

# CLIMATE CHANGE AND ENERGY POLICY PAPER

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Presented by



*Alternatives North*

## **Introduction**

Alternatives North is a social justice coalition operating in the Northwest Territories.

Within our ranks are representatives of churches, labour unions, environmental organizations, women and family advocates and anti-poverty groups. Individual citizens are important participants in our work.

This document was produced entirely by volunteer members of Alternatives North and is a result of a collaborative process. The writing style is not always consistent, but that simply reflects that many people have contributed.

An earlier version of this document was submitted as part of the GNWT's consultations on energy and climate change. We have now updated it with an expanded section on carbon pricing in response to the discussion paper by the Department of Finance.

We start with the over-all approach to climate change and summarize what we all agree on:

- that climate science demands that we all must rapidly switch to renewable energy,
- that NWT targets should be to reduce greenhouse gas emissions by 50% over each of the coming decades and to achieve 100% renewable energy by 2050,
- that renewable energy credits / carbon offsets offer a temporary way to rapidly take action, and should be considered “the right thing to do” in the same way that recycling is viewed by many people,
- that GNWT energy initiatives must be rigorously evaluated to prove that they are the most cost-effective way of achieving the transition to renewable energy

We have added an analysis of carbon pricing and how it fits within the over-all approach:

- The GNWT energy strategy should be synchronized with GNWT carbon pricing policy and vice-versa. They are both trying to achieve similar objectives and should not be developed in isolation.
- a \$50/t Carbon price alone is not high enough to stimulate the required transition to renewable energy
- Neither funds nor policies or legislation announced so far are enough to stimulate the required transition to renewable energy
- In order to have a reasonable chance of creating a real transition to renewable energy, the carbon price should continue to increase up to at least \$200/t over the next 10 years and the carbon price revenues should be re-invested in assisting individuals, businesses, government and industry switch to renewable energy.
- Some Carbon revenue should be returned to low income earners even though many of them are already protected through government subsidies and supports
- Carbon pricing and funding of renewable energy investments are just two tools in the GNWT climate change toolbox. A coherent energy and climate change strategy should use all these tools, including regulation.

We conclude the document with a list of suggested policies that should be evaluated in more detail and added to the over-all climate change and energy strategy.

## **Overall Approach to Climate Change Policy**

### The Science of Climate Change

The science behind climate change is clear. We agree with the GNWT that “Climate Change is one of the most serious environmental, economic and political challenges of our time”, that “The NWT is warming at a rate four to five times faster than global averages and this is causing significant changes in the natural environment.”, and that “Risks to economic, social and cultural values in NWT communities will intensify if climate change continues.”

It is clear that the faster greenhouse gas emissions are reduced, the less severe the total warming effect will be. World leaders agreed in November 2015 to try to limit warming to 1.5 to 2.0 degrees C, with Canada promoting the 1.5 degree C limit. Global temperatures have already risen 0.8 degrees C from pre-industrial norms and climate models show that even with the most aggressive emission reduction scenarios, the planet will warm beyond 1.5 degrees C. The hope is that, by eliminating greenhouse gas emissions by 2050, the planet will cool back down to 1.5 degrees total temperature rise by 2100. This will only happen if every jurisdiction unreservedly commits to meeting or

exceeding the science-based targets, halving their emissions each decade from now onwards. (Rockström, 2017)

### Be the change we want to see in the world

Climate change is perhaps the largest “tragedy of the commons” that humanity has ever faced. According to this concept, no single individual can make a difference if the rest of the community does not cooperate. Some form of collective commitment is needed. A specifically northern example of this phenomenon would be efforts to save the caribou herds. If everyone doesn’t play his or her part in the solution, failure is virtually guaranteed.

For climate change – all individuals, businesses, organizations, and governments share a collective responsibility to work together to ensure that greenhouse gas emissions are reduced to a level that will allow global temperatures to return to normal. In such a situation the saying, “*Be the change you want to see in the world*” applies. If everyone adopts the attitude that solving climate change is a mutual concern, the potential “tragedy of the commons” will instead have a happy ending.

The NWT is made up of individuals, businesses, industry, organizations and several layers of government. All have an opportunity to “*be the change that is required*” by adopting policies to switch to renewable energy, and to encourage positive action by other actors. At an ethical level, individuals can see what is required and make the changes voluntarily, assuming they have viable options and the resources necessary to allow them to make the right choice.

Organizations and corporations must also be able to “be the change that is required”. Under current law, publicly traded corporations are required to operate in such a way that they must seek to return maximum financial value to their shareholders. They are somewhat constrained, therefore, to only take actions that do not unduly reduce their short-term bottom-line, despite the ethical standards of the individual members of boards of directors and shareholders. Governments, as legislative bodies that can write laws and set regulations and standards, bear a large responsibility to help enable, encourage and demand responsible action from all stakeholders, including from organizations and corporations. This is a critical addition to the action they can take within their own operations to also “be the change.”

