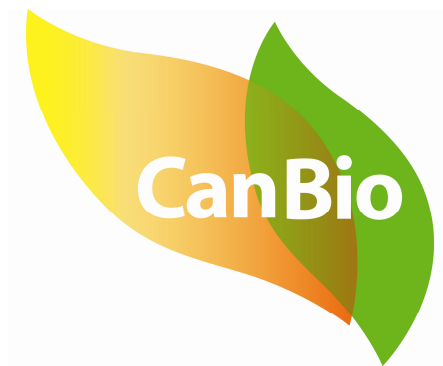




Canadian Bioenergy Association

IEA Bioenergy Task 40 Country Report

Canada 2011

March 30, 2012

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CanBio produced the Canada Report on Bioenergy 2010, issued Sept 15, 2010. This report remains the definitive detailed report on the status of the bioenergy industry in mid 2010. At the request of IEA Task 40, this report was developed to reflect data to Dec 31, 2010.

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1. General Introduction

1.1.Presentation

Canada is a country of over 34 million people, primarily English speaking, but with French minority large enough to warrant being an officially bilingual nation. At over 9 million sq. km., it is the second largest country in the world after Russia. It stretches from the US in the south to above the Arctic Circle, and from the Pacific Ocean to the Atlantic Ocean.

Canada is blessed with considerable natural resources including oil and gas, coal, hydro, minerals, and forests. With its 397.2 million hectares of forests and other wooded lands, Canada represents 10% of the world's forest cover and 30% of the world's boreal forest.

1.2. Description of main industries

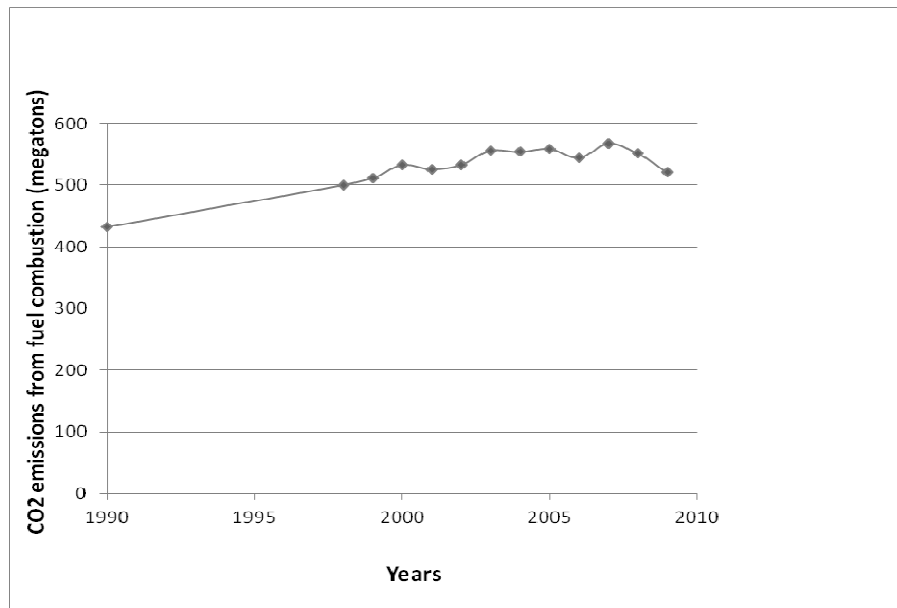
Canada resembles the US in its market-oriented economic system, and affluent living standards. Growth of the manufacturing, mining, and service sectors has transformed the nation from a largely rural economy into an industrial, urban economy. Canada's GDP in 2010 was 1.2 trillion \$CAN (€0.91 trillion at 1€= 1.35 \$Cdn).

Canada has a large, well-developed forest sector and has historically been one of the world's largest exporters of wood products. 397.2 million ha, 41% of Canada's land area, is forested of which 27.6 million ha, or 6.9%, are national parks. 77% of forests are under provincial jurisdiction, 16% are federal, and 7% are privately owned. For about 200 Canadian communities, forest sector makes up at least 50% of the economic base. However, in 2010, direct employment in the Canadian forest industry fell by 7% compared with 2009 (Natural Resources Canada 2011).

In 2009, the last year for which those numbers are available, 118.2 million m³ of industrial roundwood was harvested on 611 874 ha, a drop of 14% relative to 2008, and representing 51% of harvest levels of 2005 harvest due to falling demand for wood products in the US. Nonetheless, Canada has vast biomass potential. In December 2010, 149.8 million hectares of Canada's forests, out of 229 million hectares of managed forests, were certified as being sustainably managed by one or more of globally recognized certification standards (Natural Resources Canada 2011).

