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Canada

Biofuels Annual

2014

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Report Highlights:
With the operationalization of a 38 million liter cellulosic ethanol plant in Edmonton, Alberta and the 265 million liter biodiesel plant in southern Alberta, the Canadian renewable fuels industry is coming close to reaching its medium term domestic production capacity. Federal and provincial blend mandates are not forecast to increase beyond current levels in the short or medium term. Production and consumption incentives both at the federal and provincial levels will be sun-setting in the next one to three years so new directions to take federal and provincial biofuel strategies are being explored. Actual blend mandates are higher than the federal mandates due to the fact that biofuels are less expensive alternatives. With medium term domestic production capacity having been reached, any growth in market penetration of biofuels will have to be met through imports.

I. Executive Summary

Since December 15, 2010, Canada has had a federal mandate requiring 5 percent of the national gasoline pool to be renewable (ethanol). In addition, many provinces have equivalent or higher provincial mandates, including a 5 percent renewable content mandate in Ontario, 7.5 percent in Saskatchewan, and 8.5 percent in Manitoba.

Bioethanol production in Canada will increase by a marginal 1 percent in 2014 to 1,745 million liters from 2013 levels of 1,730 million liters. This increase is attributed to increases in operational efficiencies. There is no increase in domestic production capacity expected between 2014 and 2015. Production is forecast to remain at 1,745 in 2015. Factors most affecting changes in production will include gasoline prices and technological improvements.

Domestic production capacity will likely remain at 1.8 billion liters unless economics change substantially. Canada, unlike the United States has not reached a domestic production capacity that makes it possible to meet its blend mandates with domestic production alone and therefore will continue to import the balance. To meet the blend mandate Canada requires over 2 billion liters of fuel grade ethanol.

Primary feedstocks for bioethanol remain corn and wheat. Commercial-scale production levels of cellulosic ethanol from wood waste and municipal solid waste are now feasible, however, for economic reasons, methanol is currently being produced instead.

On July 1, 2011, the federal government implemented a federal mandate of two percent renewable content in diesel fuel and heating oil. In 2013, regulations amending the Renewable Fuels Regulations were released, extending the exemption until June 30, 2013, as well as providing a permanent exemption from the mandate for heating oils. Some provincial mandates for renewable content are also in place, including a 4 percent requirement in British Columbia and 2 percent requirements in Alberta, Saskatchewan, and Manitoba. In 2014, Ontario implemented a biodiesel mandate that will range between 2 and 4 percent renewable content depending on carbon intensity reduction properties of the feedstock used.

In 2014, Canadian biodiesel production increased due to new production capacity coming on-line. Canada's biodiesel production is estimated to reach 300 million liters in 2014 and forecast to reach 395 million liters in 2015, but remains well below the level needed to meet the federal mandate. The balance will continue to be met by imports. Primary feedstocks remain canola, animal fat, and recycled oils. Canola feedstock is expected to account for nearly 56 percent of Canadian biodiesel production by the end of 2014 and 66 percent by 2015.

Canada's limited biofuels production, both in the short and medium term, suggests that Canada will not soon become a major player in the global ethanol market. While domestic supply in Canada limits the amount of trade, there is an increasing amount of trade in the co-products of ethanol production. Cross-border trade between Canada and the United States in biofuels reflects the most economical trade corridors.

II. *Policy and Programs*

In Canada, environmental objectives rather than energy security has been the driver behind the development of federal and provincial policies and programs designed to encourage the development of a domestic renewable fuels industry. To a lesser extent, the renewable fuels policies were also seen as a means to encourage rural economic development and help diversify risk of agricultural producers who were highly depend on export markets.

Energy is a joint federal and provincial responsibility in Canada and it is for this reason that programs and incentives to support energy development are found at both levels of government. In Canada, many of the provincial governments had put in place provincial biofuel blend mandates well ahead of the federal strategy for the development of a domestic renewable fuels industry that was put into place in 2006/2007.

FEDERAL BIOFUEL POLICY STRUCTURE

At the federal level, blend mandates and production incentives are the cornerstone of the federal strategy growing the domestic biofuels industry. Based on discussion with federal agencies, the federally mandated blend rates are not expected to increase beyond current levels in the short or medium term. The main reason for this is that a significant portion of the federal mandates for ethanol and biodiesel are filled through imports.

Regulations under the Canadian Environmental Protection Act (1999) require a 5 percent renewable content in the Canadian gasoline pool, and a 2 percent renewable content in the distillate pool, excluding heating oil. The full regulations can be found at the following URL address: Renewable Fuel Regulations. The overall structure is similar to the Renewable Fuel Standard in the United States, with the point of compliance being the point of production or importation. The RFS regulations fall under the Canadian Environmental Protection Act (CEPA). An offense under this act is a criminal offense. More on the evolution of these regulations can be found in ***Appendix 1***.

Federal production incentives are scheduled to sunset on March 31, 2017 and federal agencies are doubtful that they will be extended beyond that date. The exception may be the production subsidies afforded to cellulosic or second generation ethanol producers. The rationale for extending the production subsidies would be the fact that the time horizon to get this type of ethanol commercialized is longer.

Production incentives are administered by the Federal Department of Natural Resources through the ecoEnergy for Biofuels program. ***Table 1*** on the following page illustrates the incentive rates for ethanol and renewable/biodiesel production. There are 16 ethanol producing plants that have signed the contribution agreements under the program.

Table 1: Federal Production Incentive Rates		
Fiscal Year (April 1- March 31)	**ecoEnergy Incentive Rates for Ethanol Production in dollars/liter ($/L)**	**ecoEnergy Incentive Rates for Renewable Diesel/Biodiesel Production in dollars/liter ($/L)**
2008/2009	0.10	0.26
2009/2010	0.10	0.24
2010/2011	0.09	0.20
2011/2012	0.08	0.18
2012/2013	0.07	0.14
2013/2014	0.06	0.10
2014/2015	0.05	0.08
2015/2016	0.04	0.06
2016/2017	0.03	0.04

Source: Natural Resources Canada

PROVINCIAL BIOFUEL POLICIES

In Canada, provincial policies are significant as they have been the forerunners of what eventually was developed at the federal level. In its notice of intent to implement a federal renewable fuels blend mandate, the federal government stated that it viewed the federal mandate as a means to harmonize provincial mandates and eliminated inter-provincial trade barriers. Most interprovincial trade distortions that exist are in the form of provincial incentives that may have a requirement that the biofuel be produced and/or consumed in the province. As the provincial production and/or consumption incentives sunset it the next one to three 3 years, these distortions will disappear.

Canada's western provinces, as well as the province of Ontario, have blend mandates in place. ***Table 2*** below summarizes the provincial blend mandates for ethanol and biodiesel that are currently in place. The provinces of British Columbia and Alberta have sustainability requirements attached to their blend mandates. The province of Quebec has an aspirational mandate of 5% but has concentrated most of its support on the development of cellulosic ethanol. The provinces of Alberta, Saskatchewan, Manitoba, Ontario and Quebec have in place production incentives and/or consumption incentives (tax credits) for renewable fuels. More details on the biofuels programs of each province can be found in ***Appendix 2***.

Table 2: Provincial Blend Mandates		
Province	**Ethanol Blend Mandate**	**Biodiesel Blend Mandate**
British Columbia	5 percent	4 percent
Alberta	5 percent	2 percent
Saskatchewan	8.5 percent	2 percent
Manitoba	5 percent	2 percent
Ontario	5 percent	2-4 percent*

*depending on greenhouse gas emission reductions

Provinces have also taken the lead in cap and trade initiatives. In Alberta, a Green Fund and an Offset System already exists to allow large emitters to purchase carbon credits from farmers, and a law enacted

in Saskatchewan in late April 2010 (The Environmental Management and Protection Act 2010) would allow the purchase of carbon credits from farmers within the province. Provincial and state governments in Ontario, Quebec, Manitoba, British Columbia, and California have discussed a protocol under the Western Climate Initiative (WCI). Quebec and California officially implemented the WCI's cap-and-trade regulations on January 1, 2012, and carbon emitters were given until January 1, 2013 to make necessary adjustments. British Columbia, Ontario, and Manitoba have not yet named a start date for implementation but previously mentioned joining after the program starts.