### The change we need – A just transition to 100% renewable energy

Individuals, businesses, organizations and governments need to create and implement plans to transition to renewable energy. These plans should:

- Include “SMART” goals (Specific, Measurable, Attainable, Relevant and Time-based)

- Include goals to exceed global science-based targets for limiting global warming to 1.5 degrees C:
  - To reduce greenhouse gas emissions by 50% over each of the coming decades and to achieve 100% renewable energy by 2050,
- Be rational and evidence based,
- Look at all aspects of energy use – in particular heating, transportation and electricity,
- Prioritize projects that provide the largest increases in renewable energy use over the shortest period of time. Twenty years ago, the popular approach was to improve efficiency first and consider renewable energy options later. There is no longer enough time – the switch to renewable energy needs to happen immediately – even at reduced efficiency. For example, replacing a 90% efficient fossil fuel fired boiler with a 96% efficient fossil-fuel boiler is no longer an adequate response. An 80% efficient renewable energy boiler (wood pellet) would reduce more greenhouse gas emissions,
- Consider the lifespan of infrastructure and prioritize projects that will give the longest renewable energy return on investment. For example, installing renewable energy systems in new buildings should take priority over retrofitting old buildings that will be replaced in a few years,
- Include the purchase of *Gold Standard* carbon offsets / renewable energy credits as a rapid but temporary measure to achieve a 100% renewable energy portfolio. Gold Standard emissions can be purchased at Planetair <http://planetair.ca/en/index.sn>. The website includes calculators to help figure out how many offsets to purchase.

#### What can individuals, Organizations and Privately Owned Businesses do?

Individuals (who are not living in poverty), organizations and privately owned businesses should:

1. Go “100% renewable” / “carbon neutral” by purchasing carbon offsets for their share of non-renewable energy use. Going carbon neutral is the first priority because it is the fastest way to make change. There are renewable energy projects ready to be built in other parts of the world as soon as funding is received. 100% renewable / carbon neutral living should be considered as “the right thing to do” in the same way that recycling, composting and not littering are. Purchasing 25 tons of offsets per year per person (~\$625) will more than cover most NWT residents.

2. Do as much as can be afforded to switch from fossil fuels to renewable energy, and to invest in energy efficiency. Investing in biomass technology for heating would be a northern priority action.

### What can publicly-traded corporations do?

Publicly-traded corporations should:

1. Adapt their business models to include 100% renewable energy / carbon neutrality as part of their normal operations. At this point in time (and probably more so going forward), carbon neutrality will be acceptable to most shareholders as adding value to a corporate brand. Furthermore, doing so will be preparing the business for inevitable carbon pricing that will be imposed by regulations.
2. In emissions intensive industries where purchasing offsets might not be accepted by shareholders, an internal carbon price should be included in all investment decisions so that corporate investments account for future carbon pricing that will be coming. For example, the calculation on the payback of a renewable energy system should include a \$50 per ton price on carbon, even if the price has not been legislated yet.
3. Take every economic opportunity to switch from fossil fuels to renewable energy, and to invest in energy efficiency.
4. As appropriate to the business, incorporate research into providing government, individuals and businesses with carbon neutral options.

### What can the Territorial Government Do?

The GNWT has the mandate and responsibility to protect the environment as a whole, while also dealing with its own emissions. While individuals, organizations and businesses should take voluntary actions, this does not exempt the GNWT from its ultimate responsibility and accountability. Voluntary actions have been insufficient. The GNWT is responsible to use all tools entrusted to it by the public – including regulation, legislation as well as financial incentives and carbon pricing mechanisms.

The GNWT should accelerate its transition to 100% renewable energy. It should:

1. Increase investment in renewable energy and efficiency. The GNWT has been steadily investing in wood pellet heating and solar electric generation, and it should do much more of this.
  - a. The GNWT should commit to converting all its remaining fossil fuel–heated facilities to biomass (wood pellet or wood chip) heat. Over 40% of the buildings in downtown Yellowknife are owned or occupied by the

GNWT and that percentage is often higher in smaller communities. The GNWT has developed the expertise and oversight capacity to do this conversion efficiently, typically with financial savings, so it could be done at modest extra cost. Converting GNWT facilities to biomass heat would provide the renewable energy anchor-customer that is required in each community to enable a viable delivery infrastructure and potential district heating systems that involve other community entities.

- b. The GNWT should go “100% renewable” / “carbon neutral” by purchasing Gold Standard carbon offsets for their share of non-renewable energy use. Requiring all departments to operate carbon neutrally through the purchase of offsets would make renewable energy investments comparatively more financially attractive.

