



Canadian Renewable Fuels Association

Association Canadienne Des Carburants Renouvelables

Biodiesel

Key Issues

Fact Sheets/Responses to Key Issues for Canada's
Biodiesel Industry

Canadian Renewable Fuels Association
10/14/2010

Contents

- ISSUE: The Economy 3
- ISSUE: Rural Economic Benefits 4
- ISSUE: Boosting Farm Income 5
- ISSUE: Environmental Benefits and Climate Change..... 6
- ISSUE: Energy Balance 7
- ISSUE: Indirect Land Use Change (ILUC) 8
- ISSUE: Water Constraints 9
- ISSUE: Fuel and Food 10
- ISSUE: Government Programs and Incentives 11
- ISSUE: Engine Performance..... 12
- ISSUE: Biodiesel Blends 14

ISSUE: The Economy

What economic impact does biodiesel production have?

Renewable fuels production in Canada is a source of job creation, economic activity and higher revenues that governments, in turn can use to pay for crucial public services.

• **A Jobs and Growth Engine.** A sweeping and independent study conducted by econometric firm Doyletech Corporation, concluded that the renewable fuels sector in Canada has provided a \$2.9 billion boost to economic activity and generated some 14,000 full-time jobs. What's more, each and every year it is responsible for a further \$1.5 billion in economic activity and an additional 1,000 new jobs.

The report studied 28 ethanol and biodiesel plants across Canada and added that there were major benefits from renewable fuels in "rural re-vitalization, increased oil exports from western Canada, industrial development, and valuable options for re-balancing fuel "mix"."

FACT: The very first independent survey dedicated to measuring the economic impact of Canada's renewable fuels sector was conducted in May 2010 by Ottawa-based Doyletech Corporation. It found that \$2.9 billion has been generated in economic activity from plant construction and approximately \$1.473 billion in economic activity is generated annually from these same facilities. Nearly all of it in rural Canada. ¹

• **Good Jobs, Not McJobs.** In addition to construction, there is new direct and indirect job creation in day-to-day operations of these cutting edge facilities. The jobs range from highly skilled research and development positions to manufacturing, marketing, sales, customer service, and distribution. BioTalent Canada reports that sixty-three percent (63%) of organizations in bioenergy, biofuels and industrial biotechnology reported having unfilled positions requiring industry-specific skills.²

FACT: 14,177 new direct and indirect jobs have been created since 2006 to support construction of new ethanol and biodiesel production facilities and each year, as many as 1,038 new jobs are created to support ongoing operations of renewable fuels facilities in Canada. ³

• **Guaranteed market for canola.** Canada currently exports 85% of the canola it produces either as seed, oil or meal. Japan is our largest seed customer and the US our largest oil customer. The federal renewable fuel standard will provide fundamental, long-term support for Canadian farmers by creating guaranteed market demand. Canola is vulnerable to trade impacts because of tariffs and non-tariff trade barriers. Made-in-Canada canola biodiesel will stabilize demand and help increase the value-added industry that is already expanding in Canada in anticipation of increased use of canola in North America.

¹ Doyletech Canada, Total Economic Impact Assessment of Biofuels Plants in Canada, May 2010

² BioTalent Canada, 'Generating opportunity - Human resources needs in the bioenergy, biofuels and industrial biotechnology subsectors', September 17, 2009

³ Doyletech Canada, Total Economic Impact Assessment of Biofuels Plants in Canada, May 2010

ISSUE: Rural Economic Benefits

What impact will biodiesel have on our rural communities?

Renewable fuels represent tangible hope for economic renewal in many rural communities across Canada.

- **Biodiesel is good for rural Canada.** It benefits communities and residents by attracting investment, increasing farm incomes, and creating new jobs.