CANADIAN ENERGY SITUATION

As mentioned previously, energy security is not a factor behind the recent and projected growth in Canada's renewable fuel industry. According to the U.S. Energy Information Administration (EIA), Canada has the world's third largest proven oil reserves (estimated at 180 billion barrels), behind Venezuela and Saudi Arabia. Canada is one of the world's top ten oil exporters, and is one of the world's five largest energy producers.

The National Energy Board has published a report that provides the agency's energy supply and demand projections from 2013 until 2035. The report states that Canada has enough energy supplies to meet Canada's growing energy needs for the foreseeable future and that energy production levels will continue to be increasingly greater than its domestic needs resulting in growing amounts of energy available for export.

With regards to the oil demand for the transportation sector, like the United States, the demand for oil from the transportation sector is expected to slow from historical growth rates. This is largely a result of high fuel prices, recent and forthcoming freight vehicle emission regulations that have resulted in improved vehicle efficiencies, as well as some demographic changes that suggest younger people are becoming licensed drivers later than in the past. Canada has adopted the same vehicle fuel efficiency standards as the United States and as a result it is expected that future growth rates for diesel fuel will be higher than the growth rate for gasoline. The report projects that Canadian energy demand for transportation demand will grow at average annual rates of 0.8 percent which is significantly lower than the historical growth rate of 1.2 percent. Canada's ***Energy Future 2013: Energy Supply and Demand Projection to 2035*** are available at the following URL address: https://www.neb-one.gc.ca/nrg/ntgrtd/ftr/2013/ppndcs/ppndcs-eng.html.

Data on petroleum fuel supply and demand is available by Statistics Canada; however the quality of the data per sector is not very robust and should be used with caution. A breakdown of energy use by fuel type reveals that gasoline and diesel fuel account for an average of 38 percent and 28 percent, respectively, of the fuel type used in the period 2009-2012 and dominate as the transportation sector's main energy sources. ***Table 3*** on the following page illustrates current and past fuel consumption for 2009 through a forecasted 2015. Note that this excludes industrial power generation fuel use due to lack of availability. ***Table 4*** illustrates Post's projections through 2023.

Table 3: Canadian Gasoline and Diesel Fuel Demand							
Fuel Use (million liters)							
	2009	**2010**	**2011**	**2012**	**2013(e)**	**2014(e)**	**2015(f)**

Gasoline Total	**42,228**	**43,371**	**42,938**	**43,007**	**44,441**	**43,955**	**44,307**
Diesel Total:	**28,964**	**31,750**	**33,478**	**32,125**	**33,147**	**33,151**	**33,170**
On-road	15,634	16,823	17,339	17,070	17,568	17,570	17580
Agriculture	2,368	2,829	3,197	3,050	1,637	1,637	1,638
Construction/Mining	2,979	3,558	3,815	3,728	2,003	2,003	2,005
Shipping/Rail	2,501	3,129	3,477	3,346	1,795	1,795	1,796
Industry	2,595	2,705	2,954	2,682	1,505	1,505	1,506
Heating	2,887	2,706	2,696	2,250	1,381	1,381	1,382
Jet Fuel	**5,859**	**6,075**	**6,024**	**5,837**	**3,238**	**3,239**	**3,240**
Total Fuels	**106,016**	**112,946**	**115,918**	**113,095**	**112,990**	**112,316**	**112,837**

Notes & Sources:
2006-2012 consumption based on data available on Statistics Canada's website and Natural Resources Canada's website; 2013-2014 consumption for all non-gasoline fuels based on trend; 2013 and 2014 are estimates, 2015 is post forecast.

Table 4: Projection of Canadian Gasoline and Diesel Fuel Demand

Fuel Use Projections (million liters)								
Calendar Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Gasoline Total	44,584	44,861	45,138	45,415	45,692	45,969	46,246	46,522
Diesel Total	33,502	33,834	34,166	34,498	34,830	35,162	35,494	35,823
On-road	17,756	17,932	18,108	18,284	18,460	18,636	18,812	18,896

FUTURE POLICY DIRECTIONS

With the federal and provincial programs to provide support to the biofuels industry sunsetting in a few years, the policymakers and regulators are considering new policy directions. With federal and provincial budgets being tightened, a continuation of production incentives is unlikely. The Canadian Renewable Fuels Association, the lobby organization which represents the Canadian biofuels industry at the federal level, is lobbying for an increase of the renewable content in diesel blend mandate to a 5 percent inclusion rate by 2020, believing this will encourage domestic production increases. They are endorsing a federal policy platform for emerging technologies that exempt cellulosic ethanol from federal and provincial fuel taxes. They also support policy measures that maximize the economic value of renewable fuels and their products by monetizing reduced carbon emissions. Their full strategy is available on their website at www.greenfuels.org.

III. Ethanol

Note: This section refers only to conventional/first generation biofuels.

Table 5

Ethanol Used as Fuel and Other Industrial Chemicals (million liters)										
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Beginning	30	46	72	101	108	128	127	130	131	130

Stocks										
Fuel Begin Stocks	30	46	72	101	108	128	127	130	131	130
Production	460	700	1,145	1,425	1,530	1,790	1,780	1,815	1,820	1,820
Fuel Production	400	615	960	1,340	1,445	1,700	1,695	1,730	1,745	1,745
Imports	74	528	449	222	449	1,124	1,173	1,224	1,385	1,390
Fuel Imports	2	13	11	6	11	450	893	1,214	1,360	1,365
Exports	54	23	34	78	64	40	6	4	3	3
Fuel Exports	1	1	2	57	46	35	0	0	0	0
Consumption	464	1,179	1,532	1,561	1,896	2,874	2,944	3,034	3,203	3,207
Fuel Consumption	385	601	941	1,281	1,391	2,115	2,585	2,943	3,106	3,110
Ending Stocks	46	72	101	108	128	127	130	131	130	130
Fuel Ending Stocks	46	72	101	108	128	127	130	131	130	130
Production Capacity										
Number of Refineries	7	9	13	14	15	15	14	15	15	15
Nameplate Capacity	580	810	1,297	1,429	1,818	1,815	1,760	1,800	1,800	1,800
Capacity Use (%)	69%	76%	74%	94%	79%	94%	96%	96%	97%	97%
Co-product Production (1,000 MT)										
Distiller Dried Grains (DDGs)	320	500	680	885	980	1,220	1,075	1,100	1,100	1,100
WDG	30	30	325	510	575	550	635	650	650	650
Corn Oil	0	0	0	2	2	2	3	6	6	6
Feedstock Use (1,000 MT)										
Corn	865	1,200	2,025	2,585	2,800	3,201	3,285	3,200	3,250	3,250
Wheat	100	300	355	760	770	970	850	1,000	1,000	1,000
Market Penetration (Liters - specify unit)										
Fuel Ethanol	385	601	941	1,281	1,391	2,115	2,585	2,943	3,106	3,110
Gasoline	40,88	42,12	41,69	42,22	43,37	42,93	43,00	43,86	43,95	44,30

	2	6	5	8	1	8	7	7	5	7
Blend Rate (%)	0.9%	1.4%	2.3%	3.0%	3.2%	4.9%	6.0%	6.7%	7.1%	7.0%

Production:

The ethanol industry has consolidated leaving only the bigger players and those that remain are producing at capacity. A complete list of the plants can be found in ***Appendix 3***. Canadian ethanol plants for the most part have operated at maximum capacity since 2008. Demand for fuel ethanol has generally exceeded domestic supply due to the implementation of provincial mandates and the federal blends mandates. The availability of the federal and provincial support programs has been sufficient for the plants to operate positive cash flows despite spikes in feedstock prices and competition from US imports. Only older one plant has closed since 2008.

The cellulosic plant ENERKEM was not included the domestic production numbers due to the fact that it is not conventional ethanol; so also not included in the capacity. In addition, the plant is not currently producing ethanol from municipal waste but instead is producing methanol because the economics are better.

