CARBON PRICING IN THE NWT

Discussion Paper

ECOLOGY NORTH

EXECUTIVE SUMMARY

Three momentous events happened in the Fall of 2015: the change in federal government in Ottawa, the elections for the 18th legislature in the Northwest Territories, and the COP21 meetings on climate change in Paris. These three events will mesh together in March as the Premiers meet to discuss Canada's response to the climate change crisis. The Northwest Territories has the opportunity at these meetings to distinguish itself as a leader in climate policy. One of the key planks in a new NWT climate policy should be carbon pricing.

A Carbon tax is a proven, and effective policy, which was successfully implemented in British Columbia in 2008. In 2015 Alberta became the second province to adopt this policy tool to reduce emissions. This discussion paper outlines recommendations for the implementation of a carbon tax and discusses the background, rates, options for taxation and the estimated impacts on people and businesses in NWT.

There are five considerations to consider when designing a fair and equitable carbon tax for NWT: whether to use a cap and trade or carbon tax, the extent of coverage, stringency, revenue recycling and administrative burden. After looking at each of these considerations, as well as the experiences of British Columbia, and the fact that our southern neighbour and biggest trading partner will have a similar tax, we are recommending the following for a made in the NWT carbon pricing system.

With a ten-year framework, NWT should initiate a $20/tonne carbon tax for five years; thereafter the rate would increase to $30/tonne. This tax would equate to:

Fuel Type	$20/tonne	$30/tonne
Gasoline, aviation fuel and diesel (incl. heating fuel)	$0.055/litre	$0.0825/litre
Propane	$0.031/litre	$0.0462/litre
Natural gas	$0.038/litre	$0.0576/litre

One acknowledged drawback of a carbon tax is the inelastic demand of consumption to the price of fuel. Previous studies indicate this tax would only reduce fuel use by approximately 5%. Therefore, it is important to introduce green energy solutions to increase the efficiency of fossil fuel reductions by giving residents and businesses funding to reduce emissions. Another important consideration is protecting low income, and remote communities who have fewer options available to reduce emissions and the impact on the cost of living.

We have proposed two potential options for extent of coverage of carbon taxation:

Option #1 Apply a tax to all fossil fuel consumption, the carbon tax, applied to all sectors, would generate revenues of approximately $21 million per year in Years 1-5 and about $32 million thereafter. Over an initial 10-year period, total carbon tax revenues would equal $268 million.

Option #2 Apply a tax to currently taxed fossil fuels, the heating fuels would be exempted from a carbon tax. As a result, the annual revenues in Years 1-5 would be approximately $18 million, rising to

about $27 million thereafter. Total carbon tax revenues collected over the initial 10-year period would equal $224 million.

These carbon tax revenues would be recycled back into the economy by allocating 50% to tax cuts and rebates, 47.5% to energy efficiency and green energy investments and 2.5% to GNWT administration. Green solutions would focus on energy efficiency, green financing and clean energy solutions that can be implemented at a community scale (i.e. focus on community governments, small businesses and residents).

It is important to recognize that carbon pricing is just one step in the NWT's transition to 100% green energy. We have already begun this transition, as leaders in biomass energy. Now is the time to make that plunge to make the NWT a leader on the national stage.

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1.0 INTRODUCTION

Funding for this discussion paper was provided by the Yellowknife Community Foundation – Doug Ritchie Memorial Fund, and Environment and Natural Resources, GNWT.

In 1998, the Government of the Northwest Territories (GNWT) recognized the need to reduce greenhouse gas (GHG) emissions and, as a first step, released the NWT Greenhouse Gas Strategy in 2001. Revised Strategies, released in 2007 and most recently in 2011, built on the knowledge and experience gained since 2001.

The 2011 NWT Greenhouse Gas Strategy contains the following targets:

- Stabilize emissions at 2005 levels (1,500 Kt) by 2015;
- Limit emissions increases to 66 percent above 2005 levels (2,500 Kt) by 2020; and,
- Return emissions to 2005 levels (1,500 Kt) by 2030.

These targets were set at a time when the Mackenzie Gas Pipeline was scheduled to begin construction and it was difficult to reconcile the goal of reduced emissions with constructing and operating such an enormous project. There have also been enormous changes in the political climate both in Canada and globally, and the NWT must adapt to these new realities when developing new policy. We eagerly look forward to participating in the development of an updated Climate Change Strategy with ambitious new targets and a wide-range of policy actions to meet these targets.

1.1 Purpose

Ecology North has a vision of an NWT that is powered by clean green 100% renewable energy. We believe that this is an achievable goal and that NWT has the potential to be a global leader in the coming energy transition. To this end a carbon pricing scheme is a necessary early step to the eventual attainment of this vision. In this discussion paper, Ecology North attempts to illustrate how a carbon pricing scheme might work in the NWT and identify the associated possible benefits and impacts.

By putting a cost on GHG emissions, a carbon price is a way to encourage less use of fossil fuel (i.e. gasoline, oil, diesel, propane and natural gas) and to encourage the development, use and accessibility of cleaner energy sources. The two main options for carbon pricing are a carbon tax or a cap and trade system.

A carbon pricing discussion is timely for the following reasons:

- the GNWT will soon be considering which climate policies and actions to include in a revised NWT Climate Change Strategy (for 2016 and beyond); and,

- the Government of Canada recently indicated it intends to meet with the provinces within 90 days of the UN Climate Change Conference (held in December 2015) to develop a pan-Canadian

framework for combatting climate change. Such a framework is expected to include flexibility for the provinces and territories to design their own carbon-pricing policies.[1]

1.2 Limitations

The ideas and information presented in this Discussion Paper are based on a review of the findings from various studies and analyses done in recent years, all of which are in the public domain.

It should be noted that due to time and budget constraints, the authors did not attempt to verify the data and results presented in these studies. The authors have assumed that the data and information is reasonably accurate and can be relied upon to support a discussion of carbon pricing options suitable for the NWT.