The very first independent survey dedicated to measuring the economic impact of Canada's renewable fuels sector was conducted in May 2010 by Ottawa-based DoyleTech Corporation. It found:

- 14,177 new direct and indirect jobs have been created to support construction of new production facilities and each year, as many as 1,038 new jobs are created to support ongoing operations.
- \$2.949 billion has been generated in economic activity from plant construction and approximately \$1.473 billion in economic activity is generated annually from these same facilities. Nearly all of it in rural Canada. ⁴

FACT: The report studied 28 ethanol and biodiesel plants across Canada and added that there were major benefits from renewable fuels in "rural re-vitalization, increased oil exports from western Canada, industrial development, and valuable options for re-balancing fuel "mix"."

- **Communities benefit from new property tax revenues.** New plants mean municipalities have more money to invest in services and infrastructure.

- **Local suppliers reap the rewards.** The local economic impact is positive and builds outward. From the local farmer who receives a better price for his crops to the new plant, rural shopkeepers, suppliers, and businessmen, all receive a tangible economic boost.

⁴ Doyletech Canada, Total Economic Impact Assessment of Biofuels Plants in Canada, May 2010

ISSUE: Boosting Farm Income

Will biodiesel have a positive impact on farm incomes?

Yes. While increases in crop prices are still relatively modest, they do translate into the most sustainable prospect for boosted farm incomes in years.

- **Farmers are getting fair prices.** Farmers are now able to earn more than the cost of production, putting them into a net positive position. In addition to basic fairness, this turn of events will help combat distortions in global agricultural subsidies that hit both our own farmers and those in the developing world very hard. Renewable fuels production also provides a market for damaged or low-grade crops.

FACT: Canada's canola industry adds \$13.8 billion in economic activity to the Canadian economy. More than 52,000 Canadian farmers grow canola – largely as full-time farmers and in family farm businesses. They depend on canola to generate between one third and one half of their revenues. Domestically, canola generates economic activity of \$1.3 billion in Ontario and Quebec (primarily in the processing sector), and \$12.2 billion in western Canada. Canola exports bring over \$2.8 billion back to the Canadian economy, and represent 75% of our annual production.⁵

- **Biodiesel is creating new demand and new markets.** There's no doubt that this new industry is good for the economy as new plants are built, jobs are created and farmers' incomes rise. It is expected that in Canada, substituting just 5% of the diesel we use today with domestically produced biodiesel will generate more than \$600 million in capital expenditures and contribute more than \$.1.1 billion per year additional farm income.⁶

⁵ http://www.canolacouncil.org/canadian_canola_industry.aspx

⁶ Economic Impact Study for a Canola-based Biodiesel Industry in Canada, July 2006, BBI Biofuels Canada

ISSUE: Environmental Benefits and Climate Change

Is it true that biodiesel generates environmental benefits?

Yes. Biodiesel is a practical alternative energy source that can be used in vehicles right now and both lowers GHG emissions and improves local air quality.

• **Biodiesel cuts emissions from our diesel cars, trucks and trains.** If Canadians are going to succeed in combating climate change, we're going to have to deal head-on with transportation fuels that generate large GHGs emissions from our diesel powered cars, trucks and other vehicles. Biodiesel is the only practical, immediately available means to lower this impact.

FACT: Using biodiesel blended fuel is environmentally responsible: it reduces carbon dioxide emissions by up to 99% compared with petroleum diesel, reduces emissions of particulate matter by 50%, reduces emissions of unburned hydrocarbons by 67%, reduces carbon monoxide emissions by 48% and it is sulfur and benzene free ⁷ Each of these emission reductions reduces harms to human health, especially local carcinogens created through the combustion of diesel fuel.

• **Biodiesel lowers GHG's.** A new independent third party analysis of Canadian renewable fuel production from ChemInfo Services Inc. confirms that based on a lifecycle assessment, Canadian produced biodiesel significantly reduce greenhouse gas emissions. Biodiesel reduces GHGs by up to 99%.⁸

• **Biodiesel uses less energy.** NRCan states that canola biodiesel has a positive energy balance when compared to highway diesel. Diesel fuel requires 1.25 units of energy to produce one unit of fuel at the pump. Biodiesel from canola only needs 0.23 units to produce a unit of energy at the pump and that means that the canola oil biodiesel requires 81% less energy ($1.25 - 0.23 / 1.25$) to produce than fossil diesel.