Bioethanol production in Canada will increase by a marginal 1 percent in 2014 to 1,745 million liters from 2013 levels of 1,730 million liters. This increase is attributed to increases in operational efficiencies. There is no increase in domestic production capacity expected between 2014 and 2015. Production is forecast to remain at 1,745 in 2015. Factors most affecting changes in production will include gasoline prices and technological improvements.

Domestic production capacity will likely remain at 1.8 billion liters unless economics change substantially. Canada, unlike the United States has not reached a domestic production capacity that makes it possible to meet its blend mandates with domestic production alone and therefore will continue to import the balance. To meet the blend mandate Canada requires over 2.2 billion liters of fuel grade ethanol.

As domestic production has increased, so has the production of co-products. Corn oil production has not followed the trend in the United States due in large part to the fact that Canada Feed Regulations require that the Dried Distillers Grains (DDGs) have a minimum amount of energy content that requires more oil remain in the DDGs. Guidance on these regulations can be found at the following website: http://www.inspection.gc.ca/animals/feeds/regulatory-guidance/rg-6/eng/1329275341920/1329275491608

Feedstock choice for ethanol plants has been driven by the availability of feedstock. Corn and wheat are the main feedstock for bioethanol production in Canada. At this time, there are no official statistics for the amount of corn and wheat directed into bioethanol production. Ethanol plants in Ontario, Quebec and Manitoba process corn as it is available in the vicinity of the ethanol plants. Ethanol plants

in Saskatchewan and Alberta process mostly feed wheat as there is limited corn production in those regions.

There has been an increasing interest in developing corn varieties that can be grown in Western Canada. As more corn varieties are developed with lower heat unit requirements, it is expected that corn use for ethanol production in Saskatchewan and perhaps Alberta will increase. There has also been increasing research on wheat varieties for industrial use. Currently, the need for high-yielding, low-protein wheat by the livestock industry and the bioethanol plants put the industries in conflict with each other when supplies of feed wheat are low. This will not be the case in 2014 or 2015 as poor weather has resulted in a downgrading of the wheat harvested in 2014 which will mean abundant supplies of feed wheat in 2014 and into 2015.

In 2014, it is estimated that 77 percent of the domestic production of domestic ethanol will be derived from corn, and 24 percent will be derived from wheat. Post forecasts that this will likely remain relatively stable throughout 2015. There are amble supplies of corn from the U.S. as well as domestic feed wheat will allow plants much flexibility.

Overall, Canada's limited biofuel production capacity, both in the short and medium term, suggests that Canada's entry into the global bioethanol market is still quite distant.

Consumption:

The federal mandate of 5 percent renewable fuel content requires an estimated minimum of 2.2 billion liters ethanol production for 2014. However, statistics suggest that the national blend rate is above the federally mandated level and is estimated to reach 7.1 percent of the gasoline pool in 2014. A similar national blend level is forecast for 2015. Based on industry discussions, abundant fuel ethanol supplies make ethanol a cheaper fuel than gasoline, and this is driving blend levels above the above the federal blend level requirements.

Trade:

Tariff lines used to calculate for total ethanol imports/exports was only tariff code 220720 due to the fact that most trade under 220710 was for beverage use. Trade lines for fuel ethanol for the year 2012, 2013 and 2014 were 2207201210 (Statistics Canada) and 2207200010 (ethyl alcohol for fuel purposes) as well as 2207109010 (also for fuel, Statistics Canada) and 2207106010 (US Census, also fuel). Fuel and total industrial ethanol imports could not be separated out pre-2011. Trade for fuel pre-2011 was estimated based on provincial mandates, domestic consumption, and trend.

Canada, unlike the United States has not reached a domestic production capacity that makes it possible to meet the federally mandated blend level with domestic production alone will require Canada to import the balance. Imports are further supported by demand levels above the federally mandated level due to the fact that ethanol is comparatively cheaper. Sustainability requirements in some provinces to reduce greenhouse gas emissions also push blend levels upwards. Based in 8 months of trade data, Post estimates that bioethanol imports in 2014 will rise 12 percent above 2013 levels to reach 1,360 million

liters. The level of imports is forecast to lift slightly to 1,365 in 2015.

Exports to the United States are limited due to the fact that it is more cost effective for domestic production to remain in Canada (close to blending facilities) as well as the fact that there is overcapacity and supply in the United States. Canadian exports of fuel ethanol to the United States are also limited by non-tariff barriers that require the fuel ethanol to be bonded in a warehouse while it is verified that the ethanol has been properly denatured. Due to the abundant corn crop in the United States in 2014, Post forecast that there will be no ethanol exports from Canada into the United States in 2014 or 2015.

Due to the North American Free Trade Agreement (NAFTA), there is no tariff on renewable fuels produced in the United States and imported into Canada. However, Canada does have a tariff on bioethanol imported from other countries such as Brazil ($0.05 per liter).

In terms of meeting standards, both corn and wheat ethanol plants in Canada do not have difficulty meeting the Canadian quality standard (CGSB) which is more restrictive than the ASTM standard used in the United States. As a result Canadian ethanol does not have difficulties entering the United States. However, due to differences around minimum moisture content, not all US ethanol producers can meet the Canadian standard which can prevent access to the Canadian market.

In recent years, all bioethanol trade for Canada has been with the United States. However, the possibility of significant increases in bioethanol trade, especially between the northwestern United States and Western Canada (wheat-based bioethanol to the United States and corn-based bioethanol to Canada), is unlikely to develop in the short to medium term. This is due mainly to the fact that Canada does not have excess bioethanol production capacity, which would permit large volumes of exports to the United States.

Stocks:

Due to a relative lack in data availability for stocks, stock data is based on industry discussions. Traditionally, stocks to use ratios have been approximately 7.5 percent. Post has lowered stock to use ratio to 4.5 percent in 2013 – 2015 due to an expectation that consumption (demand) levels are rising faster than the production capacity.

IV. Biodiesel

Note: This section refers only to conventional/first generation biofuels.

Table 6										
Biodiesel (Million Liters)										
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014 (e)**	**2015(f)**
Beginning Stocks	0	5	10	10	10	19	19	4	20	15
Production	25	70	95	110	115	120	100	140	300	395
Imports	5	10	20	15	100	170	260	304	277	280
Exports	20	65	95	105	110	80	85	123	305	320
Consumption	5	10	20	20	96	210	290	305	277	350
Ending Stocks	5	10	10	10	19	19	4	20	15	20
Production Capacity										
Number of Biorefineries	1	2	5	7	13	9	8	8	8	8
Nameplate Capacity	35	100	131	162	258	225	223	400	400	400
Capacity Use (%)	71.4 %	70.0 %	72.5 %	67.9 %	44.6 %	53.3 %	44.8 %	35.0 %	75.0 %	98.8 %
Feedstock Use (1,000 MT)										
Canola	0	0	2	3	3	7	7	35	152	240
Animal Fat	24	68	85	78	78	63	26	30	36	37
Recycled Oils	0	0	3	20	27	46	65	65	84	84
Soybean	0	0	0	1	1	1	0	1	0	0
Market Penetration (Million Liters)										
Biodiesel, on-road use	5	10	20	20	96	210	290	305	277	350
Diesel, on-road use	13,352	14,722	15,499	15,634	16,823	17,339	17,070	17,568	17,570	17,580
Blend Rate (%)	0.0%	0.1%	0.1%	0.1%	0.6%	1.2%	1.7%	1.7%	1.6%	2.0%
Biodiesel	5	10	20	20	96	210	290	305	277	350

use										
Diesel Use	29,961	31,590	31,523	28,964	31,750	33,478	32,125	33,147	33,151	33,170
Blend Rate (%)	0.0%	0.0%	0.1%	0.1%	0.3%	0.6%	0.9%	0.9%	0.8%	1.1%
Diesel, total use	29,961	31,590	31,523	28,964	31,750	33,478	32,125	33,147	33,151	33,170

There has been a great deal of consolidation in the Canadian biodiesel industry over the last ten years. Canadian biodiesel plants have not been as successful as the ethanol plants at operating at capacity in Canada. Only the two largest plants have consistently been able to operate at capacity in the past 5 years. At the outset, Canadian biodiesel plants tended to be smaller and therefore were unable to capture economies of scale. In addition, there was a mismatch in the timing of incentives and the startup of the federal mandates (biodiesel mandate came into full affect more than three years after the bioethanol mandate. Also, the smaller plants tended to use feedstock types which were not able to meet the internal specification of some obligated parties. Also, domestic biodiesel faced competition from imports of B99 which lowered the selling price by $1 per gallon below the Canadian cost of production. The two largest biodiesel plants in Canada that ran at full capacity exported most of their product to the US market.