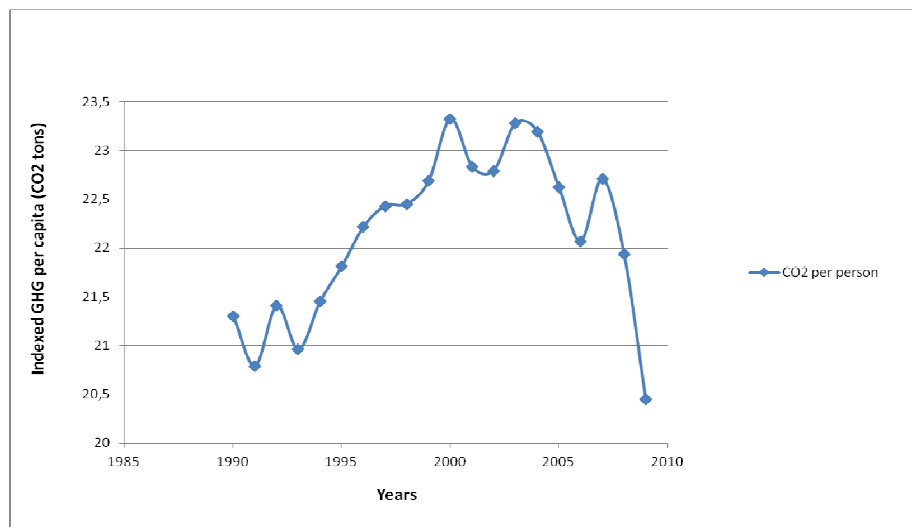
1.3. Greenhouse gas (GHG) emissions

Canada's GHG emissions rose consistently in 1990-2000, as did emissions from most countries, however Canada's emissions reflected considerable population growth and consequent demand for energy, not typical of European countries. GHG emissions stabilized in 2003-06 reflecting growing interest in emission reductions. Emissions actually fell from 568 MT to 521MT by 2009, largely as a result of the global economic slowdown. Figure 2 reports CO₂ emissions associated with fuel combustion. Fig. 3 reports excellent emission performance per capita.



From: OECD Factbook 2011

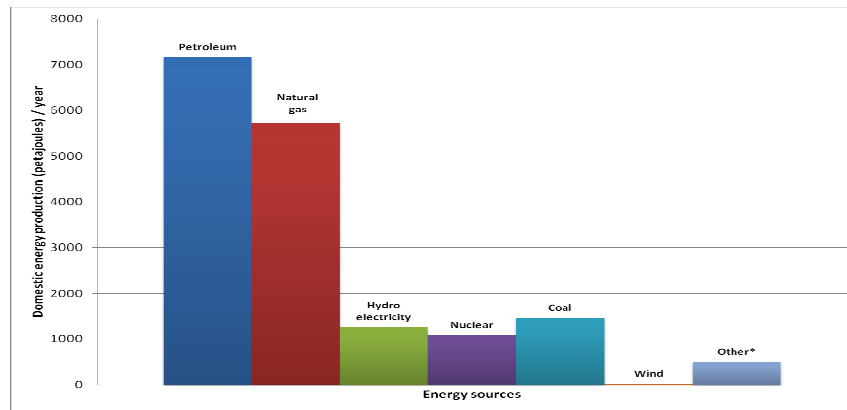
Figure 1: CO2 emissions from fuel combustion (megatons)



Environment Canada, 2012

Figure 2: : Indexed GHG per capita (tons of CO2 per person expressed as a % of 1990)

1.4. Total domestic energy production

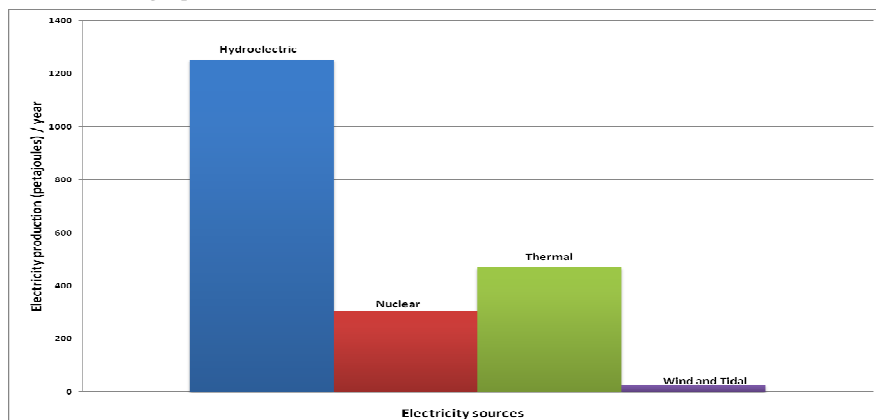


National Energy Board 2012

Figure 3: Domestic energy production by energy source, 2010 (petajoules)

