

Canadian Biofuels Industry Annual Profitability and Market Review 2011

Natural Resources Canada Alternative Fuels Programs Division April 29, 2013





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Introduction

- The purpose of this report is to provide information and analysis on the domestic biofuels industry, trade and markets
- The report was prepared by the ecoENERGY for Biofuels Program (the Program) managed by Natural Resources Canada. The Program monitors industry developments as part of its mandate in administering programs in the biofuels sector
- This report was prepared using information from both the Program and public sources. Program data is taken from reports that are submitted by Program proponents and has been aggregated in order to protect the confidential nature of this information. Additionally, the report draws upon public and subscription-based sources of information including:
 - Agriculture and Agri-Food Canada
 - Statistics Canada
 - U.S. Department of Agriculture
 - U.S. Energy Information Administration
 - Bloomberg New Energy Finance



Explanatory Notes and References

- Explanatory notes are provided as needed in the slide notes section.
 The reader is encouraged to read those notes as they provide context or clarifications to the analysis
- Detailed references are also listed in the slide note section





Protected Biodiesel Industry Information

- Biodiesel industry information collected by the ecoENERGY for Biofuels program has been excluded for confidentiality reasons. The industry is highly concentrated with two producers accounting for the majority of production, therefore industry data cannot be disclosed without compromising the confidentiality of commercially sensitive information
- It is expected that with the installation of additional production capacity in 2012-13, there will be enough data for the 2013 reporting cycle to include full analysis of the biodiesel sector



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Summary

- Ethanol built capacity and production in Canada continue to increase, reaching 1,742 ML* and 1,660 ML respectively in 2011
- Biodiesel built capacity remained unchanged from 2010 at 278 ML*.
 Production (as reported by the U.S. Energy Information Administration) increased 12% to 157 ML
- The Federal requirement for renewable content in gasoline was in effect since December 15, 2010, or just over one year. The requirement for renewable content in diesel fuel and heating oil came into force on July 1, 2011

<u>Notes</u> *ecoENERGY for Biofuels proponent built capacity as of December 31, 2011

Source(s): ecoENERGY for Biofuels, U.S. Energy Information Administration (EIA)

Canada





ecoENERGY for Biofuels Proponents







ecoENERGY for Biofuels Program

- The \$1.5 billion ecoENERGY for Biofuels Program, announced on July 5, 2007, is an important component of the Government of Canada's Renewable Fuels Strategy. This nine-year Program supports the production of renewable alternatives to gasoline and diesel and encourages the development of a competitive domestic industry for renewable fuels. It makes investment in production plants and facilities more attractive by partially offsetting the risk associated with fluctuating feedstock and fuel prices
- The Program provides an operating incentive based on production/sales levels – to producers of renewable alternatives to gasoline and diesel produced in Canada





ecoENERGY for Biofuels: Ethanol – Built Capacity in 2011





ecoENERGY for Biofuels: Biodiesel – Built Capacity in 2011





ecoENERGY for Biofuels: Ethanol and Biodiesel Production and Built Capacity*

<u>Ethanol</u>

- Total built capacity of 1,742 ML vs. production of 1,660 ML in 2011 (95% capacity utilization rate)
- Capacity increased by 13% in 2011, the major addition was the Suncor Energy – St. Clair Phase 2 expansion of 198 ML

<u>Biodiesel</u>

- Total built capacity of 278 ML vs. production of 157 ML in 2011 as reported by the U.S. Energy Information Administration (EIA) (56% capacity utilization rate)
- Many facilities that were built in 2010 did not produce in 2011 due to market factors

<u>Notes</u>

*Capacity online during the calendar year. It is less than or equal to capacity as at December 31 of each year

Source(s): NRCan/ecoENERGY for Biofuels Program, U.S. Energy Information Administration





Canada



ecoENERGY for Biofuels: Ethanol and Biodiesel Production and Sales in 2011

<u>Ethanol</u>

- Production and sales averaged 415 ML per quarter
- Cumulative annual production was 1,660 ML
- Increased production and sales in Q4 reflect improved producer margins towards the end of the year



Biodiesel

Cannot be provided (see slide 5)