Biodiesel production is estimated to have more than doubled in 2014 due to a new 265 million liter capacity biodiesel plant in southern Alberta coming on-line (canola feedstock). In 2015, production is forecast to increase to reach 395 million liters, assuming the three main producers are producing at the maximum capacity (no increase in capacity due to no new plants).

The majority of biodiesel produced in Canada is exported to the United States due to the blenders' credit. Both production and trade are continuing as if the blenders' credit will be renewed and come back for at least 2014 (retroactively) and 2015.

While biodiesel can be made from a variety of different feedstock, prices and availability are the determining factors likely to be considered. Biodiesel quality standards are not generally feedstock specific, however the cloud point of biodiesel is feedstock specific and so there is concern about the cold weather properties of B2 and B5 among the obligated parties. Some obligated parties have feedstock requirements in their internal purchasing specifications (often requiring that the feedstock be canola based). Many of the Canadian biodiesel plants were not built taking this into account and so the supply chains were not optimized for the feedstocks that the market is looking for.

Also of note, Ontario Greener Diesel requirements are introducing a new carbon intensity requirement into the decisions over what renewable diesel fuel to use. In this case, the feedstock choice will have a large influence over the final carbon intensity of the product and may favor feedstocks such as cooking oil and tallow products. It remains to be seen if this will have a major influence on the purchasing habits of obligated parties.

Canola, largely due to the abundance of the Canadian production, has proven to be the natural feedstock choice. Key competitors facing canola oil for use in biodiesel are rendered animal fats (tallow),

rendered oils (yellow grease), palm oil (which would be imported as Canada does not produce palm oil), and soybean oil. Canola and soybeans are high-priced feedstock for biodiesel since they are priced as food oils in international markets. Palm oil and rendered fats are priced at feed and industrial use levels.

With the new canola-based biodiesel plant coming on line mid-year in 2014, canola now accounts for 56 percent of the feedstock used in 2014 compared to 26 percent in 2013. For 2015, with the plant operating for the full year, canola use is to account for 66 percent of the feedstock going into biodiesel.

Canola production has reached record high levels in recent years. Increased demand for canola oil from the food retail industry has resulted in higher prices. Despite the supply response of recent years, some industry observers suggest that canola could remain too expensive, and that a 2 percent biodiesel blend must be met with cheaper feedstock. As demand for the feedstock increases, it is likely that canola prices will also increase.

While canola use for biodiesel by-itself may be expensive, the co-products from biodiesel production may make economic sense. Co-products include meal to be used in animal feed. There are limits on the profitability of using canola as a feedstock if by-products are part of the everyday production process. For example, off-seed canola may not be a suitable feedstock since this meal may not meet quality standards. Despite these limitations, co-products and the production capacity of the plants (these plants could potentially supply the vast majority of the federal 2 percent biodiesel mandate), combined with provincial biodiesel mandates may make the industry profitable, despite higher commodity prices.

Despite the current growth, future growth of the Canadian biodiesel industry may be limited due to the industry's inability to secure cheap feedstock. Most of the current and forecasted increase in biodiesel comes from canola and strong world demand for vegetable oils may hinder Canada's ability to take advantage of the growing biodiesel market opportunities.

Consumption:

The federal mandate is being met by a combination of renewable diesel (HVO) and conventional biodiesel. Only conventional biodiesel is shown in the table 6 above. To have a true picture of biodiesel/renewable consumption in Canada, and whether or not the federal mandate is being met, consumption of biodiesel and HVO renewable diesel must be looked at together. This is presented in ***Table 7*** on the next page. Post estimates that Canada will consume 567 million liters of biodiesel/renewable diesel in 2014 and forecasts consumption levels to increase to 630 million liters in 2015 (see table 5 below). By the end of 2014, the temporary exemptions for eastern Canada and Quebec will have been lifted, the compliance period will have ended, and the full federal mandate should be in force.

It is difficult to demonstrate that the federal blend mandate is being met due to the lack of publically available statistics. The blend mandate requires that the 2 percent of the distillate pool be met with biodiesel or renewable diesel; however there are exemptions for which there is limited consumption data. As close as Post can determine, the federal mandate is being met. If just using on-road diesel use statistics, in 2014 the blend rate is above the federal mandate of 2 percent and this trend is forecast to continue into 2015 (see table 7 on the next page). Based on statistics for total diesel use, and not taking

into account the exemptions, blends rate are at an estimated 1.8 percent in 2014 and a forecasted 1.9 percent in 2015. This would suggest that the federal mandate is being met. Blend rates are likely slightly higher than federal mandate of 2% due significant over-blending in BC which blends up to 20% biodiesel to meet environmental GHG reduction. In 2014, Ontario also introduced a biodiesel mandate that can reach up to 4% based on GHG emission reduction requirements.

Table 7 – Market Penetration of Biodiesel and Renewable Diesel										
Biodiesel and HVO (Million Liters)										
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014 (e)**	**2015(f)**
Beginning Stocks	0	5	10	10	10	19	19	4	20	15
Production	25	70	95	110	115	120	100	140	300	395
Imports - biodiesel	5	10	20	15	100	170	260	304	277	280
Imports - HVO	0	0	0	0	30	65	183	274	290	280
Exports	20	65	95	105	110	80	85	123	305	320
Consumption	5	10	20	20	126	275	473	579	567	630
Ending Stocks	5	10	10	10	19	19	4	20	15	20
Market Penetration (Million Litres)										
Biodiesel + HVO, on-road use	5	10	20	20	126	275	473	579	567	630
Diesel, on-road use	13,352	14,722	15,499	15,634	16,823	17,339	17,070	17,568	17,570	17,580
Blend Rate (%)	0.0%	0.1%	0.1%	0.1%	0.7%	1.6%	2.8%	3.3%	3.2%	3.6%
Biodiesel use	5	10	20	20	126	275	473	579	567	600
Diesel Use	29,961	31,590	31,523	28,964	31,750	33,478	32,125	33,147	33,151	33,170
Blend Rate (%)	0.0%	0.0%	0.1%	0.1%	0.4%	0.8%	1.5%	1.7%	1.7%	1.9%
Diesel, total use	29,961	31,590	31,523	28,964	31,750	33,478	32,125	33,147	33,151	33,170

Trade:

Trade data for biodiesel is problematic since Canada did not have an established HS code for biodiesel until 2012. Adding to the complication, a European Union anti-dumping trade investigation which concluded in 2010, revealed inconsistencies between the European Union biodiesel import trade data and the Canadian biodiesel production capacity, which is still in its infancy. The trade data from before 2012 used in this report is therefore based on a conglomeration of industry discussion, United States Department of Commerce data, Natural Resources Canada data, and Global Trade Atlas data.

Please note that only FAME biodiesel are include in the biodiesel supply and demand disposition table presented in ***Table 6***. Canada does not produce any HVO biodiesel. HVO renewable diesel is presented in ***Table 7*** above. The HVO comes under the same tariff code as biodiesel and so the HVO volumes in ***Table 7*** should be treated as estimates. The estimates were based on provincial statistics on renewable fuel use, as well as country of origin. Most of the HVO imports into Canada go into the province of British Columbia which has a biodiesel blend mandate but no commercial-scale biodiesel production.