[1] Source: www.climatechange.gc.ca

2.0 BACKGROUND

This section provides overview information on carbon pricing initiatives within Canada (as of December 2015), describes the NWT energy and emissions context and summarizes some relevant studies.

2.1 Canadian Examples

In recent years, British Columbia, Alberta and Quebec have each begun to address GHG emissions by putting a price on carbon. In April 2015, Ontario announced that it intends to enter into a cap-and-trade agreement with Quebec.

As well, at the August 2014 meeting of the Council of the Federation, Canada's premiers explicitly recognized the importance of using carbon pricing policies to help drive a transition to a low-carbon economy. At the 2015 meeting of the Council of the Federation, Canada's premiers approved a renewed *Canadian Energy Strategy*, which includes a focus on transitioning to a lower carbon economy[2].

There are three main reasons why carbon pricing efforts are emerging as a practical means for achieving reductions in GHG emissions:

- Carbon pricing policies are effective. Evidence from Canada (and internationally) suggests that well-designed and implemented carbon pricing policies can achieve significant results in reducing GHG emissions;

- Carbon pricing policies are practical. Each jurisdiction can design and implement a carbon-pricing policy that reflects its own particular economic and environmental objectives; and,

- Well-designed carbon-pricing policies are cost-effective. Reductions in GHG emissions can be achieved at the lowest possible costs as emitters are allowed to find the most efficient methods to reduce emissions.

British Columbia: Carbon Tax

In 2008, the BC Government implemented a carbon tax of $10/tonne of emissions, which was increased by $5 per tonne per year to reach $30/tonne by 2012. The tax applies to almost all of the fossil fuel burned in BC (e.g. coal, gasoline and natural gas), which amounts to about 70% of the province's total GHG emissions (some exceptions being fugitive and process emissions).

In 2013/14, the carbon tax was forecast to raise $1.212 billion. Under the *Carbon Tax Act*, this money is used to reduce other provincial taxes (referred to as 'revenue neutrality') – tax reductions for 2013/14 were forecast to total $1.232 billion ($522 million (42%) in personal taxes and $710 million (58%) in corporate taxes).

[2] See *Canadian Energy Strategy*, page 9.

Included in BC's personal tax reduction measures is a Northern and Rural Homeowners Benefit of $200[3], which helps address the increased cost-of-living impact of a carbon tax in northern and rural areas.

Several studies that examined the impact of BC's carbon tax have found it to be an environmental and economic success. Specifically, per-capita fossil fuel use declined by 16% from 2008 to 2013 while, during the same period, BC's per capita GDP grew by 1.75%, which was slightly higher than the rest of Canada (at 1.28%)[4]. A new study by the BC Climate Leadership Team (appointed by the BC Government) suggests that the carbon tax should start increasing by $10/tonne per year after 2018, increasing to $110/tonne by 2025.[5]

Alberta: Specified Gas Emitters Regulation and Carbon Tax

Introduced in 2007, Alberta's Specified Gas Emitters Regulation was the first GHG pricing policy in North America. It sets limits for large GHG emitters (greater than 100,000 tonnes CO2e per year) by requiring them to reduce their emissions intensity by 12% (over a 6-year timeframe). The regulation seeks to reduce large emitters' emissions per unit of production without capping total annual emissions.

A large GHG emitter can comply with Alberta's GHG framework in four different ways: (i) making improvements in their operations; (ii) buying Alberta-based carbon offset credits; (iii) through emission performance credits; and (iv) paying $15 per tonne of CO2e emissions over target (to Alberta's Climate Change and Emissions Management Fund). The main criticism of this system is the fact that it does not require absolute reductions in Alberta's GHG emissions.

In November 2015, the Alberta Climate Change Advisory Panel submitted its report to the Alberta Government outlining its advice for the development of a comprehensive climate change strategy to reduce Alberta's GHG emissions. Based on the Panel's Report, the Alberta Government announced that it is developing an Alberta Climate Leadership Plan, which will include four key areas:

- Phasing out coal-generated electricity and developing more renewable energy;
- Establishing a legislated oil sands emission limit;
- Implementing a new methane emission reduction plan; and,
- Introducing an economy-wide carbon tax of $20/tonne, starting in 2017 and increasing to $30/tonne in January 2018. It is anticipated that Alberta's carbon tax will keep increasing over time, based on inflation and the level of carbon pricing in competitive jurisdictions.

As the NWT and Alberta are major trading partners, the NWT may want to consider implementing a similar carbon pricing policy as Alberta. This would help ensure economic competitiveness for NWT businesses and sets the stage for possible linkages between provincial / territorial carbon policies and/or the eventual equalization of carbon prices across Canada.

[3] See "*British Columbia Budget and Fiscal Plan 2015/16 – 2017/18*", page 64.
[4] See Pembina Institute, "*Backgrounder: The B.C. Carbon Tax*", page 2.
[5] British Columbia Climate Leadership Team, " *Recommendations to Government*".

Quebec: Cap-and-Trade System

Cap-and-trade is a market-based approach that provides economic incentives for achieving GHG emissions reductions.

Officially launched January 1, 2013, Quebec's cap-and-trade system (referred to as the Carbon Market) sets a limit on the level of GHG emissions allowed by certain sectors. During the second and third compliance periods, (i.e. 2015 to 2020), the system will include the industrial and electricity sectors as well as fossil fuel distributors, which covers about 85% of Quebec's annual emissions. Any businesses within these sectors that emit 25,000 tonnes CO2e or more a year are subject to the cap and trade system.

Emitters are required to obtain emissions allowances equal to their total reported and audited GHG emissions in a particular reporting period. Emitters can obtain emissions allowances during government auctions, by purchasing them from other participants or by purchasing offset credits. One emission allowance is equal to one tonne of CO2e and the minimum price set in 2013 was $10.75 which will increase at a rate of 5% plus inflation every year until 2020. The revenues generated go into the Quebec Green Fund and are used to fund the different initiatives contained in Quebec's 2013-2020 Climate Change Action Plan.

