infrastructure, research and development of energy systems and energy corridors.
Our Vision of the NWT Energy

By 2030, the NWT will have a secure, affordable and sustainable energy system that is less dependent on fossil fuels and contributes to the economic, social and environmental well-being of the Territory and its residents.

This Vision reaffirms the GNWT's commitment to energy affordability and security, while moving the NWT towards a lower carbon economy to address climate change. The Vision places energy decisions within the GNWT's broader goal of promoting the well-being of the NWT and its residents.

Principles, Strategic Objectives, and Actions and Direction in this Strategy will help us attain this Vision.

Our Guiding Principles

The GNWT will apply the following Principles to guide actions and decisions relating to the use, generation, distribution and regulation of energy in the NWT:

- Secure, Affordable, and Sustainable: The GNWT should balance energy security, affordability, and environmental sustainability in its energy decisions.
- Shared Responsibility: Reducing greenhouse gas emissions is a shared responsibility between Residents, Governments, Business and Industry.
- Promote Partnerships: The GNWT should promote partnerships and investment opportunities on energy initiatives—where appropriate—with Aboriginal and community governments, businesses, and industry.
- Aboriginal and Community Engagement: The GNWT should support involvement, empowerment and capacity-building of Aboriginal governments and communities to participate in energy initiatives, exchange information and perspectives, meet local needs and include local and Traditional Knowledge.
- Meet our Commitments: The NWT has a responsibility to contribute to Canada's international commitments to reduce GHG emissions. The GNWT will do its part to help Canada achieve its national GHG reduction target.
- Lead by Example: The GNWT should lead the transition to a lower carbon economy by reducing GHG emissions, increasing the use of renewable and alternative energy, and improving energy efficiency within its own operations.
- Innovation and Impact: The NWT will investigate and promote innovative solutions that are proven, and have the largest impact in our northern context.
- Transparent and Accountable: The GNWT should be transparent and accountable in the implementation of the Energy Strategy.

Our Adaptive Approach

The GNWT has set realistic and achievable Strategic Objectives and supporting Actions and Directions—based on current technology and costs—to achieve its Vision. Technologies improve and costs for energy solutions change over time. Because of this, the GNWT commits to flexible implementation of both the Strategic Objectives and Actions and Directions. Over the course of the 2030 Energy Strategy, the GNWT commits to continuously reassess and validate options and costs of solutions, and adapt the approach to find the best and most economical solutions. The GNWT will re-evaluate the Strategic Objectives after five years to ensure that they represent what is achievable given new technology and opportunities.
What we will achieve

The GNWT has identified a set of Strategic Objectives to achieve its vision of moving towards a lower carbon economy. The Strategy will focus on sector-specific goals that are achievable. All of the targets are for 2030 and are based on a 2015 reference year.

The Strategic Objectives are:

1. Work together to find solutions: community engagement, participation and empowerment.
2. Reduce GHG from electricity generation in diesel powered communities by an average of 25%.
3. Reduce GHG emissions from road vehicles by 10% per capita.
4. Increase the share of renewable energy used for space heating to 40%.¹
5. Increase residential, commercial, and government building energy efficiency by 15%.
6. A longer term vision: developing the NWT’s energy potential, address industry emissions, and do our part to meet national climate change objectives.

How we will achieve it

The GNWT has identified short-term Actions and Directions needed to achieve each long-term Strategic Objective. These include things like specific energy projects, policies, government actions and support, partnerships, communications, engagement, and capacity building.

This section describes the GNWT approach to achieve its six Strategic Objectives. Specific yearly Actions and Direction will be identified through annual work planning and budgeting activities of the government.

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¹ This target represents a doubling of heating from renewable sources from current estimates. Estimate are that biomass accounts for 20% of the heating energy in the NWT. Of this about half if from wood pellets and the other half is cord wood. There is a great deal of uncertainty in the cord wood estimate, and actual amounts may be higher or lower. This target may be modified as we better understand current percentages of renewables for heat.
During the regional public engagement we heard that communities want to be more engaged and to be part of the solution. This included a range of options including being partners in developing solutions, undertaking projects independently, to simply being kept updated on local solutions. The GNWT agrees that our collective know-how and effort is needed, and over the course of this Strategy the GNWT will:

- Support community-based energy projects by providing technical and financial support to help communities advance renewable energy and energy saving projects.
- Provide opportunities for mentorship and hands-on training of community representatives for energy projects,
- Create partnership opportunities in local renewable energy projects for community and Aboriginal governments that support local capacity development
- Support the development and implementation of community-based energy plans
- Provide opportunities for community and Aboriginal governments for non-majority equity buy-in positions in energy projects with a business case
- Create guidelines to support community owned renewable generation in diesel communities.
- Continue to involve and engage communities on energy projects
- Undertake education, energy literacy, curriculum development and outreach initiatives.

**COMMUNICATIONS, ENGAGEMENT AND CAPACITY BUILDING**

The GNWT will continue to engage communities and Aboriginal governments on energy initiatives, in keeping with the principles and approach identified in “Respect, Recognition and Responsibility: The GNWT’s Approach to Engaging with Aboriginal Governments” (2012). GNWT and its partners will work with communities and Aboriginal governments to clarify roles in project design and implementation as appropriate.

The GNWT and its partners will continue to provide understandable and reliable information on energy efficiency and conservation to communities, residents and businesses of the NWT. Effective communication is essential for successful outcomes. The GNWT works with the Arctic Energy Alliance (AEA), which plays a lead role in providing energy information to residents, communities and businesses. With offices in each region, the AEA works one-on-one with communities to answer questions, deliver programs, and support communities in the design and implementation of energy projects.