The biodiesel imported into Canada to meet the federal mandate has originated from the United States (B99) and has a significantly lower selling price compared to Canadian production due to the blenders' credit available in the United States. British Columbia, has been importing signicant volumes of HVO to meet its provincial mandate and GHG reduction commitments. Imports of biodiesel in 2014 are forecast to fall slightly from 2013 levels due to an increase in domestic production. The same trend is forecast to to occur in 2015. It is expected that HVO imports will decrease due to high costs and the fact that the canola-based domestic production has come on line that has a better environmental profile. British Columbia is forecast to import some of the canola based biodiesel from the ADM plant in Alberta. The weaker Canadian dollar will also make HVO biodiesel even more expensive compared to the canola-based biodiesel. There are high stocks of canola that will make it a cheaper feedstock. Nevertheless, in the long run, blending capacities, transportation routes and the fact that domestic production capacity is not expected to increase beyond its current level will support continued and likely increasing, imports beyond 2015 imports. The US HVO will have an advantage over other HVO due to the environmental requirements (GHG reduction requirements) of the feedstock used. Whether or not the new Ontario requirements on carbon intensity may also encourage more consumption of the biodiesel produced in Ontario remains to be seen, and will likely be highly dependent on whether or not the blenders' credit is renewed.

Trade statistics for biodiesel in 2014 suggests that trade is continuing as if the blender's credit will continue. Year to date trade data shows biodiesel exports significantly higher than the previous year (169 percent). Typically, Canada exports about 85 percent of its production. In 2014, due to the fact that the trade is expecting the blenders' credit to return, Canada will likely export all its domestically produced biodiesel, as well as draw down its stocks. In 2015, exports are forecast to increase slightly further due to the increased production at the new southern Alberta biodiesel.

In fall of 2011, the United States Environmental Protection Agency (EPA) signed the Canadian Aggregate Approach Petition to approve Canadian feedstocks, including canola, for biodiesel production in the United States. This decision provides secure access for Canadian canola as a sustainable feedstock for U.S. biodiesel markets. As a result, it is likely that there will be more Canadian exports of canola to the United States to meet RFS2, with some canola derived biodiesel returning to

Canada.

Of note, the two Canadian companies that participated in the EU anti-dumping investigation have been exempt from the anti-dumping duties placed on the Canadian biodiesel industry following the investigation. Future Canadian biodiesel companies who wish to export biodiesel to the European Union will be provided the opportunity to apply for exemptions as well.

More information on the EU investigation is available at:

Council implementing regulation no 443/2011 (anti-subsidy)
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:122:0001:0011:EN:PDF

Council implementing regulation no 444/2011 (anti-dumping)
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:122:0012:0021:EN:PDF

Stocks:

There are no official statistics kept on biodiesel stocks, so Post has estimated stocks based on industry discussions. Beginning stocks are assumed to be about between 6.0% and 8.5% of consumption. The increase in exports in 2014 over 2013 levels is expected to draw down biodiesel stocks. An increase in domestic production capacity forecast for 2015 will pull stocks up in 2015.

V. *Advanced Biofuels*

While Canada is still not a significant producer of advanced biofuels, over the past few years it has been making progress toward beginning full-scale operation plants. In 2009, Enerkem opened a demonstration biofuels and biochemicals facility; in spring of 2012, this plant began production of cellulosic ethanol via treated wood as feedstock at a 5 million liter capacity.

Enerkem has completed its construction of a 38 million liter, cellulosic ethanol plant in Edmonton, Alberta. Edmonton will provide 100,000 dry metric tons of municipal solid waste to the plant as feedstock.

Future plans for a full-scale, cellulosic ethanol plant in Varennes, Quebec have also been announced. It would be a joint venture of Enerkem and Greenfield Ethanol Inc. and the Varennes plant will use Enerkem's proprietary thermochemical technology to convert non-recyclable waste into 38 million liters of cellulosic ethanol per year.

There is also Atlantic Canadian interest in producing cellulosic from wood waste or other advanced feedstock. For more information, please see the below section regarding biofuels in Atlantic Canada.

Currently, HVO production in Canada is currently less economic than biodiesel, resulting in less Canadian demand. There are currently no domestic HVO production facilities, and any intentions to start-up such facilities are not expected to be fulfilled in the near future.

VI. Biomass for Heat and Power

Wood Pellets

The expansion of the wood pellet production capacity in Canada has exceeded the growth in demand for the export markets. Production Capaity has been relatively stable since 2011 and the sales have continued to show steady growth and this has stimulated capacity utilization factors for the industry.

Canadian market share decreased between 2006 and 2012, however has begum increasing again.

There is current interest in exporting wood pellets from Canada to Europe to meet the increased demand for biofuels in European countries. The EU has been increasing funding for renewable energy production, including doubling the financial allotment of funds to renewable energy in 2007. In 2004, the EU announced that by 2020, 20 percent of its total energy consumption requirements will be renewable energy sources, greatly higher than the 12.4 percent in 2010. The pellet industry in Canada, especially in the west, has grown rapidly. According to the Canadian Wood Pellet Association (WPAC), in 2012, Canada had 42 pellet plants with 3 million tons annual production capacity, compared to 2010's 33 plants and 2 million tons capacity.

The province of British Columbia accounts for about 65 percent of Canadian production capacity. Collectively, the provinces of Alberta, Quebec, New Brunswick, Nova Scotia, and New Brunswick account for 35 percent. According to Executive Director Gordon Murray of the Canadian Wood Pellet Association, it is estimated that 90 percent of Canadian pellets were exported to Europe during 2010.

Canadian pellet consumption has remained relatively steady throughout the past several years, and there are no official statistics reflecting possible increases. However, a report released by the WPAC notes that demand for wood pellets may increase in the coming years due to Canadian desire to reduce carbon emissions in the coming years. The targeted reductions would require about 14 million tones of wood pellets to replace coal by 2020. While this desire remains somewhat impractical, Post estimates that 2013 and 2014 will show consumption increases, while not as large as mentioned above, that will reflect rising demand.

Table 8

Wood Pellets (1,000 MT)

Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Beginning Stocks	70	70	70	70	71	71	101	127	135
Production	1,145	1,485	1,335	1,300	1,320	1,450	1,500	1,800	2,180
Imports	0	0	0	40	0	0	45	23	15

Exports	1,055	1,390	1,240	1,244	1,225	1,300	1,369	1,640	2,000
Consumption	90	95	95	95	95	120	150	175	200
Ending Stocks	70	70	70	71	71	101	127	135	130
Production Capacity									
Number of Plants			33	33	33	39	42	41	41
Nameplate Capacity	1,300	1,600	2,085	2,083	2,082	2,900	3,175	3,175	3,175
Capacity Use (%)	88.1%	92.8%	64.0%	62.4%	63.4%	50.0%	47.2%	56.7%	68.7%

Fuels Produced from Other Biomass

There has been growing interest and investment in producing bioenergy from sources other than corn and wheat. Recently, there have been announcements of joint ventures to make cellulosic bioethanol and biogas, including a joint cellulosic bioethanol venture announced by GreenField Bioethanol and Enerkem. Enerkem, a Quebec-based gasification and catalysis technology company, has developed technology to convert biomass such as municipal solid waste and wood residue into cellulosic bioethanol.

Biogas is also of increasing interest and investment. Much of the work for on biogas is being done at the municipal level and for the most part is at the pilot project level. Two of the three bio-energy projects that received funding under Alberta's Biorefining Commercialization and Market Development Program and the Bio-energy Infrastructure Development Program are for the development of biogas as an alternative source of energy. Kingdom Farm Inc. received a significant grant to review the potential for bio-gas from large scale Alberta hog operations. Highmark Renewables Research also received a significant grant from AVAC Ltd. for a bio-gas feasibility study at a large scale dairy facility. More information on the biogas industry in Canada can be found on the website of the Biogas Association at the following URL: http://www.biogasassociation.ca/bioExp/.

