Alternatives North

Climate Emergency:
Getting the NWT off Diesel

Cost effective investments to reduce NWT GHG emissions by 50% within 5 years.

April 22, 2020

For Public Release

Wood Pellet Heating

Renewable Diesel

Carbon Offsets

Gold Standard®

Plain Language Summary

Alternatives North has been telling people and leaders in the NWT that global warming is an emergency for at least the last 20 years. People and leaders in the NWT are aware that climate change is caused by burning fossil fuels like diesel, heating oil, gasoline and jet-fuel. They are often more concerned about other things such as the high cost of living or the high cost of doing business in the NWT. Some actions that both saved money and also reduced burning fossil fuels have been successful, such as:

- The City of Yellowknife required that new homes be more energy efficient – new homes now use half as much heating fuel as old ones,
- Diavik Diamond mine installed Wind turbines that reduced diesel fuel use in their generators by almost 4.5 million litres per year
- Many homes and buildings started heating with wood pellets.

These successes are not enough. We are still burning too much fossil fuel. If everyone in the world followed our example, climate change would get much worse.

Recent protests by young people, both in the NWT and around the world have been saying, again, that global warming is an emergency. As Greta Thunberg has so clearly put it "We *want you to act as if your house is on fire – because it is.*"

What kind of actions would you take if your house was on fire? Would you:

1. Fight the fire with actions that save money, but are not very good at fighting fires? For example, shoveling snow onto the fire from your driveway – so you don't have to pay someone to plow the driveway later?
2. Fight the fire with things that cost money, and actually work well at fighting fires? For example, using trained fire-fighters and a fire truck?
3. Fight the fire with actions that are very expensive, but not very good at fighting fire? For example, buying a fancy pickup truck to plow the snow from your driveway onto the fire – because you really wanted an excuse to buy that truck?

The answer is that in an emergency, we need to focus on affordable actions that get results quickly.

The climate emergency is a global emergency. Everyone around the world must stop burning fossil fuels and use renewable energy – the sooner the better. The NWT is a small part of the global community, but pointing fingers at other parts of the world is not helpful. We need to take action to reduce our own fossil fuel use as an example for others.

In this report we compare the costs of actions that would cut fossil fuel burning in half in the NWT as soon as possible. In 2017 the NWT burned almost 450 million litres or about 7,200 "Super B" double tanker truck loads of fossil fuels. Only one out of four of these tanker trucks delivered fuel to NWT communities; three out of four went to the mines, so we know that mines have to be part of the solution.

There are lots of ways to stop burning fossil fuels. We looked at the following "pathways":

- Buying carbon offsets (paying people in other parts of the world to stop using fossil fuels)
- Replacing diesel and heating oil with renewable diesel (a type of diesel made from plant oil and animal fat)
- Replacing heating oil with large wood pellet boilers that pipe heat to lots of buildings
- Replacing heating oil with waste heat from diesel generators
- Replacing diesel generators at mines with wood pellet steam power plants
- Replacing diesel generators at future mines near Yellowknife with hydro power from the existing Taltson Hydro system near Fort Smith by building a power line across Great Slave Lake
- Replacing diesel generators at Ekati and future mines near Yellowknife with hydro power from an expanded Taltson Hydro system by building a power line across Great Slave Lake, and out to the mines and also to Fort Providence
- Replacing some of the diesel burned in generators with wind and solar panels (partial analysis based on existing studies)

For each pathway we looked at:

- Would it get the results we need? To cut fossil fuel burning in half, we need to replace at least 225 million litres of diesel (3,600 double tanker loads) per year
- How much would it cost to build?
- How much would it cost to operate and maintain for 20 years? How much would we save from not buying diesel?

We added all the costs and savings up over 20 years and divided that by the amount of diesel that would be replaced so that the comparison would be fair.

In NWT communities replacing heating oil with large wood pellet boilers and waste heat from the diesel generators that heat most of the homes and buildings would replace 25 million litres of diesel or 400 double tanker-truck loads. This would require around $140M to install the boilers and the pipes to bring the heat to buildings in each community. It would reduce heating bills by 20% and still make about $80M over twenty years. This would also create construction jobs in the NWT communities. But this pathway only reduces heating oil use by 25 million litres - 200 million litres short of our target. If we don't do more, we will be like the person shovelling snow from their driveway onto their burning house so they won't have to pay to get the driveway plowed later. Using wood pellets and waste heat will help reduce fossil fuel use and it will save money, but it is not enough to solve the problem.

To replace the remaining 200 million litres we need to invest in pathways that get the most "bang for our buck".