To support long-term engagement, participation and empowerment, the GNWT will develop energy literacy material for use in NWT schools so that future generations understand the different energy options and emerging technologies, and the impacts of their energy choices on the economy and the environment.

The GNWT will support and partner with communities, Aboriginal governments and community organizations that want to get involved in energy planning and projects to build their capacity. It will provide technical advice, advance project ideas, assist with funding applications, or help to find information, resources and funding that may be needed.

**COMMUNITY ENERGY PLANNING**

The GNWT and the AEA will continue to support the development and implementation of community energy plans. Current community energy planning will include lessons learned from the 2011-12 community energy planning process and focus on implementing solutions.

The GNWT and the Northwest Territories Association of Communities—with input from the AEA—have developed a work plan to provide support to community governments for implementing and updating Community Energy Plans. The GNWT is evolving its capital planning process to promote and encourage the implementation of Community Energy Plans, and is committed to working with community governments and other partners to implement their plans.

**SUPPORT INVESTMENT PARTNERSHIPS**

It is a long-standing government policy that Aboriginal governments should be given the opportunity to partner in larger energy development projects. The GNWT will continue to
seek opportunities to partner with Aboriginal groups to invest in major projects developed on traditional lands that serve new energy markets, such as energy for export. The Talton hydroelectricity expansion is a good example of the type of project that could provide investment opportunities for Aboriginal governments.

For community-based projects, the high cost of energy infrastructure in the NWT means that most renewable or alternative power projects require a subsidy to keep electricity rates from going up. Where the government chooses to subsidize a project, the subsidy will benefit electricity users and no profit will be allowed on those projects.

COMMUNITY-OWNED RENEWABLE GENERATION

What we heard during our regional engagements is that communities want to be part of the solution and want to produce renewable-generated electricity to displace diesel generated electricity. The NWT has adopted Net Metering, which allows customers to install up to 15kW of renewable electrical generation to offset their power use. Customers receive credit for excess power fed back to the utility, credit that can be applied to reduce their power bill. To complement Net Metering, the GNWT will allow community-owned renewable generation as a means for community governments to sell power directly to the local utility to displace diesel use.

This approach is not the conventional independent power producer model where the utility issues a request for more generation to meet increasing

Community-owned renewable generation guidelines

| New community-owned renewable power projects serving customers in a community must be majority owned by a community or Aboriginal government or community-based organization. |
| This policy allows between 15kW and the community based limit of renewable power to be installed in a diesel community and complements the existing net metering policy, which allows up to 15kW per installation. |
| The utility will set total aggregate allowable renewable energy by community to ensure efficiency, reliability and security. |
| Interested parties must verify with the utility that additional renewable energy is practical for the local electrical distribution system and enter into an agreement with the utility before initiating a renewable energy project. |
| Under the agreement it will be the responsibility of the community to operate and maintain its equipment, measure energy generation and bill the utility, unless otherwise agreed to by the utility. |
| The purchase of electricity from community-owned renewable generation must not increase electricity rates, as set by the NWT Public Utilities Board. A generally accepted purchase price is the displaced or marginal cost of diesel taking into account generator efficiency losses and other factors. |
| This policy does not apply to ownership of core utility assets such as transmission and distribution assets or diesel generators. The utility must maintain responsibility for these assets to ensure system reliability and security. |
| System resources intended to keep the community electrical grid stable or increase the amount of renewables that can be installed, such as batteries or solid state electronics, will be owned and operated by the utility to ensure system reliability, unless otherwise agreed to by the utility. |
| A community producing power for sale to the local utility should not be considered a regulated utility. |
| The utility is not responsible to help the community develop renewable energy projects beyond connecting to the electrical system, which may be subject to fees. The community should provide sufficient funding, or seek external funding and support. |
| The utility will provide community interconnection standards that the community must follow in order to safely connect to the grid. |
electricity demand like occurs in the south, but a made-in-the-NWT solution where we do not need more electricity generation, but we do need to displace generation from fossil fuels.

The Community-Owned Renewable Generation guidelines (see breakout box) are intended to ensure that communities and utilities have clear consistent rules that ensure fairness, ensure power produced is affordable and sustainable, help develop sustainable northern communities, support Aboriginal and community involvement, and increase community capacity and self-reliance. It is intended to allow communities to support the transition to a lower carbon economy and be part of the solution. The guidelines also help manage community expectations on how much renewable energy can be installed in isolated communities, as there is technical limitations to how much intermittent power can be installed before a community grid become unstable.

The community of Łutselk’e— with support from the GNWT, the Arctic Energy Alliance, and a private company— recently became a community-based power producer. The community sells solar power to NTPC and re-invests the revenues. Łutselk’e has embraced the project, which displaces about 2% of the diesel fuel used each year for power generation. The project raised awareness of energy issues in the community, and residents are proud to be part of a green energy solution, contributing to the transition to a low carbon economy. To be viable, the project received subsidies from the GNWT, the federal government, and a private organization.
During the regional engagement we heard that reducing reliance on diesel electricity generation in communities was a priority. Community diesel electricity generation produces on average 60,000 tonnes of GHG annually, accounting for on average over several years about 6% of the NWT’s annual emissions. The GNWT and partners will implement renewable and alternative energy solutions appropriate to each community and region to reach the target of reducing GHGs from diesel electricity by 25% by 2030. A 25% reduction equates to a reduction of 15,000 tonnes by 2030 over 2015 levels.