## 2. Focus on a Rapid Transition to Renewable Energy

As previously mentioned, incremental improvements in energy efficiency do not result in the rapid reductions in Greenhouse Gases that are now needed. NWT goals should exceed global science-based targets for limiting global warming to 1.5 degrees C, as follows:

- a. To reduce greenhouse gas emissions by 50% over each of the coming decades and to achieve 100% renewable energy by 2050,

## 3. Ban fossil fuel development in the NWT and re-allocate the resources now committed to Oil and Gas (O&G)

The GNWT has jurisdiction over the extraction of fossil fuels in most of the territory. Whether in the Territories or elsewhere, fossil fuels that are extracted are destined to be burned and will therefore contribute to global warming. As of December 2016, investors world-wide have divested or pledged to divest \$5.2 trillion from fossil fuel investments, a doubling from the previous year. Considering this trend, GNWT investment in the O&G industry is very risky and undermines climate change mitigation and adaptation efforts. As the rest of the world is doing, the GNWT must recognize that the science and physics of climate change demands a reduced reliance on fossil fuels; the majority of fossil fuel resources simply must stay in the ground. Since scientific studies have concluded that the cost of development of NWT resources makes them among the least attractive for development, **expending resources to plan for them to be extracted is effectively betting that the world is going to fail to take action on climate change.** Doing so is participating in the making of a tragedy, one that will severely impact the NWT. Assuming that the world will take action on climate change means that our expensive oil and gas resources will not be needed until several generations from now, if ever. The GNWT must pursue other more promising sources of economic development and employment. The GNWT must ban all fossil fuel development, and re-allocate funds currently spent regulating and promoting fossil fuels towards developing a robust renewable energy infrastructure.

#### 4. Use Cost of Living Policy to reduce impact of Renewable Energy Transition

For the past several decades, GNWT energy and greenhouse gas policy has been based on the assumption that “measures to reduce the energy component of the cost of living will also reduce greenhouse gas emissions”. Many of these “win-win” opportunities have been taken advantage of, but Greenhouse gas emissions have not reduced quickly enough and therefore, it is time to move beyond this assumption.

As the NWT switches to 100% renewable energy, there will be opportunities to reduce the cost of living. Energy efficiency, hydro, wind and solar all cost more up-front but offer lower and more stable cost energy once the investment has been paid off – a sound investment opportunity. Wood chips and wood pellets are also typically cheaper than fossil fuels. Such efforts often provide jobs and other economic development within communities, as the generation of energy is localized, helping both to stimulate local economies and residents to be better able to meet their energy costs.

While these energy sources and actions are all win-win opportunities and should be included in any cost benefit analysis, they are not sufficient to meet required emissions reductions or to get the NWT to 100% renewable energy. In some cases, such as aircraft transportation, it may be more affordable to meet reduction targets by purchasing carbon offsets while new technologies are developed. Over the next few decades, as the rest of the world switches to renewable energy, gold standard (reliable) carbon offsets will, in theory, become harder to find and more expensive. If the cost of offsets begins to negatively impact the cost of living for low-income earners, income assistance programs should be adjusted.

While carbon pricing is an effective tool in reducing emissions, it raises concerns that a carbon price would further drive up the cost of living, particularly in remote communities. However, the smaller, remote communities, where the costs of energy are the highest, are also the lowest absolute sources of greenhouse gas emissions, and the most protected from carbon pricing by subsidies. In addition, there are revenue recycling options that can be used to compensate for increased costs of living resulting from carbon pricing. As the NWT switches over to 100% renewable energy, the GNWT must continue to help those who cannot afford their heating and power bills.

The cost of living discussion is often framed in terms of the prices per unit of energy (\$/kWh or \$/litre), but the total energy bill that people are paying (heating, power, transportation fuel) should be the basis of how policies are judged. Efficiency measures do not reduce the price of energy, but they do reduce the total energy bill.

The GNWT spends at least ten times more every year on subsidies for fossil fuel energy than it does on energy efficiency investments. The recent emergency funding to buy fuel for the Jackfish power plant is a typical example. The GNWT spent tens of millions of dollars on diesel fuel while investing only an extra few hundred thousand in energy efficiency.

Investments in efficiency are closely tied with capacity (technical, administrative and financial know-how) issues - particularly in small and remote communities. Because of this, even if larger financial subsidies were made available, capacity issues may prevent people, small businesses and communities from accessing them. The GNWT should focus electrical efficiency programs on communities that generate their power with fossil fuels (diesel, propane/natural gas) and are therefore subsidized. It should implement an aggressive electricity efficiency strategy in these communities. A great example is the recent LED light bulb replacement program that demonstrated a 1.5 year payback to ratepayers on a GNWT investment of \$450K.

5. Adopt a “Barriers and Incentives”- based approach to the Renewable Energy Transition

The GNWT’s energy policy should focus on encouraging investments that have the highest potential to increase the use of renewable energy. The most cost effective combination of barriers and incentives should be put in place to bring about this change. Policies should:

- a. Eliminate barriers to renewable energy use
- b. Create incentives to renewable energy use
- c. Increase barriers to fossil fuel use
- d. Eliminate incentives to fossil fuel use

Many GNWT programs are focused on providing financial incentives, which assumes that the barriers are only financial. In many cases a financial incentive does not address the key barriers. For example, a financial incentive to purchase pellet stoves does not address the barrier that there are very few certified pellet stove installers. In other cases, regulations or carbon pricing mechanisms can be more cost effective at bringing about change.