In 2014, Quebec linked its system with a cap and trade system in California as part of the Western Climate Initiative (WCI). The WCI is an initiative of American state governments and Canadian provincial governments to develop a joint strategy to reduce GHG emissions. Currently, British Columbia, California, Manitoba, Ontario and Quebec are members of the WCI.

Other Jurisdictions: Manitoba and Ontario

In April 2015, Ontario announced that it will enter into a cap-and trade agreement with Quebec. A consultation process was then initiated to help determine the details of the system. In broad terms, the Ontario system, when implemented, is expected to include the following:

- A "hard ceiling" on GHG emissions in each sector of Ontario's economy;
- A linking with the WCI carbon market (which includes Quebec and California); and,
- Re-investment of the proceeds from the cap-and-trade system back into projects that will help further reduce GHG emissions and help businesses remain competitive.

In June 2011, the Manitoba Government released the results of public consultations into the creation of a cap-and-trade system to help reduce Manitoba's GHG emissions. The proposed system was modelled on the WCI's detailed regional cap and trade program for partner jurisdictions. Support for the proposed system was mixed, about 25% of respondents were in favor, about 25% of respondents were opposed and about 50% of respondents did not specifically support or oppose a cap and trade system but did indicate support for the need to implement a mechanism to reduce GHG emissions in Manitoba.

In December 2015, Manitoba released its Climate Change and Green Economy Action Plan and announced that it would implement a cap-and-trade system as part of a series of measures to address

climate change. The details of the new cap-and-trade system have not been determined but it will be linked with cap-and-trade systems in other North American jurisdictions.

Canada as a Whole

As outlined above, five provinces (BC, Alberta, Quebec, Ontario and Manitoba) have already implemented some form of carbon pricing scheme or are preparing to do so. Once Ontario and Manitoba implement their cap-and-trade systems, more than 75% of Canadians will reside in jurisdictions that have some form of carbon pricing.

In late January, 2016, Canada's federal, provincial and territorial Ministers of the Environment met (for the first time ever) to begin working towards the establishment of a pan-Canadian framework to address climate change and grow the economy. The intent of a pan-Canadian framework is to specify the actions that the different jurisdictions can take, such as carbon pricing and investments in green infrastructure, that collectively will enable Canada to meet the commitments made at the Paris climate conference (COP 21) in December 2015.

While it is too early to predict what a pan-Canadian climate change framework might mean for the NWT, it is clear that carbon pricing is one of the key measures being discussed. The next meeting in this process is scheduled to occur in March 2016.

2.2 NWT Context

Due to various factors, including its size, small population, remote location (far from provincial electricity grids) and sub-Arctic and Arctic climates, the NWT is heavily dependent on imported fossil fuels to meet its energy requirements.

As noted in the 2011 NWT Greenhouse Gas Strategy, total fuel use and emissions can vary from year to year but the NWT's total annual emissions tend to average around 1,500 kilo-tonnes (Kt).

In absolute terms, the NWT accounts for less than 0.2% of Canada's total annual GHG emissions. However, on a per-capita basis, total NWT GHG emissions are about 28 tonnes per person per year, which is much higher than the Canadian average of about 22 tonnes per person per year[6].

As well, during the last 50 years, the climate in the NWT has warmed at a rate four to five times faster than the global average, resulting in significant impacts such as winter road problems, melting permafrost, shoreline erosion and changing weather patterns[7]. The NWT's ecosystems, people and infrastructure are all dependent on cold sub-Arctic and Arctic climates and are vulnerable to impacts due to global warming.

The 2011 NWT Greenhouse Gas Strategy (pages 28-29) introduces the concept of carbon pricing by summarizing the results of a 2011 study (see below) that investigated the impacts of carbon pricing and

[6] See the "*NWT Greenhouse Gas Strategy 2011 – 2015*", page 8.
[7] Ibid.

potential emission reductions in the NWT. The 2011 Strategy briefly discusses some of the features of a carbon tax and a cap-and-trade system but does not take a position on either option.

With respect to energy costs in the NWT, it should be noted world oil prices have decreased by more than 70% (since 2014) due to a persistent imbalance in world oil supply (at about 94.6 million barrels per day) compared to world oil demand (at about 93.3 million barrels per day). Over the last 12 months, Yellowknife motorists have seen some reductions in gasoline and heating oil prices (ranging from 10% to 20%). Due to annual fuel re-supply arrangements, many of the smaller, off-road communities would not have seen immediate reductions in retail fuel prices in the 2014/15 winter season but should now be seeing some relief during the 2015/16 winter season.

The GNWT should implement carbon pricing in the NWT for the following reasons:

1. Somewhat lower energy prices make it easier on consumers to introduce a carbon pricing scheme now, rather than in a period when fuel prices are rising; and,

2. The GNWT is due to revise its' Climate Change Strategy in the coming year, so this is a good time to consider new initiatives.

3. There is new momentum among all Canadian governments (Provincial, Territorial and Federal) and there is an opportunity for the GNWT to show some leadership among the three northern territories.

4. The British Columbia case study has shown that a carbon tax can be effective and publicly popular at the same time, without hurting the economy.

5. It is the right thing to do.

2.3 Relevant Studies / Discussion Papers

Several different analyses are available to help illustrate what a suitable carbon pricing scheme for the NWT might look like and what the potential impacts and benefits may be.

<u>An Exploration into the Impact of Carbon Pricing in the NWT</u>

This study, completed in 2011 by MK Jaccard and Associates, was commissioned by the GNWT in order to investigate the potential effect of different climate policies on the NWT economy and territorial emissions over a twenty year period (2010 to 2030). Two different development scenarios were modelled; one assumed that the Mackenzie Gas Project (MGP) is not developed and one assumed that it is.