Addressing fossil fuel use in electricity is a priority because the cost of this electricity is high and a significant contributor to the cost of living in the NWT. Through its ownership of the Crown Corporation NTPC the GNWT will work to reduce the amount of electricity generated by diesel to reduce emissions and stabilize electricity costs.

As a primary approach to reduce greenhouse gas emissions in NWT communities, the GNWT will support the displacement of diesel electricity generation through the installation of renewable and alternative energy solutions. Over the life of this Strategy, the GNWT will work with federal, provincial and territorial counterparts to share ideas and seek solutions to reduce diesel use in communities.

Energy solutions might include wind, solar, mini hydro, liquefied natural gas, geothermal, transmission lines, combined heat and power, energy storage, variable speed generators, more efficient generators, and other solutions as they become available.

The GNWT has identified representative options, including GHG reductions, cost, and subsidy estimates, to achieve the 25% reduction target using renewable and alternative energy. Figure 4 shows the breakdown of GHG emissions from the electricity system, how this relates to the 25% reduction target, and the potential solutions to meet the target.

Renewable energy technology has become economic in many places in the south but has yet to become economic in the north. Implementing renewable electricity solutions in the north has so far been more expensive in part due to remoteness, high operating costs, and lack of economies of scale. To date, all recent renewable electricity solutions in the NWT, such as Fort Simpson, Aklavik or Colville Lake solar, have required government subsidies to be economic and not increase electricity rates, even with the high cost of diesel power.

The GNWT will seek federal government support, community and Aboriginal partnerships, and provide resources to ensure that these projects succeed. The GNWT estimates that based on current technology, up to $85 million in subsidies on a $190 million investment will be required over the next decade to reach this target and for projects and not increase electricity rates. This subsidy is calculated based on the value of diesel savings from the proposed projects. This is reasonable as other costs that go into electricity rates do not go away, such as the cost of the generators and distribution systems, when renewables are used to displace diesel.

The GNWT will work with partners to identify the most effective approach to achieving this target over the course of this strategy, taking into account available funding, evolving technology options, and partnership opportunities.

Figure 5 provides a ranking of cost and emissions reduction of representative renewable and alternative energy solutions to help meet the 25% reduction target. The top circles on this graphic show the potential annual GHG reductions for the proposed renewable energy solution to meet the 25% reduction target. The bottom half shows the estimated upfront cost of each solution.

Items to the left are generally more desirable as they cost less per GHG reduction, but may be more expensive overall. Everything else being equal, transmission lines to connect diesel communities to hydroelectricity are the more desirable than Inuvik Wind, even though the upfront cost is higher as compared to yearly GHG reduction, because transmission lines last several times longer than wind turbines, and therefore have higher lifetime GHG reductions. There are other factors involved in deciding what projects to proceed with. For instance, small community solar is easier to implement than a large wind turbine or transmissions lines and might occur first even though the costs per GHG reduced is better for large wind or transmission. Similarly, large wind might be simpler to implement than transmission lines even though transmission has a better cost per lifetime GHG reduced. Availability of funds, and other factors such as community acceptance, can also play a role in what projects proceed first.
Figure 4: Current Energy Mix and Proposed Solutions to Meet 25% GHG Reduction Target

The first part of this graphic shows how electricity is currently generated. Most electricity is generated using hydropower and the remaining is from fossil fuels. The middle represents GHG emissions from electricity generation and the 25% reduction target. The right side of the graphic shows a renewable and alternative energy solution scenario to reach the target.

The GNWT will work with partners to identify the most effective approach to achieving this target over the course of this strategy, taking into account available funding, evolving technology options, and partnership opportunities.
Figure 5: Ranking Cost and Emissions Reduction of Representative Renewable and Alternative Energy Solutions

This graphic provides a ranking cost and emissions reduction of representative renewable and alternative energy solutions to help meet the 25% target. The top circles on this graphic show the potential annual GHG reductions for the proposed renewable energy solution to meet the 25% reduction target. The bottom half shows the estimated upfront cost of each solution.
Inuvik uses more diesel to generate electricity than any other community in the NWT. It also has wind available that is suitable for generating electricity. The GNWT conducted feasibility studies at a site close to the airport, and has concluded that the site would be suitable for 2 to 4 MW of wind power. This could reduce GHG emissions about 6,400 tonnes per year. Historically, larger scale wind turbines were not designed for use in our cold northern climate. Turbine technology with cold weather enhancements now makes operation in extreme cold conditions possible, as proved out by the success of the 9.4MW wind farm at the Diavik Diamond Mine. Wind power is viable in Inuvik, and this is a priority project.

A few smaller communities have wind speeds suited for small wind turbines that could be installed to reduce diesel generation. In the past, small turbines were ill-suited to the NWT’s cold climate. However, wind turbines can now be delivered with features that make them more robust and reliable for cold climate use. Small wind turbines can be installed to reduce diesel use in remote communities year-round. They have the potential to annually produce more electricity than solar, which is limited in the winter. If small wind were installed in two communities GHG emissions could be reduced by about 600 tonnes a year.

Connecting diesel communities to renewable hydroelectricity would almost entirely eliminate diesel use, except for emergency backup electrical generation. There are three communities close enough to be connected to existing hydroelectric power transmission lines—Fort Providence, Kakisa, and Whatì. If these communities were connected, GHG emissions would be reduced by about 4,500 tonnes per year. No additional generation would be needed as they would use surplus hydropower that is presently available in the Snare and the Taltson hydroelectricity systems.