6. Rigorously evaluate all renewable energy programs annually

Clear renewable energy-related criteria are not evident in current GNWT policies and programs. Further, program evaluations comparing costs to realized outcomes are inconsistent. Financial incentives and investments vary greatly from program to program without any consistent relation to potential for GHG or financial savings. All energy and climate change projects and programs should be screened and evaluated based on their cost effectiveness and ability to rapidly increase the use of renewable energy, with the results feeding back in to modify or adjust the program to better achieve overall goals. The following is a sample template for completing such evaluations:

	Total GHG Reduction Potential	Barriers & Incentives Addressed	Effectiveness of Measure (%)	Program Impact	Cost per ton to GNWT
<b>33% rebate on EPA wood stoves up to \$750; installation cost not eligible</b>	50% of heating energy; 4,000 privately owned homes; 4t per year per home. 10% of homes already use a wood stove. 14,000 t potential.	Reduces capital cost, but home owner must pay up front so does not address cash-flow barrier. Does not address insurance issues, lack of trained installers.	35 stoves per year = ~1% of homes per year. ~100 years to achieve potential.	35 x 4t = 140 t/yr	\$187.50/t/yr
<b>33% rebate on Solar PV panels up to \$5,000; installation cost is eligible</b>	Limited impact in hydro communities. 5 kW system; 5 kWh per house; 2,000 privately owned homes in thermal communities. Potential to save 1.5t per year per home. 3,000 t potential	Reduces capital & installation cost, but home owner must pay up front so does not address cash flow barrier. Does not address lack of trained installers.	2 systems per year = ~0.1% of homes per year. ~1,000 years to achieve potential.	2 x 1.5t = 3 t/yr	\$3,333/t/yr
<b>Free LED Light bulb Replacement - \$41 per light bulb total program cost</b>	64,000 bulbs in 4,000 homes in thermal communities  2,000 t potential	Bulbs directly distributed – assume 100% are installed, although previous studies show that free bulbs are often not installed by owners	11,000 bulbs = 17% per year.  ~6 years to achieve potential.	350t/yr	\$1,300/t/yr
<b>\$10/t carbon price; revenue neutral</b>	Total NWT emissions: 1,500 kt	Increases barriers to fossil fuel use by \$0.02/litre. Does not remove barriers to renewable energy	Market fuel prices go up and down by \$0.20/litre so impact is low – 0.1% per yr  ~1,000 years to achieve potential	0.1% x 1,500 kt = 1,500t/yr	Revenue neutral
<b>\$200/t carbon price; revenue neutral</b>	Total NWT emissions: 1,500 kt	Increases barriers to fossil fuel use by \$0.40/litre. Does not remove barriers to	Similar to price increase in 2007 – 2% per yr	2% x 1,500 kt = 30,000t/yr	Revenue neutral

		<i>renewable energy</i>	<i>~50 years to achieve potential</i>		
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***Numbers in these examples are for illustration purposes only – these are not precise calculations and should not be used to determine policy!***

## Carbon Pricing Policy

In the language of “barriers and incentives”, a carbon price makes it more difficult to keep using fossil fuels by making them more expensive – in other words, it increases barriers to the “bad” behaviour. The idea is that people will switch to renewable energy and efficiency to avoid paying the higher prices.

In this paper, Alternative North emphasizes the need to rigorously analyse potential programs. For a carbon price to be successful, it has to decrease demand for fossil fuels. This requires 2 components:

1. The price of fossil fuels has to stay high – even if global demand reductions lead to reductions in price, the carbon price will need to increase to keep fossil fuel prices high
2. Fossil fuel users need alternatives – behavior change, efficiency and, ultimately alternative, renewable sources of energy.

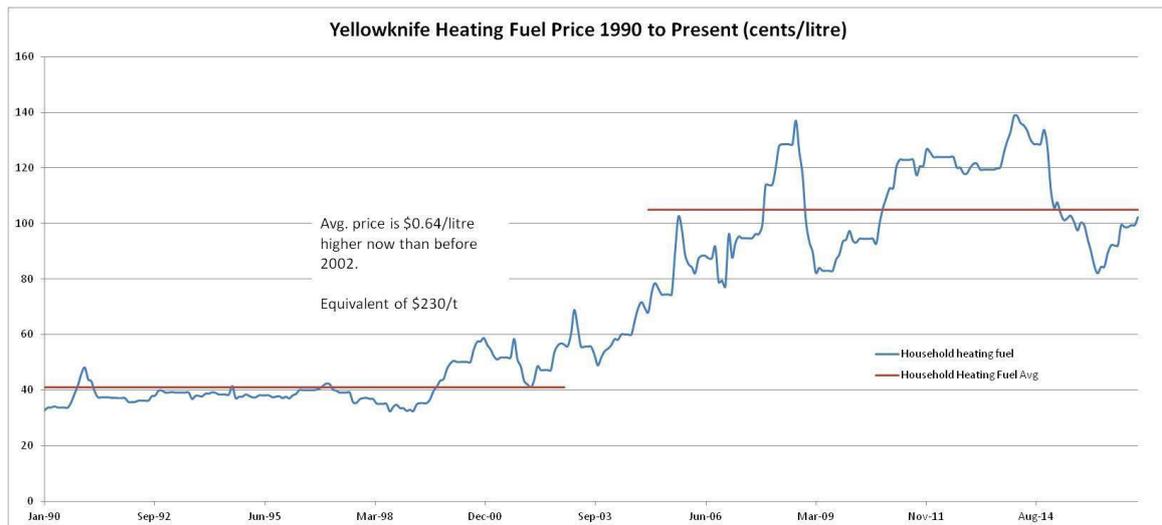
### Modelling the Impact of a Carbon Price – Past Fuel Price Increases