Some of the key findings from this study were as follows:

- In the absence of additional GHG mitigation policy, territorial emissions under the reference case (i.e. without the development of the MGP) were forecast to rise by about 50%, reaching

2,587 kt CO2e by 2030. If the MGP was developed, territorial emissions would be much higher, reaching about 4,500 kt CO2e by 2030;

- The introduction of an economy-wide carbon price, starting at $10/tonne and rising over time to $100/tonne by 2026, would reduce territorial emissions by about 6-13% (compared to a scenario with no carbon policy and no MGP) or about 5-12% (compared to a scenario with no carbon policy but with the MGP); and,

- From a macroeconomic perspective, NWT businesses and households would be better off with a carbon tax (similar to the BC model) than a cap and trade system. This is due to the fact that carbon tax revenues can be recycled back into the NWT economy in the form of reduced corporate taxes, personal income taxes or tax rebates. Under a cap-and-trade system, which applies to large final emitters, the revenues generated from emissions permits are returned to firms based on their value-added output, there is no mechanism to mitigate economic impacts on households or small businesses.

NWT Carbon Tax Discussion Paper

Another analysis, completed in 2012 by the GNWT Department of Finance, looked at the implications of a $10/tonne carbon tax on NWT residents and businesses and the NWT economy as a whole.

Using data from the 2010-11 fiscal year, the Department of Finance calculated that approximately 381 million litres of fuels were consumed that would have been subject to a carbon tax (i.e. another 27 million liters of fuels consumed by governments and other tax-exempt entities was not included in the analysis). At $10/tonne, the carbon tax was estimated to equate to an additional 2.34 cents per litre of gasoline, 2.73 cents per litre of motive diesel fuel and 2.79 cents per litre of heating fuel.

Using these rates, it was estimated that the GNWT would collect approximately $10 million per year in carbon tax revenues. Furthermore, it was assumed that the carbon tax would be revenue-neutral, where all revenue collected would be returned to taxpayers through tax reductions, rebates, subsidies etc.

Some of the Department of Finance's findings with respect to impacts were as follows:

- A carbon tax would increase costs for all NWT businesses and residents. While it is possible to implement a carbon tax that is revenue-neutral to the GNWT, at the level of individual households and businesses, a carbon tax would create winners and losers, depending on circumstances (such as their energy prices and energy usage). For low-income individuals, the impact of a carbon tax would be relatively higher (as a % of their income);

- For small, remote communities that are very dependent on imported fossil fuels, the carbon tax would be a relatively bigger burden, particularly if there are few options available locally to make use of alternative energy sources; and,

- Implementing a carbon tax in the NWT will increase the costs of doing business and make the NWT less competitive for businesses, compared to jurisdictions that do not have a carbon tax.

A Practical Approach to Reducing Canada's Greenhouse Gas Emissions

This study, completed in 2015 by Canada's Ecofiscal Commission, argues that provincial (territorial) carbon pricing is the most practical and cost-effective way to make meaningful reductions in GHG emissions.

Section 5 of the study outlines a general framework for designing a carbon pricing scheme that is both effective in reducing GHG emissions and cost-effective in doing so.

Some of the key points to consider include:

- *Carbon price (or cost of compliance*) – in a carbon tax scheme, the price of carbon is set directly by the policy (e.g. BC's carbon tax is $30/tonne). In a cap-and-trade system, the price of carbon emerges from the market given the cost to emitters to meet the allowable level of emissions (or emissions intensity level);

- *Emissions Coverage* – the coverage of the scheme, which defines those emissions subject to the carbon-pricing policy, is a major driver in determining how effective the policy is in reducing emissions and the cost at which it does so. Broader coverage provides greater incentives to reduce emissions and allows for a lower carbon price;

- *Stringency* – taken together, the level of the carbon price and the breadth of the emissions covered by the policy determine the overall stringency of the carbon policy. For example, BC's carbon tax policy is much more stringent than Alberta's emissions intensity policy as the coverage is much broader and the carbon price is higher;

- *Revenue Recycling* – a carbon tax and a cap-and-trade system (where emissions permits are auctioned) both generate revenue. How this revenue is recycled back to the economy has major implications for the economic impacts of a carbon-pricing policy. Revenue can be used for many purposes, including reductions in corporate or personal income taxes, public investments in infrastructure or direct support for, or investment in, clean energy technologies;

- *Economic Competitiveness* – to the extent that a carbon-pricing scheme increases firms' cost of doing business, this can potentially create a risk of making them less competitive with rivals in jurisdictions with less-stringent or no carbon pricing policies. At low carbon prices, this risk is small but becomes more of a concern if carbon prices rise significantly;

- *Administrative Burden* – a carbon tax on fuels can be easily and quickly implemented as it uses the existing tax system, is transparent to all emitters (and consumers) and has limited administrative costs. By contrast, a cap-and-trade system typically requires more administrative capacity to handle permit trading and the monitoring of transactions and ownership of permits.

3.0 ILLUSTRATION AND ANALYSIS OF A CARBON TAX IN THE NWT

To illustrate what a carbon pricing policy might mean for the NWT, the authors carefully considered the examples and results from other Canadian jurisdictions and the policy design criteria outlined in section 2.3. We investigate the benefits of a carbon tax vs a cap and trade system, then describe the design considerations required to make a carbon tax effective in the NWT.

3.1 Carbon Tax or Cap and Trade in the NWT

The first consideration is whether to use a carbon tax or a cap-and-trade system. A cap and trade system has the advantage of guaranteeing that specific emissions limits will be achieved for large emitters, while the price of achieving that is less predictable. A carbon tax does not specify technology or behaviour among individuals or businesses but it makes energy efficiency and renewable energy options more affordable compared to fossil fuels.