Appendix I

Federal Mandate and Policies

Canada's government announced a renewable fuels strategy in late 2006, including a national renewable fuels mandate. Since that time, there have been legislative amendments and federal and provincial incentive programs that have encouraged the development of a Canadian renewable fuels industry. On August 23, 2010, the finalized (official) federal Renewable Fuel Regulations, came into force. The regulations set the five percent renewable fuel mandate for the national gasoline pool to come into effect on December 15, 2010 (full regulations). The commencement date for the mandated average 2 percent renewable fuel content in diesel fuel and heating distillate oil, which is also a provision of the federal Renewable Fuel Regulations, was omitted. The reason for this omission was that the demonstration of technical feasibility under the range of Canadian conditions had not yet been completed. On June 29, 2011, the federal government announced it was moving ahead with a July 1, 2011 implementation date for a federal mandate of two percent of renewable content in diesel fuel and heating oil. A permanent exemption has been provided for renewable content in diesel fuel and heating distillate oil sold in Newfoundland and Labrador to address the logistic challenges of blending biodiesel in this region. Temporary exemptions for renewable content in diesel fuel and heating distillate oil sold in Quebec and all Atlantic provinces were provided until December, 31, 2012, to give eastern Canada time to install biodiesel blending infrastructure. On May 18, 2013, the Regulations Amending the Renewable Fuels Regulations, were published in the Canada Gazette. The amendments extended the Maritime provincial exemption from the 2 percent renewable diesel requirement, increasing it to end on June 30, 2013. The amendments also created a permanent national exemption for the 2 percent renewable content requirement for heating oil. The Renewable Fuels Regulations are annexed to the Canadian Environmental Protection Act, 1999.

The overall structure is similar to the Renewable Fuel Standard in the United States, with the point of compliance at the point of production or importation. The objective of the regulations is to reduce greenhouse gas (GHG) emissions by mandating renewable fuel content based on the gasoline volume,

as well as diesel fuel and heating distillate oil volumes, and fighting climate change. The regulations are estimated to result in an incremental reduction of GHG emissions of about one ton of carbon dioxide equivalent (1 MT CO2) per year over and above the reductions attributable to existing provincial requirements already in place. The regulations fulfill the commitments under the federal government`s Renewable Fuels Strategy of reducing GHG emissions from liquid petroleum fuels and creating a demand for renewable fuels in Canada.

The Government of Canada comprehensive strategy was designed to:

1. Reduce the greenhouse gas (GHG) emissions resulting from fuel use,
2.Encourage greater production of biofuels,
3.Accelerate the commercialization of new biofuel technologies, and
4. Provide new market opportunities for agricultural producers and rural communities.

This market intervention is not unlike the support provided by previous governments to support the development of other new energy initiatives such as oilsands development, nuclear energy, and other renewables such as wind. There are four primary actions that the government has put into place to achieve these objectives:

1. Increasing the retail availability of renewable fuels through regulation

Regulations developed by Environment Canada required 5% renewable content based on the gasoline pool by 2010 and 2% renewable content in diesel and heating oil by 2012, upon successful demonstration of renewable diesel fuel use under the range of Canadian conditions. The announcement was made in December 2006 and Environment Canada issued a Notice of Intent in the Canada Gazette later that month.

2. Supporting the expansion of Canadian production of renewable fuels

On July 5, 2007, Prime Minister Stephen Harper announced the ecoENERGY for Biofuels Initiative, which was established to invest up to $1.5 billion over 9 years to boost Canada's production of renewable fuels such as ethanol and biodiesel.
The initiative provides operating incentives to producers of renewable alternatives to gasoline and diesel based on reported production levels. It makes investment in production facilities more attractive by partially offsetting the risk associated with fluctuating feedstock and fuel prices.
The program has been closed for new applications since 2012.

3. Assisting farmers to seize new opportunities in this sector

On April 23, 2007, the Minister of Agriculture and Agri-Foods officially launched the ecoAGRICULTURE Biofuels Capital Initiative (ecoABC), a $200 million initiative that provides repayable contributions of up to $25 million per project to help farmers overcome the challenges of raising the capital necessary for the construction or expansion of biofuel production facilities.

4. Accelerating the commercialization of new technologies

Budget 2007 also made $500 million available over eight years to Sustainable Development Technology Canada (SDTC) to invest with the private sector in establishing large-scale facilities for the production of next-generation renewable fuels. Next-generation renewable fuels, produced from non-food feedstocks such as wheat straw, corn stover, wood residue, and switchgrass, have the potential to generate even greater environmental benefits than traditional renewable fuels. Canada is well positioned to become a world leader in the development and commercialization of next-generation fuels.

Appendix II

Provincial Mandates, Policies, Tax Exemptions, Incentives and Conditions

A. Alberta Biofuel Policies

Biofuels Strategy/Policy Documents:
The buildup of biofuels production capacity in Alberta has largely been the result of its nine-point bioenergy plan, first announced in October 2006. In December 2008, the government built on this plan and announced its Provincial Energy Strategy. A revised carbon offset protocol for biofuels is being developed in Alberta. It is expected that Alberta producers will be able to monetize any GHG emission reductions beyond the 25% threshold for fuel produced and blended in the Province. Alberta offsets can trade between $5 and $15/tonne of CO2eq.

Renewable Fuel Standard:
As part of the strategy, the government of Alberta announced its intention to implement a renewable fuel standard of 5 percent bioethanol content in gasoline and 2 percent renewable content in diesel by 2010. The implementation was later pushed back to April 1, 2011. In addition, the production and manufacturing life cycle of the renewable fuel must be at least 25 percent lower than emissions from producing and manufacturing the same quantity of traditional fossil fuels.

Production Incentives:
The province of Alberta offers a Bioenergy producer credit program (BPCP). The BPCP was extended to 2016 . The extended BPCP applies to bioenergy production in Alberta from April 1, 2011 to March 31, 2016. The incentives vary from $0.06 to $0.14 per liter depending on the fuel and the plant size. Next generation technologies receive larger incentives than commercial technologies. Plants producing less than 150 million liters per year receive $0.14 per liter and larger plants receive $0.09 per liter.

Context:

According to the most recent data, Alberta boasts approximately 11 percent of Canada's total population, 14 percent of net gasoline sales and 6.5 percent of bioethanol production capacity.

B. British Columbia Biofuel Policies

Biofuels Strategy/Policy Documents:
In 2008, the province of British Columbia (BC) committed to bioenergy and renewables and set an objective to lower greenhouse gases emissions 33 percent by 2020. The province, under its Ministry of Energy, Mines and Petroleum Resources, unveiled two strategy documents/plans related to using bioenergy resources to reduce greenhouse gases. The first is the BC Energy Plan, unveiled late February 2007. This document sets out the necessary steps for reducing BC's greenhouse gas emissions and commits to investments in alternative technologies, including biofuels for transportation. The second is the BC Bioenergy Strategy, which aims for BC biofuel production to meet 50 percent of the province's renewable fuel requirements by 2020. The BC Bioenergy Strategy was made public at the end of January 2008. The unique aspect of the low carbon fuel requirement is that the non-compliance costs are set at $200/tonne of CO2eq. This should provide a market incentive for biofuels that have a lower carbon intensity.

The program offers the same incentive to other low carbon intensity fuels like natural gas and electricity. Biofuels do have lower infrastructure costs than some of the other alternatives, as blending infrastructure is available in some regions of the province.

Renewable Fuel Standard:
Since January 1, 2010, but amended in June 2011, British Columbia's Renewable and Low Carbon Fuel Requirements Regulation has required:

- A provincial annual average of five percent renewable content in gasoline sold in British Columbia.
- A provincial annual average of three percent renewable content in diesel sold in British Columbia in 2010 and four percent in 2011 onward.
- A 10 percent reduction in the carbon intensity of transportation fuels by 2020.

Consumption Incentives: none. The Motor Fuel Tax Act and Carbon Tax Incentive which were incentives for bioethanol and biodiesel when blended with gasoline or diesel were discontinued, effective January 1, 2010. Fuel with at least 85 percent bioethanol, natural gas and propane (effective July 1, 2010) when used in a motor vehicle are exempt of the Motor Fuel Tax Act. Under specific conditions hydrogen is also exempt from the Motor Fuel Tax Act.