Since the NWT is almost 100% reliant on crude oil based fossil fuels, when the price of crude oil goes up, the price of all fossil fuels used in the NWT also go up.<sup>1</sup> Looking at how people responded to price increases in the past can help us predict what will happen under a carbon price.

The graph below shows heating oil prices in Yellowknife since 1990. Diesel for transportation, gasoline, aviation fuel and heating oil in other communities all follow a similar trend. Between 2002 and 2005 the average price increased by about \$0.60/litre – a 150% increase. This price increase was equivalent to a carbon price of \$230/t, more than four times larger than the increase currently proposed for 2023.

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<sup>1</sup> In the rest of Canada, natural gas and coal change price independently from oil so there was not the society-wide price increase in fossil fuels that was experienced in the NWT.



Graph – price of diesel over the last 25 years – showing that we had an effective \$230/t price increase about 10, years ago (average from 1990 – 2002 and 2005 - present). Source: CANSIM 2017

Since 2005, the price of oil has fluctuated more than it has in the past, but, during the period when oil was over \$100 per barrel, governments, corporations and people in general were convinced that this was the “new normal”. A report from that time (MKJA, 2011) forecast average crude oil prices to rise steadily to over \$100/barrel in 2015 and \$120/barrel by 2030 – based on the 2010 annual energy outlook from the US government. People made decisions based on this “new normal” where barriers to fossil fuel use were suddenly much higher.

During that period:

- A wood pellet market developed and grew rapidly in communities that were connected by all-weather roads to Alberta. Private individuals installed pellet stoves, while commercial building owners and the GNWT installed large commercial pellet boilers. The City of Yellowknife and the NWT Housing Corporation developed higher energy efficiency rules for new construction. Energy use per square metre dropped significantly in new construction in Yellowknife.
- Airlines and long-haul trucking industries passed on additional costs to customers as “fuel surcharges”,
- The GNWT introduced a suite of new funding programs aimed at helping the people improve their energy efficiency and switch to renewable energy, including hiring regional energy coordinators,
- The Diavik Diamond Mine installed four wind turbines with a total capacity of 9.3 MW,
- Over-all economic activity did not collapse,
- Renewable energy use doubled in the NWT – from 4 to 8% of total energy use, mostly as a result of the new wood pellet market.

The wood pellet experience is a practical example of the “barriers and incentives” theory of societal change. With wood pellets there was a large enough price difference that acted as an incentive to motivate people to overcome the barriers to installing wood pellet boilers. There were significant barriers because the boilers had to be imported from Europe and required special certifications before they could be installed. They also overcame considerable challenges with insurance companies and local inspectors who were not familiar with wood pellet boilers and local trades-people did not know how to maintain them. The significant fuel-cost savings (typically over 50%) made the effort worthwhile.

However, airlines did not have a similar, relatively barrier-free, high fuel-cost savings solution available. There are only a few cargo/passenger “Combi” jet aircraft in the world and even fewer that can land on gravel airstrips. Unfortunately, these northern capable jets are also among the least fuel-efficient. While gravel-capable “Combi” jets are still flying, northern airlines have adapted by leasing more efficient aircraft for some routes.

This shows that, if there is an alternative and the incentives are high enough, people, businesses and governments will make some effort to switch.

#### Modelling the Impact of a Carbon Price – Previous Studies

Putting a price on carbon is not a new idea in the NWT. The GNWT has already funded three reports (as cited in the most recent Dept of Finance Discussion Paper):

1. “An Exploration into the Impact of Carbon Pricing in the NWT” by MK Jaccard and Associates (MKJA, 2011) forecast the impact of various carbon pricing scenarios over 20 years, including the impact of the Mackenzie Gas Pipeline project.
2. “NWT Carbon Tax Discussion Paper” by the GNWT Dept. of Finance (Finance, 2012) looked at the sector by sector impact of a \$10/t price on carbon on the NWT economy.
3. “Carbon Pricing in the NWT – Discussion Paper” by Ecology North (Ecology North, 2015) looked at revenues from a \$20 - \$30/t price on carbon<sup>2</sup>.

The report by the GNWT Dept of Finance (2012) claimed that there are “no [economically] viable alternatives” to fossil fuels in the NWT and that, therefore, all costs from a carbon price would be either passed on to customers or would reduce the competitiveness of businesses who could not raise their prices because prices were set on an international market. There are similar (unsubstantiated) claims in the discussion paper released in 2017.