• **Biodiesel is highly biodegradable.** It is an environmentally sound choice. Biodiesel degrades about four times faster than petroleum diesel. Within 28 days, pure biodiesel degrades 85 to 88 % in water.⁹

FACT: Biodiesel that is made from rendered animal fats or recycled restaurant grease not only doesn't consume water, but it produces water which is then subjected to a sophisticated and rigorous wastewater treatment and purification system prior to discharge into the natural local watershed.¹⁰

⁷ BIOX, Benefits of Biodiesel, http://www.bioxcorp.com/benefits_of_biodiesel.php

⁸ Cheminfo Services Inc., Life Cycle Assessment of Renewable Fuel Production from Canadian Biofuel Plants for 2008-2009, November 25, 2009

⁹ National Biodiesel Board "Environment and Safety Information" 2006

ISSUE: Energy Balance

Isn't it true that biodiesel has a negative energy balance - i.e. that production of biodiesel consumes more energy than it produces?

No. Biodiesel produces a decidedly positive balance.

- **Studies show a biodiesel advantage.** NRCan states that canola biodiesel has a positive energy balance when compared to highway diesel. Diesel fuel requires 1.25 units of energy to produce one unit of fuel at the pump. Biodiesel from canola only needs 0.23 units to produce a unit of energy at the pump and that means that the canola oil biodiesel requires 81% less energy ($1.25 - 0.23 / 1.25$) to produce than fossil diesel.

FACT: For biodiesel feedstocks considered as waste (such as used cooking grease), the news is even better, there is a positive net energy ratio of 14.5 units of fuel for every unit of energy consumed.

- **Use a lifecycle analysis.** It's important to examine energy balance based on the entire lifecycle – that is to say all the inputs and outputs involved. Studies that adopt this approach consistently find that biodiesel has a positive energy balance. NRCan's GHGenius model calculates the energy required to produce renewable fuels. Since GHGenius is a lifecycle model, it takes into account the energy imbedded in the co-products from the production process and adjusts. The energy balances for renewable fuels production in Canada are all positive.

- **Rising Oil Prices Generate Environmental Risks.** As prices soared well above \$100 per barrel in 2008, oil companies began exploring new sources of production that are more remote and require energy intensive extraction methods. This included deep sea drilling of the kind that has caused such controversy in the Gulf of Mexico – as well as the tar sands and arctic exploration. These all carry increased environmental risks, require the expenditure of even greater rates of energy, and contribute much more to greenhouse gas emissions. It is these additional sources of petroleum fuel, which will be displaced by renewable fuels such as biodiesel.

¹⁰ Rothsay Biodiesel, www.rothsaybiodiesel.ca

ISSUE: Indirect Land Use Change (ILUC)

Does using more renewable fuels in Canada mean that we will need to create more farmland internationally? Do energy balances factor in the possibility of indirect land use change?

No. ILUC is a flawed methodology that has been criticized by many independent experts as using false assumptions. Canada has enough current farm land and fallow land to not only produce renewable fuels but also for feed, food, and fibre needs as well.

- **Indirect emissions cannot be measured accurately.** The very nature of indirect emissions means that they cannot be measured or predicted with certainty.

- **ILUC calculations originally done by the EPA and California are based on false assumptions.** The EPA calculations attribute all forest harvesting emissions to indirect land use emissions for agriculture. Even natural deforestation, forest fires, disease, climate damage are also charged to agriculture.

- **Why single out renewable fuels?** The concept of indirect emissions is only being applied renewable fuels and not traditional fossil fuels. GHG reductions in alternative fuels are measured against a percentage difference from gasoline and distillate. However, the indirect emissions from fossil fuels for increased drilling and more intensive extractions procedures are not being taken into account. When assessing GHG emissions, a level playing field of assumptions must be used in order for the analysis to be meaningful. ILUC studies to date have not done this.