Context:
According to the most recent data, British Columbia boasts approximately 13.1 percent of Canada's total population, 11 percent of net gasoline sales and virtually no commercial bioethanol production capacity.

C. *Manitoba Biofuel Policies*

Biofuels Strategy/Policy Documents: Manitoba was the first province to provide financial support for ethanol blends (in 1980) and saw the first use of ethanol blended gasoline in Canada in 1981. Manitoba was also the first province in Canada to implement a law requiring biodiesel in its diesel fuel. Manitoba

is developed its bioethanol and biodiesel industries under the Energy Development Initiative section of the Ministry of Innovation, Energy and Mines. Information on Manitoba's biofuels initiatives is available on the province's Energy Development Initiative website.

Renewable Fuels Mandate:
The implementation of The Bio-fuels and Gasoline Tax Amendment Act was enacted in the fall of 2007. The mandate requiring that 8.5 percent of the gasoline sold in the province must be bioethanol came into effect on January 1, 2008, beginning with a 5 percent bioethanol requirement for the first quarter of the year and moving to 8.5 percent for the remainder of 2008 and subsequent years. In December, 2007 the Province of Manitoba passed the Biofuels Act which includes strict licensing and fuel quality requirements and the option for a future biodiesel mandate. Manitoba's Biofuels Act established the legislative framework for establishing a biodiesel sales mandate, licensing biodiesel manufacturers, and adopting biodiesel fuel quality standards.

Production Incentives:
The gasoline tax exemptions for bioethanol have been replaced by a direct producer grant that decreases over a period of eight years. The staggered, decreasing production incentives are as follows: 20 cents/liter producer incentive beginning January 1, 2008 until December 31, 2009; 15 cents/liter production incentive beginning January 1, 2010 until December 31, 2012; 10 cents/liter producer incentive beginning January 1, 2013 until December 31, 2015. To be eligible for the incentive, bioethanol must be produced in Manitoba and sold in Manitoba to fuel suppliers. More information on the program is available at: Bioethanol Fund Grant Regulation.

The grant program provides an incentive of 14 cents per litre of biodiesel and runs for five years from April 1, 2010 to March 31, 2015. To be eligible for the grant the biodiesel must:

- be made in Manitoba by a producer with a valid commercial licence to manufacture biodiesel in the province;
- meet either of the quality standards for biodiesel adopted by Manitoba: ASTM D6751, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels or EN 14214 Automotive Fuels – Fatty Acid Methyl Esters FAME) for Diesel Engines – Requirements and Test Methods; and
- be sold either in Manitoba or for export. Grants are subject to caps. The maximum number of litres of Manitoba biodiesel eligible for an incentive in a 12-month period (April 1 to March 31 of the next year) is 20 million litres. ***Note: There are currently no active biodiesel producers in Manitoba.***

Context:
According to the most recent data, Manitoba boasts approximately 4 percent of Canada's total population, 4 percent of net gasoline sales and 7 percent of bioethanol production capacity.

D. Ontario Biofuel Policies

Biofuels Strategy/Policy Documents:

Ontario is the largest bioethanol-producing province in Canada and has been a leader in building bioethanol production capacity in Canada. Ontario's bioethanol strategy has two components; (1) a renewable fuel standard mandate, and (2) the Ontario Bioethanol Growth Fund (OEGF) that was created in 2005.

Renewable Fuels Standard:
As of January 1, 2007, the gasoline tax exemption of 14.7¢ a liter on the bioethanol portion of the bioethanol-blended gasoline is no longer in effect. At the same time, a mandate that requires on average, no less than-5 percent bioethanol be blended in the gasoline sold in Ontario came into effect. Ontario's Ethanol in Gasoline Regulation created a demand for approximately 850 million liters of ethanol annually.

In 2014, Ontario brought into effect regulations for a provincial renewable diesel requirement.
As part of its commitment to reduce greenhouse gas emissions and improve air quality, the Ministry of the Environment introduced a regulation that would require that Ontario's diesel pool contain a minimum percentage of diesel made from renewable sources. To ensure that tangible environmental benefits are achieved, the proposed approach includes an average greenhouse gas (GHG) reduction requirement for fuel volumes sold or used in the Province. The renewable fuel content is expected to range between 2 and 4 percent depending on feedstock used.

The proposal is expected to provide air quality benefits including reduced particulate matter and greenhouse gas reductions. It is estimated that the greener diesel requirement will reduce Ontario's GHG emissions by approximately 200,000 tonnes per year in the first compliance period, 1 million tonnes annually from 2017 onwards and by about 5 million tonnes on a cumulative basis by 2020. The proposed approach also includes a number of mechanisms to ensure that diesel fuel suppliers have flexibility in meeting the requirements of the proposed regulation.

Provincial Programs to Support the Development of a Regional Biofuels Industry:
On June 17, 2005, the Ontario Government announced a new $520-million, 12-year fund to support the production of ethanol fuel in Ontario. The projects funded through the Ontario Ethanol Growth Fund (OEGF) are expected to supply approximately 500 million litres annually of this renewable fuel.

The Ontario Bioethanol Growth Fund (OEGF) provides:

- C$32.5 million for capital assistance to help meet financial challenges; cannot exceed 10¢ per liter;
- C$60.5 million per year from 2007-2017 for operating assistance to address changing market prices; no operating grant will exceed 11¢ per liter of bioethanol;
- C$16 million in support of independent retailers selling bioethanol blends Independent Gasoline Blender's Transition Fund;
- C$7.5 million in private and public funds for research and development opportunities.

The OEGF is fully subscribed and is no longer taking applications.

The OEGF was instrumental in the construction of four of Ontario's seven ethanol plants. The program had limits on eligible participants,

Context:
According to the most recent data, Ontario boasts approximately 38 percent of Canada's total population, 39 percent of net gasoline sales and 58 percent of bioethanol production capacity.

E. Quebec Biofuel Policies

Biofuels Strategy/Policy Documents:
Quebec currently has no mandate in place for renewable fuel content in gasoline. However, it contributes to national compliance with the federal Renewable Fuels Regulations and has an aspirational target of 5% for ethanol in gasoline but no similar program for biodiesel.

Production Incentives:
Quebec currently has in place a temporary refundable tax credit (maximum C$0.185 per liter), granted for a maximum of 10 years to corporations that produce bioethanol from renewable material and sell the bioethanol for use in Québec. It began April, 2006 and expires in 2018. An eligible corporation's bioethanol production must be sold in Quebec to a person holding a collection officer's permit issued under the Fuel Tax Act. Additional conditions for the credit limit a maximum bioethanol production credit of 126 million liters and no tax credit for the month in which the average monthly price of crude oil is equal to or greater than USD$65, or the total cumulative production of bioethanol exceeds 1.2 billion liters. The reasoning for this limitation is that it was assumed that bioethanol would be competitive with gasoline if the price of crude oil exceeded USD$65 a barrel. More information is available on the web site of Revenue Quebec.

The 2011 Quebec budget introduced a new refundable tax credit applicable to cellulosic ethanol production, which applies in parallel with the existing refundable tax credit for the production of ethanol as an incentive to increase production in Quebec. This credit can be granted for a period beginning March 18, 2011 and ending March 31, 2018 for ethanol produced from renewable materials other than corn and may reach 15¢ per litre of ethanol produced.

Technical changes were also made to the existing tax credit to simplify its administration and to take into account the introduction of the new tax credit for the production of cellulosic ethanol.
Quebec also has a policy that limits the use of corn for ethanol production beyond the one existing plant in the province. Future production expansion must therefore come from cellulosic feedstocks

The Quebec strategy tends to focusing on financing specific projects through programs such as the green technologies demonstration program. The purpose of the program is to finance demonstration projects of innovative technologies and procedures that have strong potential for reducing greenhouse gas emissions in Québec. It pursues the objectives of two different green development strategies, the Development Strategy of the Quebec environment industry and green technologies and the Québec Energy Strategy 2006-2015. The program focuses on reducing greenhouse gas emissions by supporting the development of technologies that limit or reduce greenhouse gas emissions; improving energy efficiency so as to reduce consumption of fossil fuels; replacing fuels and fossil fuels with renewable energy; contributing to the development of Québec industry and job creation in the green technology

sector.