The GNWT expects that small wind turbines will be able to reduce diesel use in remote communities year-round.
Natural gas could replace diesel fuel for power generation at road-connected communities.
Liquefied Natural Gas, or LNG, is transported and stored in low pressure, insulated tanks and has proved to be cost-competitive with diesel for electrical generation in Inuvik. Though it is a fossil fuel, LNG produces 25% less GHG than diesel fuel at the point of combustion. If LNG was used in Fort Simpson and Tuktoyaktuk, GHG emissions would be reduced by about 1,500 tonnes per year. Depending on the price of diesel and how far the LNG must be shipped, LNG-produced electricity can be cheaper than diesel-produced electricity. In Inuvik, the GNWT is successfully replacing diesel with LNG—and is saving money. It makes sense to expand the use of LNG to other diesel communities, with the focus being on communities with all-season road access to enable year-round delivery of LNG. Regular delivery of LNG avoids the need to build larger and more expensive LNG storage tanks, a significant capital cost component.

The NWT has long daylight hours in the spring and summer, and can harness solar power for up to 8 months of the year. The solar resource available each year in NWT and in Ontario is similar, but NWT solar is less available in the winter and more available in the summer. Solar panels are in common use and the cost of panels has decreased by 50% since 2010. It is not the cost of the panels that makes solar expensive in the NWT, but the cost and logistics of shipping and installing solar panels that represents the biggest expense in the NWT. This added cost of operating in the north means that solar electricity will likely continue to be uneconomic without subsidies—even considering the high cost of diesel power.
Solar power also has technical limitations. Diesel power and solar power must work together. Too much solar electricity affects the electricity distribution system and causes conventional diesel generators to work less efficiently. That is why solar power delivers only a 2 – 4% reduction in diesel use. Add more solar, and the electricity system becomes unreliable. But, solar power paired with special variable speed diesel generators or energy storage such as batteries allows for more installed solar capacity and more efficient power production. This results in greater GHG reductions than solar alone, and can reduce diesel use by 20%, or more. The Colville Lake solar-battery system and the Aklavik solar variable speed generator pilot projects demonstrate that community-based high penetration solar can be successfully implemented in the North. A slate of solar panel solutions paired with battery storage and variable speed generators in twelve NWT communities will result in 2,000 tonnes of GHG reduced per year.
During our public engagement sessions, we heard that, though it will be challenging in the NWT context, the GNWT should address emissions from the transportation sector. Large distances between communities, and the distance from southern markets, means that goods and people must travel much farther than in most southern jurisdictions. Distances and cold weather are challenges for alternative fuel options such as electric vehicles and biofuels. In general, to reduce costs and emissions for transportation the following range of initiatives are possible: drive less, use alternative modes of transport such as cycling or public transit or less air transport and more marine transport, use smaller vehicles and more efficient electric or hybrid vehicles for commuting, and use less GHG-intensive fuel sources, such as renewable electricity.

In 2015, the transportation sector produced approximately 915,000 tonnes of GHG, or approximately 63% of total NWT emissions. Of the total transportation emissions road transportation accounted for 77% and aviation accounted for 12% of the total with the remaining generated by railway and marine transport. Of the road vehicle emissions heavy duty diesel equipment accounted for 90%—mostly from large industry (off-road) and transport trucks that bring us food, goods and fuel. Small vehicles such as cars and light trucks were responsible for 10% of road transportation emissions.

The GNWT is committing to reducing GHG emissions from road transportation by 10% by 2030 over 2015 levels on a per person basis. With a population of approximately 43,000 the per person emissions from road transportation is 16.5 tonnes per person, and a 10% reduction is 14.9 tonnes per person.

Reducing emissions from aviation requires a national approach to efficiency and fuel standards. It is a similar situation for road vehicle and marine fleet efficiency standards. The GNWT will advocate at the national level for higher efficiency standards for road, air and marine transportation. The GNWT will lead by example, making wise choices in the selection and operation of vehicles and heavy equipment, improving efficiency of vessels and taking advantage of new technologies as it replaces and retrofits its marine fleet and ferries.

Given this context, the GNWT is committed to the following activities to reach the emissions reduction target for this sector:

- Support community-based transportation initiatives that reduce emissions, such as active transport, public transportation, and car sharing programs.
- Lead by example, implementing fleet management for vehicles, heavy equipment and marine fleet.
- Pilot a grant program for hybrid plugin electric-gasoline vehicles and charging stations for hydro communities.
- Support the installation of in-line auxiliary heaters for fleet vehicles and heavy duty vehicles to reduce idling.
• Undertake an education and awareness campaign to encourage efficient vehicle choice, “Smart Idling”, efficient driving practices, and alternative transportation choices.
• Periodically assess the status of LNG and biofuels for transportation in the NWT context, including availability, price, long-term storage and cold weather stability. Pilot biofuel use in the NWT once the technology is deemed suitably mature for our northern context.
• Work with the federal government to ensure that renewable fuel standards are applicable to the North.
• Work with the federal government to continually improve vehicle efficiency standards.

HYBRID GASOLINE-ELECTRIC VEHICLE PILOT PROGRAM

The GNWT will offer a pilot grant program for the purchase of hybrid gasoline-electric vehicles in communities that are serviced by hydroelectricity. The program will provide a subsidy for eligible vehicles and installation of charging stations. The GNWT and AEA tested a hybrid gasoline-electric vehicle and found that the technology works in our climate and does result in GHG reductions, but has a higher up-front purchase cost.