The NWT economy is partially based on resource extraction activities. Other important sectors include public administration, construction, transportation, trade and services. Given that there are very few "large emitters" operating in the NWT, a cap-and-trade system that targets large emitters is not really an effective or viable option. While the mines do use a significant amount of fuel, approximately two-thirds (2/3) of the NWT's fuel use and annual emissions result from non-industrial space heating, power generation and transportation activity, which would not be covered by a cap and trade system. A cap and trade system could be designed to include fuel distributors (as has been done in Quebec) and could cover most sectors of the economy, including power generation and transportation. The system could be designed so that specific sectors of the economy were allocated emissions permits for free, which would give the government flexibility in targeting who would be impacted. However, it is considerably more complicated to administer.

The GNWT already administers a taxation system on many fossil fuels, so it would be easier for the GNWT to implement a carbon tax policy similar to British Columbia and Alberta, rather than a cap and trade system. Due to ease of administration, clarity and effectiveness we recommend the NWT proceed with a carbon tax.

3.2 Carbon Tax Design Considerations

Assuming a carbon tax is implemented (rather than a cap-and-trade system), **the second consideration is the extent of the coverage**. At present, the GNWT levies taxes on most fuels consumed in the NWT including gasoline, motive diesel, non-motive diesel and aviation, jet and railway fuels. Fuels not presently taxed include heating fuel, propane, natural gas and naptha. Extrapolating from GNWT data from 2010-2011 (see Department of Finance, GNWT 2012), it is estimated that the GNWT is currently taxing about 325 million liters of fuel per year. In terms of coverage, this represents an estimated 75% of the NWT's annual emissions[8].

[8] Fossil fuels used for space heating, such as heating oil, propane and natural gas, are currently not taxed but represent 20-25% of the NWT's annual GHG emissions.

A third design consideration is the stringency (price that should be set on emissions and who should pay). From 2006 to 2012, the price of fuel in the NWT increased by about $0.60/litre, which works out to a carbon price equivalent of roughly $200 per tonne of emissions. With oil prices falling, it could be argued that a price of $200 per tonne would be reasonable as it would simply return the price to what was paid in the past few years. However, the price of oil is unpredictable so it is practical to start off with a carbon tax at a low level, and then gradually increase it over time. A carbon tax could start at $20/tonne for an initial 5-year period and then be increased to $30/tonne for another 5 years. This would bring the NWT in line with other provinces in Canada and allow consumers and businesses sufficient time (i.e. up 5 years) to adjust their behaviours and implement technological solutions to reduce fuel consumption as opportunities arise.

With broad coverage, it is arguable that setting an initial low price on carbon still provides some stringency to the policy which will stimulate GHG emissions reductions. In addition, an initial low price per tonne of emissions eliminates any serious concerns about negatively impacting the competitiveness of NWT businesses or sectors, particularly given carbon pricing developments elsewhere in Canada.

A fourth consideration involves revenue recycling. Some degree of revenue recycling is required to protect low-income consumers and small, thermal communities from unaffordable cost increases. However, as we have seen over the last 10 years, simply increasing the price of fossil fuels will not address all the barriers to switching to a renewable energy based economy. Therefore, a significant portion of the carbon tax revenues collected should be allocated towards the implementation of various green energy solutions to help communities, businesses and residents make permanent reductions in their fossil fuel usage over time, which gets at the root of the problem.

There is much that can be done to help communities, businesses and residents implement solutions to reduce their fuel consumption and switch to renewable energy. Different parts of NWT society have different capacities to adapt. While corporations and governments may have the ability to respond to higher prices (by switching to wood pellets, for example) residents of remote communities face logistical, financial and technical challenges that they should not be expected to overcome without support. More research is needed into what those challenges are and resources should be allocated to address them.

For this reason, approximately 45% of the revenue from a carbon tax should be put in a fund to help energy users implement proven energy efficiency and clean energy practices and technologies. The GNWT should retain a small portion (~5%) of the carbon tax revenues collected to cover its administrative costs The remaining 50% of annual carbon tax revenues could be used to offset the increased cost of fuel to those who are the most impacted – by providing tax reductions or rebates, as needed.

A fifth consideration involves administrative burden. The implementation and administration of a carbon tax can easily be achieved by the GNWT's Department of Finance by bundling together the collection of carbon taxes and fuel taxes and designating current fuel tax collectors as carbon tax collectors.

In conclusion, when all of these factors are taken into account, it becomes clear that a well-designed carbon tax policy is one of the most effective tools available to the GNWT to reduce carbon emissions while protecting the economy.

3.3 Carbon Tax Assumptions and Options

As described in the previous section, there are several parameters involved in the design of a carbon tax scheme. To illustrate what a reasonable carbon tax policy might mean in the NWT, some assumptions were made which were then applied to two different carbon tax options. These are explained below.

3.3.1 Carbon Tax Assumptions

The analysis in this paper is based on the following assumptions:

Carbon Price – to maintain similarity with the carbon tax system in B.C. as well as the carbon tax system expected for Alberta in 2017, it was assumed that a NWT carbon tax would be set at $20/tonne for the first five (5) years, then increase to $30/tonne thereafter;

Time Horizon – for illustrative purposes, the analysis covers the first ten (10) years of a carbon tax. Obviously, once implemented, a carbon tax would continue indefinitely rather than sun-setting after 10 years;

Carbon Content – the carbon content for gasoline, railway, aviation fuels and diesel (motive and non-motive) ranges from about 2.342 to 2.786 kilograms of CO2e per liter. For simplicity, an average carbon content of 2.75 kg CO2e per liter was assumed for these fuels. For propane, an average carbon content of 1.54 kg CO2e per liter was assumed. For natural gas, an average carbon content of 1.92 kg CO2e per cubic meter was assumed;

Carbon Tax Rates – using the assumptions above, the following carbon tax rates were derived:

Fuel Type	$20/tonne	$30/tonne
Gasoline, aviation fuel and diesel (incl. heating fuel)	$0.055/litre	$0.0825/litre
Propane	$0.031/litre	$0.0462/litre
Natural gas	$0.038/litre	$0.0576/litre

3.3.2 Carbon Tax Options

Under the *Petroleum Products Tax Act*, the GNWT currently charges fuel taxes on gasoline, aviation fuel and diesel fuel used in combustion engines. Fuels not presently taxed include heating fuel, propane, natural gas, naphtha, butane, ethane, kerosene and menthol.

