CLIMATE CHANGE IQ

A SERIES OF BACKGROUNDERS

Greener transportation

PART I

Biofuels: The good and bad

GREENHOUSE GAS (GHG) emissions are the major contributor to climate change. Transportation in Canada is a major contributor to our GHG emissions—measuring 26% or more of our GHG emissions, according to Statistics Canada. Worse still, Canadian transportation emissions are expected to rise as more people come to own cars and drive them further.

Therefore, any serious plan to lessen the damage and dangers of climate change must include strategies to reduce the GHG emissions due to transportation.

To find the best solutions we need to critically examine our options. The National Union has chosen to explore three areas crucial to the transportation puzzle:

1) Biofuels: the good and bad;
2) Personal Transportation and Fuel Efficient Vehicles; and
3) Public Transportation and Policy.

PART ONE
BIOFUELS: THE GOOD AND BAD

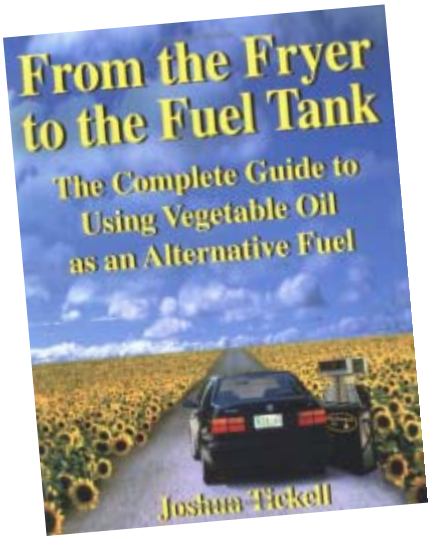
A tremendous surge in economic activity has begun with the creation of a biofuel industry in virtually every developed country on the planet. It is being presented as a key part to each country's plan to reduce their GHG emission. For this reason we thought we would reflect on some facts and evaluate for ourselves the impact that biofuels, ethanol and biodiesel, may have on the problem of climate change.

Only part of the solution

We need to keep in mind that biofuels are only part of any solution, simply a piece of a much more comprehensive plan which should emphasize the efficient use of fuel, and place curbs on fuel consumption.

Over the past decade there have been fleeting campaigns urging car drivers to buy ethanol blended fuel made from grains like corn and wheat. At some gas stations you can find a pump decorated in green or perhaps sporting a leaf to indicate its contents as a "cleaner option". By all accounts these ethanol blends do burn cleaner and have fewer pollutants coming out

national union



of the tailpipe than conventional gasoline. This fact makes them of particular interest when considering actions to mitigate climate change caused by burning gasoline.

Biodiesel seems to have a much more grassroots history in its offerings as a fossil-fuel alternative. In the early days of biodiesel, garage chemists would use waste fry oil or fats from the local chip wagon or the diner down the street. A simple process would convert it to biodiesel suitable for putting in any diesel vehicle's tank, straight-up or blended with petroleum diesel.

With the expansion of commercial biodiesel production, various oil seeds are made into vegetable oils and then modified to run diesel vehicles. Similarly, biodiesel burns cleaner and of course frees us up from a reliance on fossil fuels.

So where's the problem?
The problems start to emerge when we look at the proposed scale of production. As governments around the world look at biofuels as part of their greenhouse gas reduction schemes, they are adopting an increase of their use through mandatory targets and subsidies.

Biofuels can be a cause of, not a solution to, climate change

The increased volume of vegetable oils required to meet each country's blended percentage of ethanol/gasoline or biodiesel / diesel has already had **significant impact on the environment.** In fact the CO_2 emissions can actually be higher for ethanol and biodiesel when the entire chain of production is taken into account. This should be cause for alarm – putting biofuels in the category of *a cause of,* not *a solution to*, climate change.

BIOFUELS IN PERSPECTIVE

The Good

- A good possibility of no threat to food security with the use of Jatropha curcas (a non-food plant) or plant stocks and waste wood.
- A good possibility of low levels of energy input when small, organic, labour intensive farms take part.

- Decreased GHG Emissions
  at the tailpipe when compared to fossil fuel use.
- Economic benefits for farmers, for communities with small refineries achieving fossil fuel independence.

The Bad

- High water consumption
  with conventional irrigation practices and drying climates in North America's Midwest.
- Threat to food security
  where food competes with fuel for arable land.
- Energy input high
  with conventional agribusiness practices of large machinery, fertilizers and pesticides.
- Biodiversity lost
  if deforestation continues to make way for palm and soy plantations, species will be lost.
- Increased GHG emissions
  when "carbon sinks" like the rainforests are burned to clear land for fuel crops.
- Economic benefits
  for multinational corporations with large refineries.

AMBITIOUS TARGETS

Countries are scrambling to fix mandatory targets for the blending of biofuels with fossil fuels as part of their plans to reduce their overall GHG emission. The eagerness to apply this fix to our transportation troubles is that little reflection is going into the full impacts of biofuel production.

COUNTRY	*TARGET #1*	*TARGET #2*	*TARGET #3*
European Union	5.75% by 2008	7% by 2010	10% by 2020
Britain	2.5% by 2008	5% by 2010	33% by 2050
Canada	5% by 2010 ethanol		2% by 2012 biodiesel

THE ETHANOL JUGGERNAUT

The US and Brazil: Leading producers of bioethanol

The opportunities provided by these new targets are not lost on US businesses, neither the farmers nor the ethanol and biodiesel refineries. In the US, 115 plants are already on-line and 77 are under construction. The US targets are production targets. A quintupling of production, reaching 132 billion litres of biofuels produced annually by 2017, has affected both the agribusiness and the oil companies in the US and globally.