GOVERNMENT LEAD BY EXAMPLE: GOVERNMENT FLEET MANAGEMENT

Government will lead by example by undertaking fleet management for its vehicles. Fleet management will increase the efficiency of vehicles within the fleet, and change driving habits. Fleet management includes the following elements:

• Fleet right sizing – dispose of older and larger fuel-inefficient vehicles, improve fleet management to optimize asset life-cycle management, develop fleet utilization standards so the right vehicle is chosen for the task.
• Assess the percentage of LNG and hybrid vehicles that can be integrated into the government fleet based on application, and maximize these opportunities.
• Implement fleet management software to manage and track performance.
• Continue training and communications on fuel efficient driving.
• Pilot the use of auxiliary heaters to reduce idling vehicles. These heaters keep fluids and cabs warm during rest periods in cold weather, allowing vehicles to be turned off rather than idling, greatly reducing vehicle emissions.

If successful, the GNWT will offer a grant and education program to assist businesses with the purchase of in-line fuel heaters and auxiliary power heaters for fleet vehicles and heavy duty vehicles.

The GNWT will advocate at the national level for higher efficiency standards for road, air and marine transportation.

Arctic Energy Alliance Electric Vehicle Pilot Project

In 2014, the Arctic Energy Alliance piloted the use of a Chevrolet Volt in Yellowknife to test the vehicle’s efficiency and effectiveness, especially in cold weather. The Volt can be charged by plugging into a regular household outlet or with an electric vehicle charging station, which is a specially designed outlet that charges faster. The vehicle also has a gasoline generator to recharge the batteries for long distance travel. The pilot project demonstrates that electric vehicles is reliable and can effectively reduce vehicle emissions in hydro-powered communities, but a subsidy is required for the vehicle to be cost effective given the higher purchase price of the vehicle.
COMMUNITY-BASED INITIATIVES

There are two main ways to reduce emissions from transportation—reduce distances driven, or increase the efficiency of the vehicles being driven. The GNWT and the AEA will work with NWT communities to identify and implement programs to assist them to reduce their emissions from transportation. Programs may include the following:

**Community Based Solutions:** Within larger population centres such as Yellowknife, programs aimed at increasing use of public transit (e.g. subsidized bus passes). Viable solutions include carpooling and car sharing initiatives, and improving the fuel efficiency of transit vehicles.

**Active Transport:** Active transport means walking, cycling (or skiing or snowshoeing!) instead of driving. This reduces vehicle emissions, saves money by burning less fuel, and promotes personal health and well-being. Existing programs and competitions, such as Walk-To-Tuk and Commuter Challenges promote active transport. Expanding similar programs to run year-round or making it easier or safer for residents to choose active transport, such as building a sidewalk along a main road, may create incentives for people to leave their vehicles behind more often.

EDUCATION AND AWARENESS

The GNWT will undertake an education and awareness campaign to promote green driving behaviour such as smart idling, efficient driving practices, encourage efficient vehicle choice, and promote alternative transportation choices such as transit, car-pooling or ride-sharing, and active transport. This action will support and complement many of the other actions listed.

VEHICLE STANDARDS AND BIOFUELS

The GNWT will continue to work with the federal government to continually improve vehicle efficiency standards, and to ensure that renewable fuel standards are appropriate for the North. The GNWT will periodically assess the status of liquid biofuels—such as biodiesel and ethanol—for transportation. Their use will be assessed in the NWT context, including price and availability, stability in long-term storage and at low temperatures, and cold weather performance. It should be noted that biofuel can still cause air pollution, and have land use and potential food security concerns.
Community space heating is a significant contributor to the cost of living and GHG emissions in the NWT. Community heating with fossil fuels produces about 190,000 tonnes of GHG per year, or approximately 13% of total NWT emissions. Space heating in the NWT is primarily fuelled by heating oil, propane and renewable biomass. We heard from the public that the GNWT should support the greater use of renewables for heating to make heating more affordable and sustainable.

Wood pellets are considered to be a renewable resource when harvested sustainably. Currently, it is estimated that 20% of non-industrial heating needs in the NWT are met by biomass such as cord wood or pellets. There is some uncertainty in this estimate and the GNWT will work with its partners to better understand how much wood is used in the NWT, and the potential to expand the use of renewable energy for heat in the NWT.

This strategy sets a target of increasing the share of heating met by renewable energy to 40% by 2030 over 2015 levels. This represents a reduction of 47,500 tonnes of GHG reduction over current emissions.

A promising way to increase the use of renewable energy is to encourage greater uptake in the use of biomass for heating. In the short-term, the GNWT will continue to expand the wood-pellet supply chain including local production, support the early adoption of wood-pellet boilers in communities, and provide incentives to switch to wood fuel for heat.

Currently in South Slave communities that receive electricity generated by the Taltson hydroelectric project, electric heat is available to consumers at a reduced rate that is less than the cost to heat with oil. The GNWT and its partners will promote this program and look for ways to improve it.

The GNWT will lead by example and continue to install biomass and electric heating in new and existing government buildings. The GNWT and its partners will also support renewable heating options in Yellowknife schools and in larger commercial buildings.

The GNWT will investigate and will consider supporting other technologies, such as heat recovery, combined heat and power, heat pumps, district heating and solar heating, and will continue to assess advances in technology, products and methods that contribute to our long-term energy solution.