- **World agricultural systems are not operating at maximum capacity.** The ILUC argument assumes that the global agricultural system is operating at full capacity. This is untrue. There are many countries where not all agricultural land is fully utilized. Land is often idled due to a lack of markets and crop producers do not utilize the optimum amounts of fertilizer. Often measures to protect the crop from diseases and pests are not taken, nor are the latest varieties of seeds utilized. For example, in the United States somewhere between 65% and 75% of the agricultural land is used to produce a crop, the rest of the land is in temporary pasture, summer fallowed, or otherwise idle. Similar situations can be found in other countries, India idles as much land each year in summer fallow as 65% of the cropland in Canada.¹¹ Each of these opportunities to increase production can be taken before additional land must be brought into cultivation.

There is significant potential for increasing the production of agricultural crops throughout the world simply by maximizing the capacity of the land that is already in agriculture.

¹¹ Letter to BC Government in Response to Low Carbon Fuel Requirements Regulation Intentions Paper for Consultation, Don O'Connor on behalf of CRFA, Sept 30, 2009

ISSUE: Water Constraints

Isn't it true that biodiesel production consumes massive amounts of fresh water?

No.

• **Biodiesel production uses relatively modest amounts of water.** Overall, it takes about 1 gallon of fresh water to generate one gallon of biodiesel. This compares favourably with a range of other commercial processes including the production of a barrel of crude oil which requires 1851 gallons of fresh water. What's more, this ratio is improving constantly with new technologies, which include the possibility of using recycled waste water with various degrees of treatment.¹²

FACT: It takes 684,000 gallons of water to irrigate one acre of a golf course. The average golf course is 75 acres; that's more than 51 million gallons of water.¹³

The water use facts below will put the amount of water that biodiesel production uses into perspective:

Water Usage Trivia

- How much water does it take to process a quarter pound of hamburger?
 - Approximately one gallon.
- How much water does it take to make four new tires?
 - 2,072 gallons
- What is the total amount of water used to manufacture a new car, including new tires?
 - 39,090 gallons per car.
- How much water is used in the average five-minute shower?
 - 25-50 gallons
- How much water is used on average for an automatic dishwasher?
 - 9-12 gallons
- How much water does the average residence use during a year?
 - 107,000 gallons
- How much water does an individual use daily?
 - 50 gallons
- How much water does it take to process one barrel of beer?
 - 1,500 gallons
- How much water does it take to refine one barrel of crude oil?
 - 1,851 gallons
- How much does it take to produce one ton of steel?
 - 62,600 gallons

¹² http://www.nap.edu/openbook.php?record_id=12039&page=49

¹³ Illinois Corn Growers Assn. Water Usage

ISSUE: Fuel and Food

Isn't it true that biodiesel is consuming crops that are needed for food? In order to achieve a mandated 2 percent renewable content in diesel, what portion of Canada's productive farmland will be converted to grow crops for fuel?

There is no conflict between food and fuel. The so-called food and fuel 'conflict', which reached a crescendo in the media during the spring of 2008, was never rooted in facts. Media attention has moderated as the lack of policy argument in favour of such a conflict has become increasingly apparent. As an example, biodiesel in Canada is primarily made from recycled animal fats. With the roll-out of biodiesel programs at the federal and provincial levels, the majority of biodiesel in Canada will likely be made from Canola. In neither circumstance is the food supply at home or abroad negatively impacted.

- **A Canola Surplus.** In each of the last three years, Canada's 'carry-over' of Canola seed was over 1.3 million tonnes.¹⁴ In other words, there is a substantial surplus and biodiesel would assist in putting that excess of supply to meaningful use.

- **Canadian Soybean Production.** Since 1980, Canadian soybean production has climbed 450%, exceeding 3.1 million tonnes on 2.9 million acres in 2005. Current forecasts suggest further steady, manageable growth, reaching 3.5 million acres within a decade.¹⁵

- **Only about 2.4% of all canola produced in Manitoba is used for biodiesel.** Manitoba's biofuels program, which includes a 2% mandate for biodiesel, is moderate. Based on recent production levels of canola in Manitoba, a 2% biodiesel mandate (approx. 20 million litres of biodiesel annually) would only use 2.4% of Manitoba's canola crop. A 5% biodiesel mandate (approx. 50 million litres of biodiesel annually) would only use 6.0% of Manitoba's canola crop. This is but one example of a canola producing region which can fulfill provincial and federal biofuels mandates with a relatively small percentage of their canola output.