The key sources of information available on annual fuel sales in the NWT include Department of Finance fuel tax records and fuel sales records from the Fuel Services Division (formerly called the Petroleum

Products Division). Due to data limitations and confidentiality requirements, there are gaps and shortcomings in the available fuel data[9].

Two carbon tax options with different degrees of coverage were constructed:

Option #1: Apply a Carbon Tax to All Fossil Fuel Consumption (i.e. 100% Coverage)

One option is to apply a carbon tax to all fossil fuels. In practice, this option is difficult to assess as data on fuels currently exempt from taxation is either limited (i.e. heating fuel and naphtha) or isn't tracked (natural gas, propane, butane, ethane, kerosene and menthol).

Extrapolating from the fuel data that is available, it is estimated that in an average year, the NWT may use the equivalent of 400 million litres of fossil fuels that could be subjected to a carbon tax. A breakdown of this total is shown below, by use and fuel type:

End Use	Volume
Mining (power, heating, heavy equipment)	135 million liters
Transportation (aviation, railway, trucking)	115 million liters
Transportation (retail gasoline and diesel)	60 million liters
Diesel power generation (communities)	15 million liters
Heating in communities (diesel)	50 million liters
Heating in communities (propane)	15 million liters
Heating in communities (natural gas)	10 million liters
Other fuels (naphtha, butane, ethane, kerosene and menthol)	unknown
	400 million liters

In terms of coverage, it is estimated that this option would apply to about 95% of the NWT's total GHG emissions (the remaining emissions are due to oil and natural gas production / refining and other sources)[10].

Option #2: Apply a Carbon Tax to Currently-Taxed Fossil Fuels

Another option, which is easier to implement, is to apply a carbon tax to the fossil fuels already subject to fuel tax under the *Petroleum Products Tax Act*. In 2011/12, the latest year for which data are available, NWT businesses and residents consumed an estimated 325 million liters of fuel that was taxed.

Basically, the difference between Option #1 and #2 is the exclusion of fossil fuels used for space heating of homes, buildings and businesses.[11] Space heating (from fossil fuels and biomass) is estimated to be

[9] See Appendix A, Department of Finance, "*NWT Carbon Tax Discussion Paper* (2012).
[10] See NWT Greenhouse Gas Strategy 2011 – 2015, page 8.

responsible for about 30% of the NWT's annual emissions, mostly the result of the combustion of heating oil and propane. Exempting heating fuels from a carbon tax would therefore significantly reduce the extent of the coverage – likely down to about 75% of the NWT's GHG emissions.

3.3.3 Carbon Tax Revenues

The estimated carbon tax revenues that would be collected annually are shown below:

Sector	*$20/tonne*	*$30/tonne*
Mining (power, heating, heavy equipment): 135 million liters	$7,425,000	$11,137,500
Transportation (all fuels): 175 million liters	$9,625,000	$14,437,500
Power Generation (communities): 15 million liters	$ 825,000	$ 1,237,500
Heating (communities)		
Heating oil: 50 million liters	$2,750,000	$ 4,125,000
Propane: 15 million liters	$ 465,000	$ 693,000
Natural gas: 10 million liters	$ 380,000	$ 576,000
Annual Total	$21,470,000	$32,206,500

Under Option #1, the carbon tax, applied to all sectors, would generate revenues of about $21.5 million per year in Years 1-5 and about $32.2 million thereafter. Over an initial 10-year period, total carbon tax revenues would equal $268.5 million.

Under Option #2, the heating fuels would be exempted from a carbon tax. As a result, the annual revenues in Years 1-5 would be about $17.875 million, rising to about $26.812 million thereafter. Total carbon tax revenues collected over the initial 10-year period would equal $223.5 million.

3.3.4 Revenue Recycling

As noted earlier, B.C. recycles 100% of the carbon tax revenue received by using it to reduce other provincial taxes (referred to as 'revenue neutrality') – in 2013/14, 42% was used to reduce personal taxes and 58% went to reductions in corporate taxes. Alberta is currently designing the carbon tax scheme to be introduced in January 2017 so it is too early to know what Alberta intends to do with the carbon tax revenue it collects.

In the NWT, there are two significant public interest concerns to consider:

- ***Cost-of-living*** – there is clear recognition that the cost of living in NWT communities is quite high. Lowering the cost of living is one of the stated priorities of the 18th Legislative Assembly. Implementing a carbon tax without recycling revenue will increase the cost of fossil fuels which impacts NWT residents and businesses; and,

[11] Due to data limitations, Option #2 ignores the use of diesel fuel for space heating at the mines. This isn't considered significant as the mines capture as much heat as possible from their diesel power plants for their space heating requirements.

- ***Need to reduce dependency on imported fossil fuels*** – also included in the stated priorities of the 18th Legislative Assembly is support for energy efficiency, renewable energy and climate change mitigation and adaptation initiatives.

Using the above as a guide, the authors suggest that annual carbon tax revenues in the NWT be allocated in the following manner:

Revenue recycling: 50% should be used to reduce other personal and corporate taxes, including some form of tax rebate to assist low-income individuals and residents in the small, remote communities where the cost of living is the highest.

Green investments: 47.5% of the carbon tax revenues received should be invested in various energy efficiency and clean energy initiatives to help reduce fossil fuel use and GHG emissions. Over time, such investments may also help lower the cost of energy in the NWT.

GNWT admin costs: 2.5% of the revenues should be retained by the GNWT to offset the costs of administering the carbon tax and managing climate change-related initiatives.