Over the course of this Strategy—to meet its 40% target—the GNWT will:

- Release and implement the Forest Industry Development Strategy.
- Create a community-based firewood harvesters support program.
- Inventory large non-government commercial buildings for biomass heating potential and support biomass adoption.
- Review AEA programs and services to better support renewable heating.
- Continue to support and expand the biomass supply chain.
- Choose biomass and renewable-based electric heating over fossil fuel heating of GNWT buildings.
- Evaluate, and if viable, encourage expansion of solar heating, and assess its potential for wider deployment and GNWT support.
- Support biomass and residual districting heating systems.

Figure 7: Current Energy Type for Community Heating
BIOMASS SUPPLY

While firewood has been—and continues to be—a common fuel source for heating homes in the NWT, expansion of biomass energy supply is challenged by the absence of major forestry activities, as well as limited road transportation infrastructure. Wood pellets or chips are most commonly produced from waste wood from timber harvesting and processing. The NWT does not have a low-cost supply of waste wood, so we must harvest trees to produce pellets or gather biomass from other sources, such as road building, forest clearing, burn areas, or waste materials. Most wood pellets used in the NWT are imported from Alberta or British Columbia. Local pellet production is on the horizon, a development that will create local economic development and jobs, and may reduce the cost of pellets. Wood pellets are generally a less expensive heating source than heating with oil or propane. Wood pellets are also considered to be a renewable resource when harvested sustainably and are therefore carbon neutral.

The GNWT is developing a strategy for our forest industry in co-operation with Aboriginal governments and organizations. To support job creation and business opportunities in the forest industry, the GNWT has negotiated Forest Management Agreements with Aboriginal development corporations. Completing this forest strategy will facilitate the sustainable growth of the NWT’s forestry industry, which will increase the accessibility of local biomass supplies for energy production in communities.

Complementary to this, the GNWT will work with the AEA and communities to establish a new program to support community-based firewood harvesting, to encourage small business opportunities, provide a stable local supply of firewood, and support increased use of cord wood for space heating.

BIOMASS USE

The GNWT is committed to expanding the use of biomass for space heating in the NWT. To understand the needs, opportunities and barriers to increased biomass use in the NWT, the GNWT will refine its estimates of biomass use for heating. The GNWT will undertake an assessment of the quantity of cord wood, wood chips and pellets used in residential, commercial and government applications.

AEA currently provides rebates for the purchase of residential wood stoves and wood-pellet stoves. Funding is also available to community governments, businesses and individuals to support the purchase and installation of biomass heating systems such as pellet boilers. These popular programs promote the installation of biomass-fired boilers and biomass district heating systems, among other renewable technologies. The GNWT will continue to provide funding to the AEA to continue and expand on their success in these programs.

The GNWT will support the installation of biomass boilers in larger privately owned commercial buildings, which are currently too large and costly to be funded through the current AEA programs. Replacement of large oil fired boilers with biomass boilers produces significant GHG reductions.

The GNWT will lead by example and continue to install pellet boilers in new and existing government buildings and facilities across the NWT, using the GNWT Capital Asset Retrofit Fund (CARF). With twenty-eight biomass boiler systems as of the end of 2016, the GNWT met 24% of its total heat load.

DISTRICT HEATING SYSTEMS

Burning diesel and natural gas to generate electricity is inefficient. Sixty-five percent of the energy produced is typically lost as waste heat. That heat can instead be recovered and used to heat nearby buildings. There are also opportunities to build district biomass boilers. This reduces the amount of fuel transported, stored and used for heating. The GNWT will support opportunities to make use of residual and biomass districting heating for buildings in the NWT.

OTHER RENEWABLE HEATING TECHNOLOGY

Solar energy can also be used for space and water heating purposes. Through the AEA, the GNWT promotes the use of solar air and water heating systems, and offers rebates for residential and commercial applications. The GNWT and its partners will continue to research, monitor, test and promote new technologies for use in the NWT.
During the regional public engagement we heard that supporting building energy efficiency is key in addressing energy affordability and reducing greenhouse gas emissions in the NWT. In fact, energy efficiency and conservation are often the least cost solution and easiest to implement. For this reason energy efficiency is being pursued as an objective in this Strategy, and will help meet the other Strategic Objectives. Energy efficiency—in heating and electricity in particular—will help the NWT reach its objectives and targets.

In terms of measuring this target, energy efficiency can mean many things. For this Strategy, energy efficiency refers to the reduced total energy use for buildings in residential, commercial, public/institutional settings combined, and for spacing heating and electricity on a per person basis. This will allow us to compare energy use now with future use in buildings—even with population changes. In 2015, 133 Gigajoules per person was used on average for commercial, residential and government buildings in the NWT. A 15% improvement means a reduction of about 20 Gigajoule to 113 Gigajoules per person of energy use for commercial, residential and institutional building. This is the target.

The GNWT delivers energy efficiency and conservation programs and services to the public through the AEA. These programs help many people and organizations across the NWT, and are in high demand. The GNWT is a major energy user in the NWT, and leads by example through efficiency upgrades in its buildings and through the activities of NWT Housing Corporation to continuously improve energy efficiency in government buildings. Over the course of this Strategy, the GNWT will continue to lead by example and:

- Enhance support to the AEA’s energy efficiency and conservation programs.
- Regularly review AEA programs and services for efficiency and effectiveness.
- Introduce new AEA programs including, for example, a whole building retrofit energy-rating grant program and support for low income home owners.
- Engage with the tax-based communities around potential changes to the Cities Towns and Villages Act that would enable community governments to set up programs that help finance energy efficiency retrofits.
- Continue the Capital Asset Retrofit (CARF) Program.
- Enhance energy efficiency and conservation education and outreach.