- **There is room to grow.** The United Nations Food and Agriculture Organization (FAO) has calculated that of the 10.4 billion acres (4.21b hectares) that could be used for agriculture today, only 35% are used, and of that, only 1 percent of that area is used for renewable fuels¹⁶.

FACT: Canadian farmers already produce enough canola to meet the biodiesel needs of Canada at a 2% requirement. As such, there is no rational basis to fear that biodiesel will remotely generate canola oil shortages for food.¹⁷ In fact, the Canola Council of Canada's 2007 plan 'Growing Great 2015' is projected to take Canadian canola production to 15 million tonnes of sustained market demand and production by 2015. Achievement of the plan relies on 2.5 million tonnes of seed demand from biodiesel by 2015.

¹⁴ Canola Growers Association

¹⁵ <http://www.canadiansoybeans.com/content.php?id=12>

¹⁶ National Biodiesel Board, April 17, 2008 – Biodiesel Brings a lot to the Table

¹⁷ <http://www.canolacouncil.org/biodiesel/faqs.aspx>

ISSUE: Government Programs and Incentives

Do governments give the biodiesel industry an unfair advantage?

No. Governments support all areas of the energy sector, including oil and electricity, and their current and ongoing support of the biodiesel industry will help Canada become a low-cost, world-class producer of this clean-burning, renewable fuel. Subsidies for the tarsands greatly exceed those for renewable fuels.

• **Canada has committed to renewable fuels.** The national Renewable Fuels Standard (RFS) is the cornerstone of renewable fuels policy in Canada – it helps ensure our industry attracts the demand, the critical mass and the momentum to draw private sector investment and consumer-based take up. The RFS, which will see 5% renewable content in gasoline (ethanol) and 2% renewable content in the distillate pool and home heating oil (biodiesel), comes into effect September 1, 2010 and by 2011 respectively, and will result in a demand for 2 billion litres of ethanol and 600 million litres of biodiesel per year. The majority of provinces have established their own Renewable Fuels Standards, either meeting a similar commitment to the national standard or even exceeding it.

• **Canada is investing in renewable fuels.** Over the past decade or so, the government has invested in renewable fuels and advanced green technologies. These programs are meant to establish a self-sufficient industry by aiding in initial research, technology development, demonstration projects, and feedstock availability. These programs are:

FACT: This investment is small compared to other government subsidization of the energy industry in Canada. This has included: more than \$3-billion for Hibernia, \$14-billion for the Darlington nuclear plant and in excess of \$44-billion invested in the oil sands. By comparison, funding for the ethanol industry is relatively small – a payment of no more than \$1.5B in total over many years.

• **An investment in biodiesel is an investment in the future.** Government support of the biodiesel industry translates into good ‘green collar’ jobs in a growing sector of the energy industry, and a more plentiful supply of low-cost, clean-burning renewable fuels that benefit the environment and provide competition at the fuel pump – a benefit for consumers.

ISSUE: Engine Performance

Will using biodiesel negatively affect the performance of my vehicle's engine?

No. The opposite is true. Biodiesel is a high-performance fuel that is used to achieve the highest levels of automobile performance while generating environmental benefits and improving engine-life.

- **Biodiesel use is growing.** Most diesel engines are warranted to run on anywhere between B5 (5% biodiesel) to B20 (20% biodiesel). Regular diesel engines can safely run on B100 (100% biodiesel) with small fuel system modifications needed for cold weather. Most biodiesel use is in the form of fuel blends ranging from B2 – B20.