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<sup>2</sup> This paper was funded by both the GNWT and the Doug Ritchie memorial fund.

The report by Ecology North (2015) did not attempt to predict the impact of carbon pricing on fossil fuel use and assumed (for simplicity) that there would be no reductions at either the \$20 or the \$30/t price over 20 years.

The MKJA (2011) report was based on a more complex economic model of the NWT economy that included alternative options and predicted which energy options would be selected by each energy use sector as the price on carbon increased. The report suggests that a \$10/t carbon price, escalating to \$200/t over 20 years would, on its' own create \$70 million in investment and result in a 13% reduction in greenhouse gas emissions. This report assumed that all carbon revenues would be returned as tax rebates. The model did not predict higher reductions because the authors restricted the uptake of bio-diesel in the transportation sector due to known issues with cold weather.

The Dept of Finance's assertion that "there are no viable alternatives" is overly pessimistic as mines, private business and the GNWT itself have been steadily investing in alternatives as discussed in the section on the recent reaction to increased fuel prices. In addition the GNWT already provides incentives through the Arctic Energy Alliance for a large number of economically viable alternatives.

None of the above studies predict that a carbon price alone, even if it increases to \$200/t will create an adequate shift towards renewable energy. The carbon price must be part of a larger climate change and energy policy framework that removes barriers to the adoption of renewable energy and efficiency, particularly in the industrial and transportation sectors.

The report "100% Renewable Energy in the NWT", released by Alternatives North in 2016 shows that technology is commercially available today that could be used to run the entire NWT society on 100% renewable energy. There are numerous "soft" barriers, including cost, but there are no fundamental technological barriers.

There is a promise of additional funding from the Government of Canada, which will certainly help, but currently the GNWT has stated that the majority of it will be spent on building a transmission line to Saskatchewan or Alberta in order to export hydro-power from an as-yet-to-be expanded Taltson Hydro system, and investing in alternatives to diesel generator use in remote communities. These ideas do not address the entire emissions profile in the NWT, nor have they been demonstrated to be the best opportunities for achieving GHG reductions. The levels of funding announced so far, combined with the \$50/t carbon price, are insufficient to generate the transition to renewable energy that is required.

#### A \$2.4 Billion Energy Transition

As a carbon price of \$50/t is clearly too low and current government funding levels are inadequate, Alternative North proposes that the carbon price continue to increase to \$200/t over 10 years and that the majority of the carbon pricing revenues be returned to carbon tax-payers in the form of rebates and incentives to aid the transition to renewable

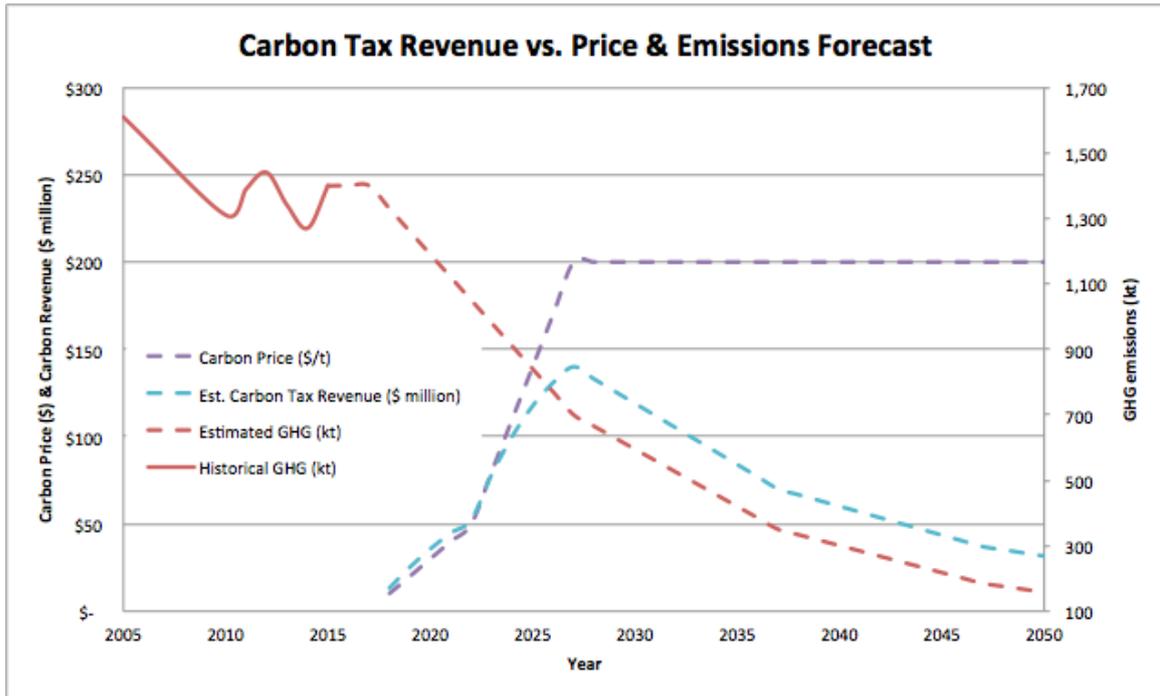
energy. This would generate approximately \$1.75 billion over 20 years and \$2.4 billion by 2050. Combined with other policy tools and additional government investment, this could achieve the transition that is required.