GOVERNMENTS LEADING BY EXAMPLE: REDUCING GNWT ENERGY USE

The GNWT Capital Asset Retrofit (CARF) program uses money saved through energy efficiency improvements to government buildings to fund further improvements. Government facilities are significant energy users, and this program has effectively reduced GHG emissions in the NWT. The GNWT will continue the CARF program and continue to improve the energy efficiency of government buildings.

The GNWT has set a target to exceed the 2011 National Energy Code for Buildings by 10% for new government buildings. The 2015 National Energy Code of Canada for Buildings has been released, and the GNWT is reviewing this to determine if a similar target can be reached with the new code.

Figure 8: Energy Types Used to Heat NWT Buildings
HOW WE WILL ACHIEVE IT

SUPPORTING PUBLIC ENERGY EFFICIENCY

The GNWT will enhance support to the AEA as the lead agency providing energy efficiency and conservation programs and services in the NWT. The GNWT will conduct a review of AEA programs and services to ensure that funding is achieving best results, that the programs meet the needs of the NWT, and that the programs align with the objectives of this Strategy.

Additionally, the AEA will be funded to expand the energy efficiency, conservation and renewable energy program to include eligibility for non-profit organizations, include new and retrofit whole-building energy rating grants, and provide support for low income home owners, for example.

The GNWT will also look for ways that community governments can support energy efficiency. The GNWT will engage with community governments to get feedback on proposed amendments to the Cities, Towns and Villages Act, amendments that would enable communities with sufficient capacity to provide loans to assist residents and businesses to improve the energy efficiency of their properties.
A Longer Term Vision: Develop the NWT’s energy potential, address industry emissions, and do our part to meet national climate change objectives.

The NWT has significant conventional, renewable and alternative energy potential. Developing this potential improves our economy, creates jobs, and ensures a more sustainable energy system for the NWT and Canada.

We heard consistently from the public that the GNWT must do more, be more innovative, and address industrial emissions. Connecting the NWT to the North American electrical grid, connecting the North and South Slave electrical systems, and connecting industry to renewable energy, are initiatives that would significantly reduce GHG emissions, and reduce the cost of living and doing business in the NWT. Developing the Taltson hydroelectric system would enable the NWT to make a significant contribution to the national GHG reduction targets agreed under the Paris Accord.

The construction of all-season transportation corridors to mining development in Slave Geological Province and to the community of Whatì could allow us more economically build transmission lines to link renewable hydroelectricity to industry. Extending the Mackenzie Valley Highway will provide an opportunity to bring renewable energy such as wood pellets to more communities. Having road access makes energy more accessible and affordable. Extending the all-season highway system and developing affordable and sustainable energy systems are interlinked.

Over the course of this Strategy the GNWT will:

- Do its part to meet national GHG reduction targets.
- Advance the Taltson hydropower expansion project and transmission line connection to the North American electricity system.
- Advance opportunities and partnerships to connect the North and South Slave electricity systems together and connect to industrial developments.
- Support and partner with industry to increase renewable energy use and energy efficiency to reduce GHG emissions and make industry more competitive.
- Explore and undertake feasibility of emerging technologies to applicability to the North and look for opportunities to partner with energy leaders.
- Seek opportunities to replace diesel with liquefied natural gas for heating and electricity.
MEETING NATIONAL CLIMATE CHANGE OBJECTIVES: TALTSON HYDROELECTRICITY EXPANSION AND CONNECTION TO SOUTHERN GRID

The Taltson hydroelectric system has additional capacity which is not currently being harnessed to produce power. A 60 Megawatt (MW) expansion next to the existing 18 MW hydro plant on the Taltson River could deliver green energy to market within 5-10 years. This would rely on existing water storage with no new flooding, and would include a transmission line to connect to the southern grid. In the longer term, future phases of expansion could add up to 140 MW.

The purpose of this project is to export clean renewable power south to displace coal use, contributing to national GHG reduction targets and providing a long-term revenue stream that can be invested in the North. Revenues could fund energy projects that would stabilize the cost of energy in the NWT and make energy development a net contributor to the NWT economy.

If the Taltson project can be connected at either Alberta or Saskatchewan, it has the potential to save as much as 360,000 tonnes of GHG emissions a year for the life of the facility, likely to exceed fifty years. This is equivalent to displacing about 25% of the total GHG emissions of the NWT.

To make this project a reality, partnership with provinces or with industry, and federal support, will be required. Should this project proceed, the GNWT will offer equity investment opportunities to Aboriginal partners. Finding a market for Taltson energy is a key priority at this time.

SUPPORTING INDUSTRY

Connecting the North and South Slave grids, and expanding the Taltson system, would pave the way to connecting industry to clean renewable hydroelectricity. Hydroelectricity could provide industry with access to cheaper, renewable power, lowering energy costs for current and future development. As industry is the largest energy user, connecting industry to renewable power will result in a significant reduction in GHG emissions.

The biggest challenge for this action is the initial cost of connecting the widely dispersed, short duration industrial customers to the distant hydropower systems that serve our largest communities. Federal infrastructure funding is required to make this possible, as are long-term partnerships with industry. This investment would develop the long-term economic and environmental sustainability of the NWT.