FACT: Now all the big Three North American automakers warranty B20 in their diesel truck line-up. GM recently announced the new, 2011 Duramax 6.6l Turbo Diesel engine with B20 capability. These vehicles are covered by GM's five-year/100,000 mile powertrain warranty. This new engine will be in heavy-duty pickups, trucks as well as full sized vans.¹⁸

- **Proof is in the testing.** In Canada, as part of the Renewable Fuel Standard, a national average of 2% renewable content (biodiesel) in the distillate pool and home heating oil comes into effect by 2011. Consequently, the government of Canada has subjected biodiesel to a thorough series of on and off road testing. The Alberta Renewable Diesel Demonstration (ARDD) was Canada's largest cold-weather study of renewable diesel fuels. This project successfully demonstrated the on-road use of low level renewable diesel blends in a range of Canadian climatic conditions.¹⁹

In Saskatoon, the results of the demonstration found that using even just a B5 blend showed a significant greenhouse gas and engine wear reductions and even fuel savings. These results were even more pronounced for highway driving.²⁰

- **Fuel Economy is a non issue.** In a recent cold-weather biodiesel demonstration project in Alberta, the fleet data showed that there was no meaningful difference in fuel mileage.²¹ The BIOBUS study in Saskatchewan found fuel savings, especially in highway driving.²²

- **Biodiesel keeps your engine cleaner and performing better.** Biodiesel has extremely high lubricity which protects the fuel systems and extends its life, an important factor with the new ULSD diesel specs which have reduced lubricity compared with the previously used higher sulphur diesel. It also has a high

¹⁸ General Motors Announces B20 Biofuel Capability For New, 2011 Duramax 6.6L Turbo Diesel, GM, Feb 8, 2010

¹⁹ Alberta Renewable Diesel Demonstration Final Report, February 5 2009

²⁰ S. Munshaw, M.Sc. and P. B. Hertz, P.Eng., Saskatoon BioBus – Phase II Final Research Report, March 2006

²¹ Alberta Renewable Diesel Demonstration Final Report, February 5 2009

²² S. Munshaw, M.Sc. and P. B. Hertz, P.Eng., Saskatoon BioBus – Phase II Final Research Report, March 2006

cetane level, a measure of combustibility, which improves engine responsiveness and reduces particulate emissions by achieving more complete combustion of the fuel.²³

²³ Benefits of Biodiesel, Rothsay Biodiesel, <http://www.rothsay.ca/products/biodiesel/>

ISSUE: Biodiesel Blends

Is it true that a diesel engine can run on 100% biodiesel (B100) with little to no modification?

Yes. Biodiesel fuels are typically combined with conventional petroleum diesel at various levels such as B2, B5, B20, and B50 but can also be used alone in dedicated form (B100). A B2 blend would be 2% biodiesel and 98% petroleum diesel fuel and so on.

- **Biodiesel is the fuel of the future – and it’s available now.** On June 26, 2008, Parliament passed Bill C-33, which will require the use of 5 percent renewable content in gasoline by 2010 and 2 percent renewable content in diesel fuel by no later than 2012.

- **B5.** Major engine manufacturers in North America have indicated that use of blends up to B5 (5 per cent biodiesel) comply with their engine warranties. Some manufacturers will warranty their engines up to B20 (twenty per cent biodiesel).²⁴

- **B20.** Biodiesel can be safely used in blends of B2 to B5 without any modification to your vehicle even for cold weather considerations. The Montreal fleet has been operating on B5 throughout the cold Montréal winters since 2001.²⁵

FACT: The Hudson's Bay Company tested B20 biodiesel and the results exceeded expectations prompting them to continue using B20 in all the test vehicles and expand the program to several other vehicles.²⁶

- **It burns clean.** Biodiesel itself is composed of 11 percent oxygen by mass and is almost sulphur-free, thus even low concentrations added to petroleum diesel make it burn better and may improve the performance of catalytic converters.²⁷

²⁴ http://www.gov.mb.ca/seeinggreen/economic_growth/initiatives/biodiesel.html

²⁵ www.rothsaybiodiesel.ca

²⁶ <http://www.tc.gc.ca/eng/programs/environment-ecofreight-road-tools-technologies-alternativefuel-111.htm>

²⁷ <http://oee.nrcan.gc.ca/transportation/fuels/biodiesel/biodiesel-benefits.cfm?attr=16>