Source(s): NRCan/ecoENERGY for Biofuels Program



ecoENERGY for Biofuels: Ethanol Producer Profitability

Operating Profits in 2011*

- Without incentives: \$0.16/L (19% operating margin)
- With Incentives: \$0.31/L (31% operating margin)
- Lower operating margins in Q3 vs. Q2:
 - Average cost/litre sold increased by 9% on higher feedstock prices but was only partially offset by higher ethanol prices
- Margins improved in Q4 vs. Q3 on lower feedstock costs and only a small reduction in ethanol prices
- Operating margins declined in 2011 over 2010 despite a small increase in per litre operating profits
 - Operating margins declined due to a 63% increase in costs, while revenues only increased by 49%
 - On a per litre basis, operating profit increased by 2 cents/litre (15% increase)



Operating Margin w/o incentives (%)

2011



Operating Margin w/o Incentives (%)

Annual

<u>Notes</u>

*Operating profit does do not include other costs which account for 10-15% of revenues such as labour, maintenance, and selling, general and administrative expenses (SG&A)

Source(s): NRCan/ecoENERGY for Biofuels Program, Ethanol Expansion Program

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ecoENERGY for Biofuels: Ethanol Sales Price* vs. Market Price

- ecoENERGY for Biofuels average selling price of \$0.70/L in 2011
- Slight premium to Chicago Board of Trade (CBOT) ethanol price which averaged \$0.67/L (this is the reference price for most ethanol sold in Canada)
- Prices decreased towards the end of the year due to:
 - Lower corn costs
 - The upcoming expiration of the U.S.
 \$0.54/gallon (\$0.14/litre) Volumetric Ethanol Excise Tax Exemption driving ethanol production despite lower demand for fuels
- Markets remain closely tied to developments in the U.S.









ecoENERGY CBOT Ethanol

<u>Notes</u>

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*CBOT Ethanol is calculated from the average weekly closing price for the nearby CBOT Denatured Ethanol futures contract sold on the Chicago Mercantile Exchange (CME)

Source(s): NRCan/ecoENERGY for Biofuels Program, Haver Analytics/CME

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ecoENERGY for Biofuels: Ethanol Feedstock Price vs. Market Price

- Producers used over 4 MT of feedstock from April 2011 to March 2012:
 - 77% corn
 - 21% wheat
- Market prices for corn ranged from \$249/MT to \$278/MT
- Corn costs generally remained stable in 2009 and most of 2010 but started to increase significantly in Q4 2010 and through 2011
 - 2009: \$168/MT
 - 2010: \$173/MT
 - 2011: \$264/MT



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Source(s): NRCan/ecoENERGY for Biofuels Program, AAFC

ecoENERGY for Biofuels: **Ethanol Net Income and Return on Capital**

4%

2% 0%

%

Net Income Margin

After a drop in 2010, net income margins for ethanol exceeded those recorded in 2009. Net income margin was 8.7% in 2011, compared with 4.8% in 2010

Return on Capital

- Return on capital is measured as net income divided by total capital invested. The trends mirror those observed for net income
- Ethanol saw returns improve from 4% in 2010 to 9.1% in 2011



Ethanol □ 2009 ■ 2010 ■ 2011

Net Income Margins (%)



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Source(s): NRCan/ecoENERGY for Biofuels Program

EcoENERGY for BioFuels: Return on Asset Benchmarking

- When compared to companies (primarily operating out of the U.S.) for the solar / wind power generation, electric power generation, biofuel manufacturing and petroleum refining submarkets:
 - The ethanol segment of the Program generated significantly higher returns on assets (weighted average) for 2011
 - The ethanol segment performed better than the other benchmarks and was similar to the U.S. biofuels benchmark in 2010. In 2009, the ethanol segment outperformed most benchmarks (except for petroleum refining)



Return on Asset Benchmarking (%)

The biofuels sub-market outperformed all of the other three benchmarks for 2010 and 2011. Note that we did not have a comparable benchmark for 2009

Source(s): NRCan/ecoENERGY for Biofuels Program, Deloitte



Canada

ecoENERGY for Biofuels:

Ethanol and Biodiesel Operating Incentives Received in 2011

| | Ethanol (undenatured) | Biodiesel | | | |
|--|--------------------------|-------------------|--|--|--|
| Provincial Operating Incentives | | | | | |
| # of plants receiving provincial incentives | 7 out of 15 | 4 out of 12 | | | |
| Litres incented (as % of total litres sold) | 1,010.9ML (62%) | N/A – see slide 5 | | | |
| Average provincial incentive per litre | \$0.103 | N/A – see slide 5 | | | |
| Value of provincial incentives | \$103.7M | \$0.7M | | | |
| Federal Operating Incentive (ecoENERGY) | | | | | |
| Average federal incentive per litre | \$0.0825 | \$0.185 | | | |
| Value of federal incentive (estimated) | \$134.1M | N/A – see slide 5 | | | |
| Total Value of Provincial & Federal Incentives | \$237.7M | N/A – see slide 5 | | | |

Source(s): NRCan/ecoENERGY for Biofuels Program

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Summary

<u>Ethanol</u>

- Built capacity and production in Canada continue to increase, reaching 1,742 ML* and 1,660 ML respectively in 2011
- Operating margins declined in 2011 over 2010 despite a small increase in per litre operating profits
 - Operating costs increased by 63% while revenues only increased by 49%
 - On a per litre basis, operating profit increased by 2 cents to 16 cents/litre (without incentives) and 31 cents/litre (with incentives)

<u>Biodiesel</u>

Built capacity remained unchanged in 2011 from 2010 at 278 ML*.
 Production (as reported by the EIA) increased 12% to 157 ML

<u>Notes</u>

*ecoENERGY for Biofuels capacity as at December 31, 2011. Biodiesel production: U.S. Energy Information Administration. International Energy Statistics





Domestic Market







Market Update

<u>Markets</u>

- A survey* of Canadian refiners concluded that: most of the biodiesel used in Canada will be in Western Canada; most of the biodiesel will be imported; and Hydrogenation Derived Renewable Diesel (HDRD) is expected to be used to meet about 50% of the requirement for renewable alternatives to diesel
- Most of the ethanol produced in Canada was for use in Canada. Most of the biodiesel produced in Canada was exported to the U.S.
- Biodiesel producer margins improved substantially over prior years on rising fuel prices and after the compliance flexibilities offered by the U.S. Renewable Fuel Standard for 2009/2010 had expired

<u>Notes</u>

*EcoRessources Consultants. <u>An Update on Renewable Diesel Infrastructure in Canada</u>. February 2012

Source(s): EcoRessources Consultants, Neste Oil

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Domestic Markets:

Annual Ethanol Production and Gross Consumption

(In millions of litres unless otherwise noted)

| Year | Production (denatured) | Exports | Imports | Apparent Consumption | Motor Gasoline Consumption* | Share of Gasoline Consumption (%) |
|------|---------------------------|---------|---------|-------------------------|--------------------------------|--------------------------------------|
| 2011 | 1,660.8 | 25.4 | 977.3 | 2,612.7 | 44,291.7 | 5.9% |
| 2010 | 1,391.8 | 32.4 | 521.6 | 1,881.0 | 42,984.7 | 4.4% |
| 2009 | 1,301.0 | 39.7 | 265.2 | 1,526.5 | 41,551.2 | 3.7% |

- Gross consumption does not factor changes in inventory
- Significant increase in ethanol imports and consumption from 2010 to 2011 due to the cominginto-force of the federal requirement for renewable content in gasoline in December 2010
- Some refiners blended above the 5% requirement, likely due to favourable blending economics (see the following slide)
 - Based on gasoline consumption, it is estimated that 5% of the 2011 gasoline pool created demand for 2,214.6 ML of ethanol*. Approximately 400ML in additional ethanol was consumed during the year

<u>Notes</u>

*Natural Resources Canada estimate based on consumption from Statistics Canada. Excludes gasoline used in Newfoundland and Labrador, the Northwest Territories, Yukon, and Nunavut. Does not factor other exemptions e.g. fuel used in military combat equipment or competition vehicles