The following graph shows potential revenues with the following assumptions:

- That carbon revenues will be invested in reductions and there will be additional investments and policy tools used to ensure that the NWT will achieve a 50% reduction in GHG emissions over each of the the next 3 decades as required to do our part to keep warming between 1.5 and 2 degrees C,
- The Environment Canada figure for 2015 (1,400 kt) has been used as an estimate for 2018, when the carbon tax will take effect.
- All fossil fuels will be charged a carbon tax, and all sectors will pay, including government,
- The Carbon price rises from \$10 to \$50 over the first 5 years, then to \$200/t by year 10. The carbon price remains at \$200/t until 2050,
- The Mackenzie Gas Project does not proceed but mining does continue at current levels while incorporating renewable energy at the same rate as the rest of the NWT.

It should be noted that the data on fuel consumption and GHG emissions in the NWT is not very precise, and the mining portion of economy is unpredictable, so this is a rough estimate.

As society begins to transition away from fossil fuels, less fuel will be sold, which would lead to declining revenues. In this model, from revenues peak 10 years from now at \$140 million/year.



The above (simple) model assumes all revenues are available to be returned to tax-payers as renewable energy incentives. However, Alternatives North recognizes that lower income earners may not be in a position to take advantage of energy rebates and are already struggling with very low levels of income. We suggest that 10% of the carbon tax revenue be returned to the 10,000 lowest income earners through a tax-credit. The tax credit should be designed so that even people who do not earn enough to pay income tax, would receive the benefit.

### Other Carbon Pricing Options

In our submission to the energy and climate change consultations, Alternatives North suggested that the GNWT use air quality regulations to impose a carbon price on large carbon emitters without impacting communities.

Alternatives North also recognizes that carbon offsets may provide a temporary, more affordable way to achieve rapid action on reducing greenhouse gas emissions. Industries or mines with a shorter remaining life-span could be offered the option of purchasing Gold Standard carbon offsets instead of paying the carbon tax.

## Other Climate Change Policy Options

Different policies and programs based on addressing different barriers and providing appropriate incentives are called for in different parts of the NWT society. Following are suggestions of policies and programs that could be combined to create an NWT energy plan and climate change strategy. As mentioned above, these suggestions should be rigorously evaluated and then combined to create an effective plan that demonstrates how it will meet the science-based targets proposed earlier in this paper .

### Financing Renewable Energy Systems through Local Improvement Charges (LICs)

Heating is a large part of fossil fuel use in the NWT and wood pellets are a form of renewable energy that is cheaper than heating oil. Many home-owners have already had a pellet stove installed and businesses are also installing wood pellet boilers. Analysis of barriers and incentives suggest that while some home-owners are installing pellet stoves, others find that the payback on the investment is too long (if they plan on selling their house before the stove is paid for and the housing market does not recognize the additional value of a pellet stove). A local improvement charge (LIC) loan – provided by municipalities, could be paid back through the property tax system, allowing the debt to be transferred to future home-owners. Using the LIC funding model allows the costs to be paid through energy savings over time. This mechanism could be used for other energy measures too, such as re-insulating homes, adding solar panels in thermal communities, and so on.

NWT Communities have repeatedly called for the GNWT to enact legislation enabling LICs over the last few years.

### Require large industry to use renewable energy

Industry, which produces more than half of all NWT greenhouse gas emissions, requires a different analysis than do home-owners and communities. Different barriers and incentives, including renewable energy standards, are required to bring about the switch to renewable energy. For example, Diavik Diamond Mine has demonstrated the technical and economic feasibility of wind power generation at mine sites with their 9.3 MW facility and less than 8-year payback. Through transparent and predictable regulatory schedules, new mines must be required to provide an increasing proportion of their energy needs from renewable sources and new and existing mines must account for their carbon energy use through the purchase of carbon offsets.

## Increase renewable electricity generation and electrify local transportation

Abundant evidence shows that energy demand across the country currently being met with fossil fuels is shifting to being met with clean electricity. Significant expansion is now forecast to be likely by as early as 2020. While it may be longer for the NWT to see this change, there are many cases where electricity is already replacing fossil fuels, such as for heating infrastructure in Ft. Smith, and solar power production in thermal communities. Energy storage technology is also developing faster than predicted only a year or two ago. This is similarly the case with ground transportation. Given all this, the GNWT should be developing and implementing evidence-based plans for more renewable electricity generation throughout the jurisdiction, and establishing electric charging stations beginning in the southern centres.