While some corn production takes place in Quebec, Quebec's focus is on the development of cellulosic bioethanol. It is Quebec's intention to use wood from its forestry industry to grow its bioethanol market. This technology seems to be moving closer to commercialization given the joint venture announcement between Enerkem, a Quebec-based gasification and catalysis technology company, and GreenField Bioethanol, Canada's leading bioethanol producer. Enerkem was founded in 2000 and currently operates two plants in Canada: a pilot facility in Sherbrooke, QC and a commercial-scale plant in Westbury, QC. It has completed construction of its waste-to-biofuels plant in Edmonton, AB, Canada, which has received over C$23 million from the government of Alberta and the City of Edmonton. Additionally, Enerkem, in joint with GreenField Ethanol Inc., has proposed a plant in Varennes Quebec, Varennes Cellulosic Ethanol L.P. The Quebec government announced that it will be injecting $27 million into the plant. Varennes Cellulosic Ethanol L.P. will use Enerkem's proprietary thermochemical technology to convert non-recyclable waste into 38 million liters of cellulosic ethanol per year.

Context:
According to the most recent data, Quebec boasts approximately 24 percent of Canada's total population, 21 percent of net gasoline sales and 10 percent of bioethanol production capacity.

F. Saskatchewan Biofuel Policies

Biofuels Strategy/Policy Documents:
Saskatchewan's "Go Green" strategy promotes environmentally friendly transportation. Initiatives include working with industry to develop E85 (fuel blends with 85 percent bioethanol and 15 percent gasoline) corridors in the province, developing a 1.4 billion liter biofuels industry in Saskatchewan, and implementing a Government and Crown vehicle purchase policy that requires all vehicles to be hybrid electric, alternative or flex-fuel, or within the top 20 percent efficiency in their class.

Renewable Fuels Mandate:
Saskatchewan currently has a 7.5 percent bioethanol content requirement in its gasoline. The actual implementation of the mandate was tied to Saskatchewan production.
Saskatchewan is working on an offset program similar to the one being developed in Alberta.

Saskatchewan introduced a mandate for inclusion of 2% renewable content in the average annual diesel fuel pool for fuel distributors beginning July 1, 2012. In order to allow industry to fully make the transition, the first compliance period runs from July 1, 2012, to December 31, 2014.

Production Incentives:
The ethanol mandate level was initially a modest 2%, rising to 7.5% in 2005. Saskatchewan currently provides incentives (5 cpl), through the fuel tax collection system for ethanol that is produced and consumed in the province. They have announced plans to eliminate the incentive. Historically, the economic value of the fuel tax exemption has been shared between the blender and the producer.

In anticipation of the mandate, the Saskatchewan Renewable Diesel Program incentive was developed to support production of renewable diesel. The incentive component provides 13 cents per liter of eligible

renewable diesel to qualifying producers in Saskatchewan for use in all diesel fuel applications. The incentive program is effective April 1, 2011, and terminates March 31, 2016. The incentives are subject to caps. The maximum number of liters of Saskatchewan renewable diesel eligible for an incentive in a fiscal year (April 1 to March 31 of the next year) per producer is 20 M liters. The total program incentive cap is set a t 40 M liters per fiscal year.
There is one operating biodiesel plant in Saskatchewan with a production capacity of 20 million liters.

Saskatchewan also provided grants to fuel distributors through the Bioethanol Fuel Grants Program. To be eligible for the grants, the bioethanol used by the distributor has to have been produced at a facility located in Saskatchewan from biomass grown in Saskatchewan. The program provided a 15 cent per liter grant to eligible distributors who blend Saskatchewan produced ethanol for domestic consumption. A program review indicated that the objectives of the program have been largely met, and a phase out program started April 1, 2013. This reduced the grant from 15 cents per liter to 10 cents per liter with an annual cost of $16 million (down from $24 million).

Enterprise Saskatchewan administers the Saskatchewan Bioethanol Program.

Context:
According to the most recent data, Saskatchewan boasts approximately 3 percent of Canada's total population, 3 percent of net gasoline sales and 19 percent of bioethanol production capacity.

G. Biofuel Policies in Atlantic Canada

Biofuels Strategy/Policy Documents:
Biomass developments are increasing in Atlantic Canada. The Atlantic Council for Bioenergy Co-operative (ACBC) was founded in 2010 with the vision of bringing a vibrant, sustainable bioenergy industry to Atlantic Canada. While Atlantic Canada may lack the arable area for traditional biofuels feedstock, options are being explored in the realm of cellulosic ethanol and renewable diesel via wood waste and other advanced feedstock.

Currently, however, Nova Scotia is the only province to include a tax credit on biodiesel. The remaining Atlantic provinces have no incentives, mandates or tax credits regarding biofuels and are the only governments in Canada that do not have a biofuels or bioenergy policy in place. The New Brunswick Department of Environment has indicated that it will consider implementing the federal national standard in New Brunswick, but has not committed to an official provincial mandate.

Appendix III

Biofuel Plants

Table 9				
Ethanol Production Plants				
Status	**Location**	**Company Name**	**Primary Feedstock**	**Nameplate Capacity (million liters)**
Existing	Westbury, Quebec	Enerkem	Wood waste	5
Existing	Lanigan, Saskatchewan	Pound-Maker	Wheat	15
Existing	Weyburn, Saskatchewan	NorAmera Bioenergy	Wheat, corn	25
Existing	Unity, Saskatchewan	North West Terminal Ltd.	Wheat	25
Existing	Tiverton, Ontario	GreenField Ethanol	Corn	27
Existing	Edmonton, Alberta	Enerkem	Municipal landfill waste	38
Existing	Hairy Hill, Alberta	Growing Power Hairy Hill	Wheat	40
Existing	Red Deer, Alberta	Permolex	Wheat	42
Existing	Havelock, Ontario	Kawartha Ethanol	corn	80
Existing	Minnedosa, Manitoba	Husky Energy	Corn, wheat	130
Existing	Lloydminster, Saskatchewan	Husky Energy	Wheat	130
Existing	Aylmer, Ontario	IGPC	Corn	172
Existing	Belle Plaine, Saskatchewan	Terra Grain Fuels	Wheat, corn	150
Existing	Varennes, Quebec	GreenField Ethanol	Corn	175
Existing	Chatham, Ontario	GreenField Ethanol	Corn	195
Existing	Johnstown, Ontario	GreenField Ethanol	Corn	200
Existing	Sarnia, Ontario	Suncor Energy	Corn	396
			TOTAL:	1,845
Source: Canadian Renewable Fuels Association and the Global Biofuels Center;				

Table 10				
Biodiesel Production Plants: Existing, Expanding, Under Construction				
Status	**Location**	**Company Name**	**Feedstock**	**Nameplate Capacity (million liters)**
Existing	Mississauga, Ontario	Methes Energies Canada	Recycled oils	5
Existing	Springfield, Ontario	Noroxel (Methes Energies)	Recycled oils	5
Existing	St-Jean d'Iberville, Quebec	QFI Biodiesel (Methes Energies)	Recycled oils	5
Existing	Sombra, Ontario	Methes Energies Canada	Recycled oils	50
Existing	Delta, BC	Consolidated Biofuels	Yellow grease	11
Existing	Foam Lake, Saskatchewan	Milligan Bio-tech	Canola oil	20
Existing	Montreal, Quebec	Rothsay	Animal fats, recycled oils	45
Existing	Delta, BC	City-Farm Biofuel Ltd.	Recycled oil/tallow	50
Existing	Lethbridge, Alberta	Kyoto Fuels	Animal fats, recycled oils	66
Existing	Hamilton, Ontario	BIOX Corporation	Animal fats, yellow grease	67
Existing	Welland, Ontario	Great Lakes Biodiesel	Canola, soybean	170
Existing	(West) Lloydminister, Alberta	Archer Daniels Midland	Canola	265
			TOTAL:	759
Source: Canadian Renewable Fuels Association				