Source(s): NRCan/ecoENERGY for Biofuels Program, Statistics Canada, CRA



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Domestic Markets: Ethanol Blend Economics in 2011

Blender Perspective

- Blenders paid a price for ethanol that was between the energy adjusted and volumetric price of wholesale gasoline*
 - On average ethanol futures prices trailed wholesale gasoline prices by \$0.11/L, peaking at \$0.16/L in Q2
- Given that blenders paid less for ethanol on a volumetric basis, there was an opportunity for discretionary blending (as evidenced in the previous slide)



2011

<u>Notes</u>

*Energy adjusted price of wholesale gasoline applies a factor of 70% to account for the lower energy density of ethanol

Source(s): AAFC, Haver Analytics/CME, NRCan



Domestic Markets: Ethanol Producer Economics in 2011

Producer Perspective

- Revenues from ethanol sales are only enough to cover the main input cost (i.e. corn)
- Revenues from co-products such as distillers grains and operating incentives (not included in chart) are needed to cover the remaining production costs and allow for the producer to generate a profit



2011

Source(s): AAFC, Haver Analytics/CME, NRCan



Domestic Markets: Annual Biodiesel Production

(In millions of litres unless otherwise noted)

| Year | Production | Imports | Diesel Consumption* | Heating Oil Consumption |
|------|------------|---------|------------------------|----------------------------|
| 2011 | 156.8 | 251.7 | 21,615.7 | 0.85 |
| 2010 | 139.4 | 143.6 | N/A | N/A |
| 2009 | 121.9 | 21.3 | N/A | N/A |

- Biodiesel production is from the International Energy Statistics from the U.S. Energy Information Administration, converted from thousand barrels per day
- Biodiesel is exported under an "other miscellaneous chemical" category therefore Canadian export statistics are not available and calculation of apparent consumption is not possible
 - U.S. import statistics indicate the U.S. imported approximately 122.5 ML of biodiesel from Canada in 2011
- The federal requirement for renewable content in diesel fuel and heating oil came into effect on July 1, 2011*. Based on diesel fuel and heating oil consumption, it is estimated that some 670ML of renewable alternatives to diesel will be required during the first compliance period (July 1, 2011 to December 31, 2012)
 - Diesel and heating oil volumes are for all of 2011

<u>Notes</u>

*Excludes diesel and heating oil used in Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, the Northwest Territories, Yukon, and Nunavut. Does not factor other exemptions e.g. fuel used in military combat equipment or competition vehicles. Natural Resources Canada estimate for diesel consumption based on consumption figures from Statistics Canada

Source(s): NRCan/ecoENERGY for Biofuels Program, NRCan/TRAGS, Statistics Canada, U.S. Energy Information Administration





Domestic Markets: Biodiesel Blend Economics in 2011

Blender Perspective

- Anticipation of expiry of the U.S. blender's credit resulted in a demand boost in the second half of 2011
- Higher effective biodiesel prices (relative to diesel) reduce blender's margins and the opportunity for discretionary blending

Producer Perspective

- Margins improved in Q4 due to reduced feedstock prices and stable biodiesel prices
- Biodiesel from canola oil cost an average \$0.25/L more to produce than biodiesel from yellow grease due to higher feedstock costs

Source(s): Statistics Canada, The Jacobsen, OPIS, BNEF, NRCan

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□ Yellow Grease □ Methanol □ B100



Domestic Markets: Summary

<u>Ethanol</u>

- Average Chicago Board of Trade ethanol price of \$0.67/L against net corn cost of \$0.48/L provided decent margins to producers. Favourable ethanol blending economics of about \$0.11/L encouraged discretionary blending
- Significant increase in ethanol consumption from 2010 to 2011 due to the coming-into-force of the federal requirement for renewable content in gasoline in December 2010

Biodiesel

- With an average pure biodiesel (B100) price of \$1.35/L against an average yellow grease price of \$0.81/L, producers were able to attain a higher margin for 2011
- Blender margins were unfavourable in 2011 thereby reducing the opportunity for discretionary blending