3.4 Estimated GHG Emissions Reductions and Benefits

The two carbon options described earlier can be used to quantify the carbon tax benefits that would result in the first ten years:

GHG Emissions Reductions

The carbon analysis commissioned by the GNWT in 2011 (see MK Jaccard and Associates Inc.) provides some insight on how effective a carbon tax may be in reducing territorial GHG emissions.

To re-cap, this analysis was based on a twenty-year simulation of the NWT economy that contained numerous assumptions or forecasts of economic activity, infrastructure investments, technological advancements and energy supply and demand relationships, including the Mackenzie Gas Project.

One scenario, which assumed that the Mackenzie Gas Project would not proceed, estimated that a carbon tax (starting at $10/tonne and rising to $100/tonne over twenty years) would achieve emissions reductions of 6-13% (compared to a reference case with no carbon tax). Over time, as the carbon tax increases, it induces a greater range of emissions abatement actions, such as energy efficiency and fuel-switching.

Given Ecology North's assumption of an initial $20/tonne carbon tax for five years, followed by an increase to $30/tonne thereafter, it would appear that a modest carbon tax would only induce a relatively small reduction in annual territorial emissions, likely in the range of 5% or less. In this regard,

Option #1, which puts a carbon tax on all fossil fuels, would obviously have more impact than Option #2, which exempts heating fuels.

As the GNWT prepares its next Climate Change Strategy, it should explore a range of carbon pricing options to better quantify the relationship between specific carbon tax surcharges and the degree of emissions reductions that may result.

Investments in Green Solutions

As noted in section 3.3.4 above, we are suggesting that the GNWT implement a revenue-positive carbon tax so that some of the money collected is used to fund energy efficiency and green energy solutions.

Under Option #1, the carbon tax would generate estimated revenues of about $21.5 million per year in Years 1-5 (at $20/tonne) and about $32.2 million thereafter (at $30/tonne). Over an initial 10-year period, total carbon tax revenues would equal $268.5 million.

Under Option #2, the heating fuels would be exempted from a carbon tax. As a result, the estimated annual revenues would drop to about $17.875 million in Years 1-5 (at $20/tonne) and about $26.812 million thereafter (at $30/tonne). Total carbon tax revenues collected over the initial 10-year period would equal $223.5 million.

Assuming that 47.5 % of the total carbon tax collected over 10 years is allocated to energy efficiency and green energy solutions, approximately $127.5 million would be available under Option #1 or $106 million under Option #2.

Using $106 to $127 million as a guide, Ecology North suggests that the GNWT consider the following investment ideas:

- **Energy Efficiency Improvements** – the GNWT has committed to investigating the case for an NWT Energy Efficiency Act[12]. Ecology North encourages the GNWT to implement an NWT Energy Efficiency Act, however, even in the absence of such legislation, significant investments in energy efficiency should still be made to help reduce fossil fuel use, emissions and energy costs. It is suggested that over the first 10 years of a carbon tax, the GNWT consider investing at least $25 million in a grant program to assist communities, businesses and residents make energy efficiency improvements.

  Green Financing – another idea, discussed at the 2014 NWT Energy Charrette and included in the GNWT Response to the 2014 NWT Energy Charrette Report, is to revise territorial legislation to enable tax-based communities to use a Local Improvement Charge (LIC) to support homeowners and businesses make energy-related improvements. This concept is supported by the NWT

[12] See the "*GNWT Response to the 2014 NWT Energy Charrette Report*", page 12.

Association of Communities and the City of Yellowknife released a report on the potential for this type of program[13].

The GNWT could consider setting up its own green financing program or it could allocate some of the carbon tax revenues towards an LIC initiative that could be directly managed by the tax-based municipalities. It is suggested that $25 million be allocated to support community green financing programs. This would be a one-time investment as the program(s) should be self-sustaining.

Community Clean Energy Solutions – the GNWT currently has a (draft) Hydro Strategy, a Solar Strategy, a Biomass Energy Strategy and a Power System Plan and is examining the potential for wind energy among other things. As well, the GNWT has several programs to promote and support energy efficiency and renewable energy efforts and provides significant funding to support the Arctic Energy Alliance. In total, the GNWT is currently spending about $9.3 million annually on various energy actions and programs[14].

The GNWT could greatly expand such programming using carbon tax revenues. Depending on whether Option #1 or #2 is implemented, as well as the other investments described above, it is suggested that $55 to $75 million could be allocated to support various community-scale clean energy solutions over the first 10 years of a carbon tax. This would represent a significant increase in the amount of funding available to support such initiatives.

All of the above allocations should be **in addition** to current funding levels. The GNWT should not be tempted to use carbon tax revenues to replace funding for existing programs as this will not result in a net decrease in emissions.

Over time, the investments described above would further reduce fossil fuel use, GHG emissions and energy costs, and increase renewable energy use and associated employment opportunities.

Revenue Recycling: Protection of Low-Income Households, Small Businesses and Remote Communities

There is a legitimate concern about the cost-of-living impact that a carbon tax may have on low-income households, small businesses and communities that are not connected to the all-weather road system.

If the GNWT decided to use 50% of the carbon tax revenue collected for revenue recycling, over the first 10 years, this would equal about $134 million under Option #1 and $112 million under Option #2.

Using the BC carbon tax model as an example, the GNWT could consider dividing the tax reductions equally between personal and corporate taxes, as follows:*

- Low-income tax credits ($250 per person per year?) – 25% ($28 to $33.5 million)
- Remote community homeowner benefit ($300 per household?) – 25% ($28 to $33.5 million)

[13] See "*Loans for Heat: Towards a Yellowknife Energy Savings Program*". The idea of an LIC is to allow a property-owner (resident or business) to access low-cost, long-term financing from a municipality to invest in energy efficiency improvements and renewable energy retrofits, with repayment tied to the property through property liens and charges on the property tax bill.

[14] See "*GNWT Response to the 2014 NWT Energy Charrette Report*", page 30.