We found that the next cheapest and fastest way to replace fossil fuels is to buy Gold Standard carbon offsets. The NWT has long, dark, and cold winters, long distances between communities and mines, and high

labour costs which all combine to make it one of the most expensive places in the world to build renewable energy systems. Carbon offsets provide funding to people in parts of the world where renewable energy has less technical challenges, but people cannot afford it. For example, carbon offset funds could help pay to replace a kerosene lantern with a solar powered lamp in Africa where there is plenty of sunshine but many people live on less than $2 per day. The Gold Standard is a certification organization based in Switzerland that makes sure that the money actually goes to projects that reduce the burning of fossil fuels. The NWT would need an investment of $15 million per year to offset half of its fossil fuel use. This could start right away. Buying carbon offsets is like paying for a fire truck to come from another town to fight the fire in your home – because your region's fire truck is too slow and costs too much – Gold Standard carbon offsets are the most cost effective way of quickly solving the problem.

However, we don't know how much Gold Standard carbon offsets will cost in the future. Even if it costs more, many people would prefer to invest our money closer to home and directly replace the fossil fuels we burn in the NWT.

Renewable diesel is the only pathway that could directly replace 200 million litres of fossil fuels in the NWT. In fact, when it is formulated for winter use it could replace all 370 million litres of fossil diesel and heating oil we burn. Renewable diesel is a direct replacement for fossil diesel that is made from plant oils and animal fat in a refinery in a similar way to how fossil diesel is made from crude oil. At an estimated wholesale price of $1.60 per litre, an investment of $65 million per year would allow renewable diesel to be sold for the same price as fossil diesel and heating oil. California already uses 200 million litres of renewable diesel per year and there are plans to start producing it in Alberta. In our house fire analogy, investing in renewable diesel is like paying extra to bring in the region's fire truck. Renewable diesel costs more, but it solves the problem and keeps our money closer to home.

Transmission lines across Great Slave Lake, Taltson hydro expansion, solar panels, and wood pellet fired electricity generating plants are three to six times more expensive than renewable diesel (over 20 years). Even in the most optimistic and unlikely scenarios, they would only replace 100 million litres of fossil diesel per year. These pathways are more like the third option in our house fire analogy – like buying a fancy truck to plow snow from your driveway onto the fire, because you really wanted that fancy truck. Transmission lines across Great Slave Lake, Taltson expansion, solar panels and wood pellet fired electricity plants could replace some fossil fuels and might be very fancy, but they would not solve the problem. Building them might use up all the money that is supposed to be spent reducing fossil fuel use.

We looked at the different plans and strategies that the GNWT has produced over the last decade or so. We found that, in the past, the GNWT treated climate change more like the "shovelling snow onto the fire from the driveway" option. They invested in small projects that saved some money, but did not address the problem. Now that the Government of Canada is offering funding to replace fossil fuels, the GNWT's 2030 Energy Strategy is like "buying a fancy truck to plow snow onto your house fire – because you really wanted that fancy truck". The vast majority of funding is now proposed to go to transmission lines across Great Slave Lake and expanding Taltson Hydro. These are extremely expensive projects that will not reduce diesel use enough.

Recommendations

This leads to the following recommendations:

1. The GNWT revise the current Energy Strategy towards more immediate and cost effective ways of reducing emissions – as outlined below
2. The GNWT commit to purchasing 600 kt of Gold Standard Carbon Offsets (about $15M/yr), starting in 2020 and continue to purchase offsets each year as required to maintain a total reduction of 600kt as other actions take effect
3. The GNWT directly invest over the next 5 years in the construction of biomass and co-generation district heating systems in NWT communities (~$145M). This should be done over the next five years with financial support from the Government of Canada. The GNWT should also operate these systems and sell heat recovered from diesel generators and centralized biomass boilers at 80% of the price of fossil heating oil. This is estimated to reduce emissions by 68kt/yr
4. The GNWT should immediately begin a transition from fossil diesel to renewable diesel. The GNWT can begin with its own internal operations, and show how renewable diesel can be used in its own boilers, vehicles, and generators. The GNWT should also work with fuel suppliers to purchase approximately 200M litres of renewable diesel per year within 5 years and provide a subsidy to reduce the price to be the same as fossil diesel (~$65M/yr). Combining renewable diesel use with the district heating systems in recommendation three would result in at least 600kt of annual reductions within 5 years and eliminate the need to purchase carbon offsets
5. The GNWT commission a study, similar to this one to examine the most cost effective way of becoming carbon neutral within 15 years. While this study uses tail-pipe emissions, life cycle analysis of each fuel source would be better. However, lack of life-cycle analysis is not an excuse for delaying action. As NWT moves toward climate neutrality a method for life cycle carbon accounting similar to what is used for California's renewable fuel standards or Canada's Clean Fuel Standard should be adopted.

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PLAIN LANGUAGE SUMMARY ONLY

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March 16, 2020

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