Domestic Policies







Domestic Policies

- This report covers approximately the first half of the first compliance period for the Federal requirement for 5% renewable content in gasoline
- The first compliance period began on December 15, 2010 and ended on December 31, 2012
- Federal regulations requiring 2% renewable content in diesel and heating oil came into force on July 1, 2011*
- British Columbia biodiesel mandate amended to remain at 4% in 2012 and onwards instead of 5%
- Saskatchewan 2% renewable alternative to diesel mandate announced with planned start date of July 2012
- In its 2013 Budget, Ontario announced that it will eliminate the biodiesel fuel tax exemption and replace it with a provincial mandate to be defined after consultation with stakeholders
- See Annex 2 for list of provincial biofuel programs

<u>Notes</u>

*Excludes diesel and heating oil used in Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, the Northwest Territories, Yukon, and Nunavut. Does not factor other exemptions e.g. fuel used in military combat equipment or competition vehicles







Domestic Mandates

| | Renewable Alternatives to Gasoline | Renewable Alternatives to Diesel |
|------------------|--|-------------------------------------|
| Federal | 5% | 2%* |
| | Provincial | |
| British Columbia | 5% | 4% |
| Alberta | 5% | 2% |
| Saskatchewan | 7.5% | 2% starting July 1, 2012 |
| Manitoba | 8.5% | 2% |
| Ontario | 5% | Under consideration |
| Quebec | 5% by 2012 (target only) | |

<u>Notes</u>

Ethanol: Alberta, Saskatchewan, Manitoba, and Ontario have "renewable alcohol" or ethanol specific mandates Biodiesel: Manitoba's mandate only allows for biodiesel e.g. methyl esters

*Excludes diesel and heating oil used in Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, the Northwest Territories, Yukon, and Nunavut. Does not factor other exemptions e.g. fuel used in military combat equipment or competition vehicles





Domestic Trade





Domestic Trade

- 2011 ethanol imports (977 ML) nearly doubled previous record set in 2010 (522 ML)
 - Almost 100% from the U.S. (no imports from Brazil)
 - Increase largely due to federal 5% regulation that came into force on December 15, 2010
- 2011 biodiesel imports (252 ML), not including HDRD, 85% of which imported into Western Canada where mandates exist. 99% of biodiesel imports were from the U.S.
- HDRD imports are classified as a diesel fuel thus specific HDRD import data is not available
- The U.S. Environmental Protection Agency approved Canada's petition that Canadian feedstocks used for biofuels production in the U.S. fall under the "aggregate compliance approach" (this applies the same preferential compliance approach as is offered to biofuels produced from feedstock sourced in the U.S.)
- The European Union concluded its investigations into the circumvention of countervailing and antidumping duties on U.S. biodiesel by shipment through Canada
 - Biodiesel shipped from Canada, whether or not it was produced domestically, is subject to 409.2 EUR/tonne (0.47 EUR/litre) in duties
 - Exporters that can demonstrate that their fuel was not sourced in the U.S. may apply for an exemption from these duties

Source(s): Statistics Canada, EPA, EU



Domestic Trade: Ethanol and Biodiesel Tariff Rates

| Fuel | Default | Exceptions |
|-----------|---|--|
| Ethanol | 4.92¢/litre of absolute ethyl alcohol | COLT, CT, CCCT, CRT, IT, LDCT, MT, NT, PT, SLT, UST: Free |
| Biodiesel | Free | Free |

Source(s): Canada Border Services Agency

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Domestic Trade: Ethanol Imports

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- About ½ of total imports went into Ontario and Quebec
- This represents the province of clearance does not mean that ethanol remained in that province but good indication of regional use
- High December imports likely due to 15% drop in ethanol prices from November to December



Annual

2011



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□ Total ■ U.S.