- Small business tax credit and corporate tax reductions – 50% ($56 to $67 million)

*The figures provided are for illustrative purposes only, the GNWT should consult with the public to determine the most appropriate measures.

3.5 Estimated Impacts on Consumers and the Economy

The cost of living in most NWT communities is already quite high and resource exploration and extraction and transportation are both important sectors in the NWT economy.

Implementing a carbon tax that will collect more than $100 million over an initial 10-year period is clearly going to increase the cost of energy and have some impact in the NWT economy.

To evaluate what these impacts may be, it is useful to consider the implications from several perspectives, including the NWT economy, the GNWT, the electric utilities and for a typical resident or small business.

NWT Economy

In 2014, the total value of all goods and services (i.e. gross domestic product) for the NWT was estimated at $3.83 billion. Key sectors include mining, oil and gas (29%), government, education and health (25%), construction (9%), retail/wholesale (8%) and transportation (7%). Numerous other industries and services make up the remaining 22%.

As shown earlier, a $20/tonne tax would generate annual revenues of $18 to $22 million and a $30/tonne tax would generate annual revenues of $27 to $32 million, depending on whether most, or all, fuels were included. Most of the carbon tax collected would be from three sectors of the economy; mining, transportation and space heating. The electric power industry would also pay a small amount.

For illustration, following is an assessment of the potential impact that a $30/tonne carbon tax, applied to all fuels (i.e. Option #1) may have on these four sectors of the NWT economy:

Sector	2014 Value	$30/Tonne Tax (annually)	Impact (%)
Mining	$1,794,280,000	$11,137,500	0.6
Transportation	$ 249,000,000	$14,437,500	5.8
Space heating (by oil)	$ 60,000,000 (est)	$ 4,125,000	6.9
Electric power	$ 150,000,000	$ 1,237,500	0.8

Overall, imposing a carbon tax (in the range of $20 to $30 million per year) on the NWT economy, with an annual value of $3.83 billion, would have a very negligible impact of less than 1% (i.e. 0.5% to 0.8%).

On a sectoral basis, the tax would also be very insignificant for the mining industry (at 0.6%) and for the electric power industry (at 0.8%). For the transportation sector and space heating, the potential impact could be somewhat higher, at about 6% and 8% respectively. However, it should be noted that some of this impact would be cushioned by revenue recycling and by significant investments in energy efficiency and green energy solutions.

GNWT Implications

As a major user of energy, the GNWT would also be directly impacted by a carbon tax. Available GNWT data indicates that the GNWT's annual expenditures on electricity and space heating were $21.7 million (in FY2009/10), as shown below:

Electricity:	$13.3 million
Heating:	$ 8.4 million

No information was available on the GNWT's use of transportation fuels. Allowing for transportation fuels and any new construction that has occurred since 2010, it would appear that the GNWT is likely spending at least $25 million annually[15] as a user of fossil fuels.

As a rough estimate, a $20/tonne carbon tax may result in a 2% increase (~$500,000) in the GNWT's annual energy expenditures. An eventual increase to a $30/tonne would bring this impact to about $1.0 million annually (assuming no corresponding decrease in the GNWT's overall fossil fuel consumption). One note: due to the GNWT's early adoption of biomass technology, they have already decreased their exposure to a carbon tax.

Typical Household / Business

Depending on individual circumstances and local conditions, the annual consumption of energy (i.e. electricity, heating oil and motive fuel) by a typical household or small business, and the prevailing prices paid by the customer, can vary considerably between different communities.

As a general rule, energy users in the southern NWT consume less energy due to milder climatic conditions and have access to multiple sources of energy at lower prices, than compared to energy consumers in more northern communities that contend with longer winters, fewer supply choices and higher retail prices.

To illustrate what a $20/tonne or $30/tonne carbon tax might mean for a typical NWT household or business that uses gasoline and heating fuel, the following average price ranges were assumed:

Heating oil:	$1.00 to $1.25 per liter
Motive fuel:	$1.00 to $1.25 per liter

[15] This figure is a conservative estimate as it does not include energy expenditures by the NWT Housing Corporation or any leased buildings or facilities that the GNWT occupies.

Adding a carbon tax of $0.055 ($20/tonne) to $0.0825 ($30/tonne) per liter to these prices ranges (and assuming no corresponding decrease in the customer's actual consumption patterns), the impact on consumers would be as follows:

Heating oil cost increase: 5.5% - 6.6%

Motive fuel cost increase: 5.5% - 6.6%

For a typical household that consumes 5,000 liters in total per year (heating oil and motive fuel combined), the cost increase from $20/tonne or $30/tonne carbon tax would range from $275 to $412 per year.

For a typical small business that consumes 25,000 to 50,000 liters in total per year, the cost increase due to a $20/tonne or $30/tonne carbon tax would range from $1,375 to $4,125 per year.

For a larger business that consumes 100,000 to 200,000 liters in total per year, the cost increase due to a $20/tonne or $30/tonne carbon tax would range from $5,500 to $16,500 per year.

These estimated cost-of-living impacts from a $20/tonne or $30/tonne carbon tax aren't precise but should serve as a starting point that the GNWT can use in designing personal and business tax breaks or rebates to recycle 50% of the annual carbon tax revenue received.

4.0 RECOMMENDATIONS

To summarize, in order for the GNWT to begin moving towards a 100% renewable economy, the GNWT should consider the following:

1. Implement a Carbon Tax – start at $20/tonne and increase to $30/tonne after 5 years. Apply the tax to most of the fossil fuel (current taxation policy) sold annually in the NWT (estimated 325 million liters) or all of the fossil fuel (estimated 400 million liters)

2. Carbon Tax Revenues – allocate 2.5% to GNWT administration, 47.5% to energy efficiency and green energy investments and 50% to tax cuts and rebates; and,

3. Green Solutions – focus on energy efficiency, green financing and clean energy solutions that can be implemented at a community scale (i.e. focus on community governments, small businesses and residents)

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