Currently, Canadian canola-biodiesel production is at 150 million litres from four refinery plants but needs to ramp up to 600 million litres to meet the 2% Canadian mandate by 2012. Government incentives are responsible for new biodiesel and ethanol refineries in Ontario and Alberta, struggling to meet the production target, while Canadian canola growers are pushing for a larger 5% fuel standard by 2015.

In our scramble to reduce our emissions, we can't be highjacked by corporations to choose a path that is ineffective and creates a variety of additional problems.



The BIGGER Picture

Energy, water and farm land are required to grow corn, sugar cane, soy, palm and other food crops that will be used to produce biofuels. The impact of consuming energy and water and using arable land to produce fuel requires reflection. Our appetite for fuel competing with the need for food is also of concern.

Energy is required to grow corn and other crops, especially on the agribusiness scale required to feed the refineries. Consider the large machinery—tractors and combines. There will be emissions from these machines even if they use blended fuels. Furthermore, agribusiness uses fertilizers and pesticides that also require energy input and petrochemicals in their production. Farmers will no doubt be turning over previously unfarmed land to reap ongoing profits from growing fuel crops.

Water, through modern irrigation techniques, will also be used to ensure the maximum yields of these crops and, with a warming climate, competition for water will be high.

Of grave concern are the reports of **tropical rainforests being cut and burned** in Brazil (for soy), and in Indonesia and Malaysia (for palm) to make way for fuel crops.

We are only beginning to understand the many implications of destroying the planet's biodiversity

The burning of any forest releases CO_2 as the carbon in wood is released. The rainforests are not only a massive "carbon sink" (a storage place for carbon) but they also act as a climate controller. This massive ecosystem moderates the water cycle at the equator influencing precipitation globally. As we destroy the remaining rainforest, we lose not only habitat for hundreds of thousands of species, we lose unique plants and animals from the earth's biological catalogue daily. We are only beginning to understand the implications of destroying the planet's biodiversity.

A report from Dutch consultants, Delft Hydraulics, shows that every tonne of palm oil produced in this way results in 33 tonnes of **CO_2 emissions**. Biodiesel from palm oil causes ten times as much climate change as ordinary diesel. A recent UK-funded report found Indonesia was the world's third-largest emitter behind the US and China, largely because of the annual forest fires.

The loss of arable land to the production of fuel crops is most tragic of all. Competition between "food for cars or food for people" is a game we cannot afford to engage in, given the limited arable land on the planet and the number of starving people.

Farmers, in the US, have responded to the demand for ethanol by planting over 90 million acres of corn this spring. The result is record reductions in rice, cotton and soy. A quarter of this corn harvest will be used to manufacturer ethanol. Already the high price of corn is triggering protests in Mexico. China and India are starting to suffer from food inflation. Since the US livestock farmers have switched to wheat feed, the intense demand for corn is easing but the food versus fuel debate is not going away.

African countries also hope to cash in on the high prices of sugar,

maize and soy. The threat to **food security** is real. The ethics of using food for fuel in some of the poorest countries in the world cannot be ignored. An offered solution to the food vs. fuel debate is *Jatropha curcas*. This shrub species is not a food plant and has ideal qualities for biofuel production. Still we have the problem of plantations instead of rainforest, and possibly the energy intensive use of pesticides and fertilizers.

A movement to develop guidelines, certification and acceditation of biofuels is underway. An alliance of environmentalists is working on biodiesel standards, with ethanol accreditation to follow. A proposed Dutch law will only allow biofuels if they can be proven to: cause no environmental damage, lead to less emissions of GHGs than fossil fuels, not endanger food security, and contribute to the prosperity of local communities. A "track and trace" monitoring system has been suggested, but the EU is only beginning to look at the problem. The truth is unsustainable biofuels are already a part of the European market.



BIOFUELS FROM WASTE: CELLULOSIC ETHANOL

In the long run even sustainable biofuels will occupy the space that food crops used to. So what about using something that we humans have lots of, waste! Enter cellulosic ethanol.

Converting the cellulose in wood wastes and crop wastes (the non-edible stocks) into ethanol through enzyme conversion is entirely possible and has been done for years. This technique could either remove the use of food as fuel from the equation, or increase ethanol yields from sugar cane and corn crops by approximately one-third, because it would be able to use what is currently waste parts of the plants.

The catch is no company has yet been able to produce ethanol from cellulose in mass quantities that are priced competitively with corn-based ethanol. This method still has tremendous merit and solutions should be found to this pric-

ing problem. Without the ethanol produced from waste no country will meet its long-term targets for biofuels. There is simply not enough arable land.

THE ANSWER

Reduced consumption + Increased efficiency

The pressure to deliver an endless flow of fuel is at the heart of the problem. As long as someone can make a profit on this fuel it will be packaged and delivered to us as a solution.

We need to focus on reducing consumption through a variety of measures. A variety of incentives and efficiency regulations can reduce our need for increasing quantities of fuel.

- mandatory fuel economy standards on personal and commercial vehicles
- dedicated taxes on gas to influence purchasing and consumption habits
- walking paths and cycling lanes to encourage alternatives for short trips
- improvements to public transit systems
- tax free bus passes
- fee-bate schemes for efficient personal vehicles
- an improved rail system to limit trucking of freight

Countries in their planning for reduction targets need to focus on sustainable solutions. Canada and other countries pursuing the biofuel solution need to put a **moratorium on biofuel incentives** – 5 year freeze. During this time maximum effort should be placed on efficiency, reducing consumption, and resolving the shortcomings of biofuel production.