Domestic Trade: Biodiesel Imports

- Biodiesel imports in 2011 tended to follow expected use patterns – late spring to early fall
 - 85% of all biodiesel imported into Western Canada
 - Highest imports in BC due to 4% mandate
- Biodiesel imported in 2009 and 2010 under a different code (not shown in graphs). This led to an E.U. investigation of circumvention of duties of U.S. biodiesel through Canada
- Biodiesel export figures are not available

2011



2011



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Domestic Trade: Summary

<u>Ethanol</u>

- 2011 ethanol imports (977 ML) nearly doubled previous record set in 2010 (522 ML)
 - Increase largely due to federal 5% regulation that came into force on December 15, 2010 and refiners appear to have blended in excess of the requirement
 - Almost 100% of all imports from the U.S. No imports from Brazil
 - Limited exports (25ML in 2011)

<u>Biodiesel</u>

- Biodiesel imports tended to follow expected use patterns late spring to early fall
- Biodiesel is exported under an "other miscellaneous chemical" category therefore export Canadian statistics are not available
 - U.S. import statistics indicate the country imported approximately 122.5 ML of biodiesel from Canada in 2011



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Annex

Canada



Provincial/Territorial Ethanol Programs in 2011 Pg. 38

| Prov | Name | Description | Main Condition | Fund (duration) |
|------|---|---|-------------------------------|---|
| AB | Bioenergy Producer Credit Program | First-generation ethanol (grain based): \$0.10/L for the first 150 ML/year, \$0.06/L for production in excess of 150 ML/year Second-generation ethanol: \$0.14/L for the first 150 ML/year, \$0.09/L for production in excess of 150 ML/year | Produced in AB | \$490M for first four years ('11 –'16) |
| SK | Ethanol Grant Program | Distributor payment (grant) program of \$0.15/L | Produced and used in SK | N/A ('05 – '12) |
| MB | Ethanol Fund | Fixed incentive grant, variable over 8 year program: \$0.20/L (2008 & 2009), \$0.15/L (2010, 2011, 2012), \$0.10/L (2013, 2014, 2015) Capped at mandated requirement (~130 ML/year) | Produced and sold in MB | A portion of gas tax revenue ('08 – '15) |
| ON | Ontario Ethanol Growth Fund (OEGF) | Operating incentive of up to \$0.11/L Capital grant or loan guarantee of up to \$0.10/L of plant capacity | Produced in ON | \$520 M ('05 – '17) |



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Provincial/Territorial Ethanol Programs in 2011 Pg. 39

| Prov | Name | Description | Main Condition | Fund (duration) |
|------|---|--|-------------------------------|--|
| QC | n/a | Refundable tax credit of up to \$0.185/L Maximum production of ~126 ML/year (calculated monthly) Non-repayable & variable, based on price of crude Excludes cellulosic ethanol | Produced and sold in QC | ('06 – '18) |
| QC | Tax Credit for the Production of Cellulosic Ethanol | Refundable tax credit of up to \$0.15/L for cellulosic ethanol produced from industrial, agricultural and household residual material using a thermochemical process Maximum production of ~40 ML/year (calculated monthly) Non-repayable & variable, based on market price of ethanol | Produced and sold in QC | \$20M for first 4 years (March 17, 2011 – April 1, 2018) |
| QC | First- generation ethanol fuel production efficiency improvement support program | Fund investments and studies to: Improve the yield, energy efficiency and environmental performance of first-generation ethanol fuel production equipment Facilitate the incorporation of new equipment and processes in existing first-generation installations to foster their transition to second-generation technologies. | | \$8M (11 – '15) |



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Provincial/Territorial Biodiesel Programs in 2011 Pg. 40

| Prov | Name | Description | Main Condition | Fund (duration) |
|------|---|---|-------------------------------|--|
| AB | Bioenergy Producer Credit Program | Biodiesel and bio oil: \$0.13/L for the first 150 ML/year, \$0.09/L for production in excess of 150 ML/year | Produced in AB | \$490M for first four years ('11 –'16) |
| SK | Saskatchewan Renewable Diesel Incentive Program | \$0.13/L of renewable diesel Annual program capped to 40M litres | Produced in SK | ('11-'16) |
| MB | Biodiesel Fund Grant | \$0.14/L production grant up to 20 million litres | Produced and sold in MB | A portion of diesel tax revenue ('10 – '15) |
| ON | N/A | ■\$0.143/L road tax exemption on FAME | Sold in ON | ('06 -) |
| QC | N/A | Fuel tax refund of \$0.162/L on the purchase of pure (B100) biodiesel | Sold in QC | ('05 -) |