Outside of transmission expansion to connect industry to hydroelectricity, there is the potential for the GNWT, and its Crown Corporation, NTPC, to work with industry and institutions to study and deploy new technologies, and to partner with industry to fund renewable energy projects.

LIQUEFIED NATURAL GAS

LNG is natural gas that is cooled to a liquid state. It is odourless and non-toxic, and can be safely and efficiently transported over long distances to locations not supplied by pipeline. It is a cost-effective alternative to diesel fuel for electricity, heating and transportation applications. The combustion of natural gas results in 25% less greenhouse gas emissions than diesel fuel, per unit of energy.

LNG is presently used for power generation in Inuvik—accounting for approximately 40% of power production—with the rest coming from diesel. Feasibility studies have been carried out to assess the business case for LNG power generation in Fort Simpson and Tuktoyaktuk. Small-scale LNG supply facilities could be developed in other NWT communities as additional natural gas resources are developed. There is potential to expand LNG use even more with all-season road transportation corridors.

EXPLORE EMERGING ENERGY TECHNOLOGIES

While there is potential for many forms of renewable energy throughout the NWT (hydro, solar, wind, geothermal, biomass), not all are proven to function reliably in a cold, remote environment. The GNWT will continue to monitor emerging technologies and will look for opportunities to partner with leaders in these fields to pilot promising new technologies within the NWT (See Figure 9 for details).
Figure 9: Emerging Energy Technologies

**BIOENERGY**
- Proven viable and cost effective for heat
- Local air pollution reduced GHG
- More complex for electricity
- Well established technology and local resources

**BIOMASS COMBINED HEAT AND POWER**
- Proven technology but scale issues for use in NWT
- Local air pollution reduced GHG
- Heat and electricity
- Local biomass preferred for better economics

**NATURAL GAS**
- In use now in the NWT for power
- Less expensive than diesel
- Still produces GHGs
- Imported, but local resource may be available

**ENERGY STORAGE**
- Already in use in the NWT
- Costly
- Allows for ↑ renewables, ↓ GHG
- Short lifespan

**ELECTRIC THERMAL STORAGE**
- Uses electricity to store heat for later use
- Untested in the NWT
- A way to use surplus hydropower

**LIQUID BIOFUELS**
- Issues with cold weather and storage
- Options for gasoline and diesel replacement
- Technology is quickly advancing
- Potential environmental impacts from productions and food security

**GEOTHERMAL**
- Significant theoretical potential in the NWT
- Requires costly test wells before investment
- Established technology
- Small scale could result in costly power

**ENERGY FROM WASTE/BIOGAS**
- Beginning to be used in the South
- Unproven in cold climate
- Unknown viability for vehicle use
- Local resource may be too small

**SMART GRIDS AND DISTRIBUTED GENERATION**
- Becoming more popular and available
- Remote communities already distributed,
- Smart meters already piloted in NWT
- May be the future of generation in remote communities

**VERY SMALL NUCLEAR**
- None are licenced for use in Canada
- Cost of power is unknown
- Requires community acceptance
- Could be used for heat and power
The GNWT will prepare annual reports to track and communicate its activities and progress towards its Strategic Goals. Annual reports will be tabled in the NWT legislative Assembly yearly and made available through the INF website, with printed copies available and on request.

The GNWT will review this Strategy in five years, and will update the Strategy and related Strategic Objectives if needed.
FOR QUESTIONS, COMMENTS OR FEEDBACK PLEASE CONTACT

MAIL: Attention Energy Division
DRAFT ENERGY STRATEGY PUBLIC COMMENT
P.O. Box 1320, Yellowknife, NT, X1A 2L9

OR

Drop off comments in a package to:
Reception, 2nd Floor Stuart Hodgson Building
5505 - 49 Street Yellowknife, NT

EMAIL: NWTENERGY@GOV.NT.CA
WEB: WWW.NWTENERGY.CA
If you would like this information in another official language, call us.

English
Si vous voulez ces informations dans une autre langue officielle, contactez-nous.

French
Kīspin ki nitawihtīn ē nīhiyawihk ōma ācimōwin, tipwāsinān.

Cree
Tłíchǫ yati k’ējë. Di wegodi newô dé, got’s’o gonedë.

Tłíchǫ

?erihtl’is Déne Súłiné yati t’a huts’elkēr xa beyāyati thezi qat’ē, nuwe ts’en yōtī.
Chipewyan

Edi gondi dehgāh got’je zhati k’ējë edati’ēh enahddhē nide naxets’ē edahlī.

South Slavey

K’āshshō got’jne xada k’ě hederi ɂdējhtl’ē yerńwē nide dů口腔.

North Slavey

Jii gwandak izhii ginjik vat’at’įjáchč’u u zhit yinohtohan ji’, diits’āt ginohkhii.

Gwich’in

Uvanittuaq ilitchurisukupku Inuvialuktun, ququaqluta.

Inuvialuktun

Ҫ̨ḌĊƉNu康养bĐ’_vendorajaŋḳ ɂłεł̣jεł̣jεł̣j Ḳaƞų’ḥ, Ɖųʔŋ̣ Ɖųʔŋ̣ Ɖųʔŋ̣ Ɖųʔŋ̣ AUGḅ.

Inuktut

Hapkua titiqqat pijumagupkit Inuinyaqtun, uvaptinnut hivajarlutit.

Inuinyaqtun

Aboriginal Languages Secretariat: 867-767-9346 ext. 71037  Francophone Affairs Secretariat: 867-767-9343