## Develop a Territorial Energy Building Code and the capacity to enforce it

The GNWT, like all provinces and territories, has jurisdiction over building codes. In the rest of Canada, building codes are provincial - not municipal. While Yellowknife has its own building permitting and inspections system and has created its own energy related building code, no other community has the capacity to do this. The GNWT should develop a territorial energy building code including:

- EGH-80 for homes
- MNECB plus 40% for buildings
- 50% of a building's energy requirements be met with renewable energy
- EnergyStar appliances
- Low-flow toilets & showers
- No electric water heaters in diesel communities
- District heat with mandatory connection
- GNWT taking responsibility to inspect and enforce building codes throughout the NWT

Pursuant to energy charrette recommendations, the GNWT committed to implementing an *Energy Efficiency Act*, and these and other measures should be addressed in such overdue legislation. The GNWT should require all GNWT-funded building infrastructure, including all new municipal government infrastructure—to exceed the territorial energy standard and to use 100% renewable energy.

## Invest in Renewable Energy infrastructure

The GNWT should also create an investment strategy to switch the entire territory to 100% renewable energy by 2050. It is an opportune time to establish green infrastructure considering current Government of Canada infrastructure funding programs. However, despite their potential to contribute to cost of living and permanent employment challenges, the GNWT has a consistent record of passing up on green infrastructure in favour of transportation infrastructure. This is wrong-headed. Options for how to switch to 100% renewable energy, beginning with technology now available, are outlined in the Alternatives North research paper “100% Renewable Energy NWT by 2050” (available at [www.alternativesnorth.ca](http://www.alternativesnorth.ca)). Some examples include:

- Build district heating systems in all communities to make use of waste heat from generators that burn wood pellets or wood chips.
- Develop a program to encourage installation of EPA certified wood pellet, and wood stoves (and dramatically cut heating costs).

## Make GNWT Technical Capacity available to everyone in small Communities

One of the biggest barriers to energy efficiency and adoption of new renewable energy technologies in small communities is lack of local technical capacity. The GNWT has the most technical capacity in small communities. This capacity should be made available to people, local businesses and communities on a cost recovery basis. For example, technical staff at the NWT Housing Corporation and the Department of Infrastructure should be made available to inspect new construction, and to tune pellet boilers throughout the communities.

## Create an Energy Revolving Fund

Create a revolving fund that people and small businesses can borrow from to finance the cost of converting to more energy efficient homes and operations. The loans can be repaid with savings in costs. The fund could be financed through government issued, RRSP-eligible, investment grade bonds available to NWT citizens.

## Create Renewable Energy Cooperatives

An NWT renewable energy cooperative could provide a mechanism to harness private capital, encourage private investment and enhance participation of residents and businesses if supported with appropriate policies. Such policies have been documented

and developed by the Toronto Renewable Energy Cooperative. Details are available on their web site at [www.trec.on.ca](http://www.trec.on.ca).

## References

- Alternatives North (2016) – Alternatives North, 2016, “1005 Renewable Energy in the NWT by 2050” <https://anotheralt.files.wordpress.com/2016/10/100-renewable-energy-report-nwt-final.pdf>
- CANSIM (2017) Table 216-0009 6106023 <http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3260009>
- Climate Analytics (2014) *Is it Possible to Return Warming to below 1.5 deg C within this Century*, [http://climateanalytics.org/files/climate\\_analytics\\_briefing\\_is\\_it\\_possible\\_to\\_return\\_warming\\_to\\_below\\_1\\_5degc\\_within\\_this\\_century-.pdf](http://climateanalytics.org/files/climate_analytics_briefing_is_it_possible_to_return_warming_to_below_1_5degc_within_this_century-.pdf)
- Ecology North (2015) - Ecology North, 2015, “Carbon Pricing in the NWT – Discussion Paper” <http://ecologynorth.ca/wp-content/uploads/2016/04/CARBON-PRICING-IN-THE-NWT-.pdf>
- Environment Canada (2017) – Environment Canada, 2017, “NATIONAL INVENTORY REPORT 1990-2015: GREENHOUSE GAS SOURCES AND SINKS IN CANADA - CANADA’S SUBMISSION TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE - PART 3” [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/10116.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php)
- GNWT Finance (2012) - GNWT, Dept of Finance, 2012 “NWT Carbon Tax Discussion Paper” Tabled in NWT Legislature, Document 24-17(3) <http://www.assembly.gov.nt.ca/sites/default/files/12-06-08td24-173.pdf>
- MJKA (2011) - GNWT, Dept of Environment and Natural Resources, M K Jaccard & Associates, 2011, *An Exploration into the Impact of Carbon Pricing in the Northwest Territories: Revised Reference Case and Quantitative Policy Analysis*, [http://www.enr.gov.nt.ca/sites/default/files/reports/an\\_exploration\\_into\\_impact\\_of\\_carbon\\_pricing\\_in\\_the\\_nwt.pdf](http://www.enr.gov.nt.ca/sites/default/files/reports/an_exploration_into_impact_of_carbon_pricing_in_the_nwt.pdf)
- Rockström, (2017) - Rockstrom J, Gaffney O, Rogelj J, Meinshausen M, Nakicenovic N, Schellnhuber HJ (2017). *A roadmap for rapid decarbonization: Follow a “carbon law” toward a zero-emissions future* Science, 23 March 2017 <http://science.sciencemag.org/content/355/6331/1269>