Figure 3 reports energy production from various sources. Petroleum and natural gas are the main energy sources. Bioenergy is included in “other” sources and includes solid wood waste, spent pulping, wood and other fuels for electricity generation.

1.5. Total electricity production

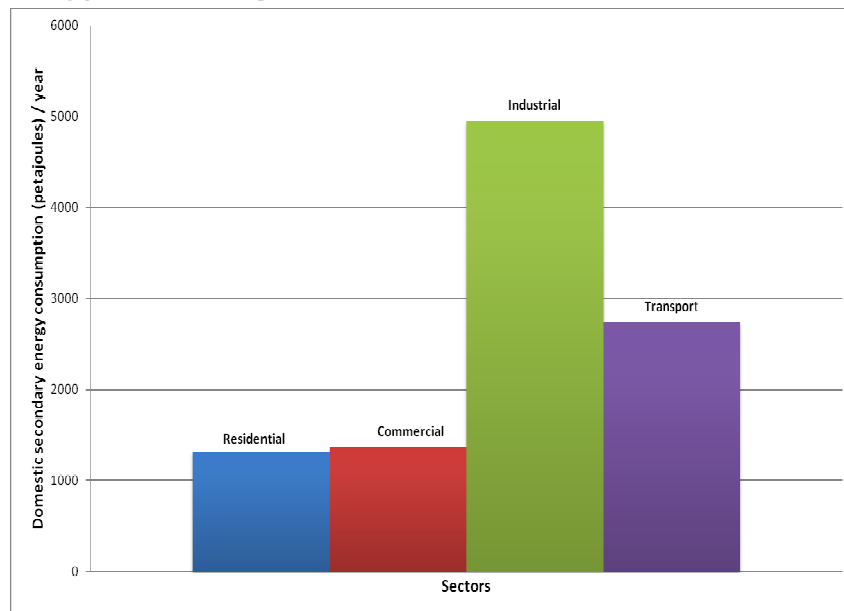


From: National Energy Board 2012

Figure 4: Electricity production by source, 2010 (petajoules)

Figure 4 reports electricity production. Hydroelectricity is the most important source (1253 PJ). Canada is the third biggest producer in the world, despite decreased production due to low precipitation in 2010. Thermal energy ranks second for electricity production, representing about 1/3 of the amount provided by hydroelectricity (469 PJ) (National Energy Board 2012).

1.6. Total energy consumption



From National Energy Board 2012

Figure 5: Domestic secondary energy consumption per sector, 2010 (petajoules)

Figure 5 reports energy consumption for 2010. The industrial sector is the largest consumer at 4,950 PJ, followed by transport at 2,743 PJ. Residential and commercial sectors have a similar consumption, at 1 300 PJ. Energy consumption in the residential sector was lower in 2010 because of a relatively warm winter (National Energy Board 2012).

2. Policy

All policies as of mid 2010 are detailed in Canada Report on Bioenergy 2010, Sept 15, 2010, found on the CanBio web site www.canbio.ca. All policies new in 2010 and not contained in the above report are shown below. All policies up to Dec 2011 are summarized in Appendix 1. See also Appendix 2 for an overview of sustainability issues and research on forest biomass. In the following section, a conversion factor of 1\$CAN=0.76€ was used.

2.1. Federal initiatives

One pillar of the Government's broader Renewable Fuels Strategy came into action in 2010. The Renewable Fuels Regulations, published on September 1, 2010, require an average renewable fuel content of five per cent in gasoline starting December 15, 2010. The Regulations already include full provisions to require fuel producers and importers of diesel fuel and heating distillate oil to have an average annual renewable fuel content equal to at least 2% of the volume of distillates that they produce and import; the coming-into-force date for this requirement of July 1, 2011.

2.2. Provincial initiatives

The **Northwest Territories** and **Yukon** both launched strategic plans on energy which promote a greater utilization of biomass for energy production.

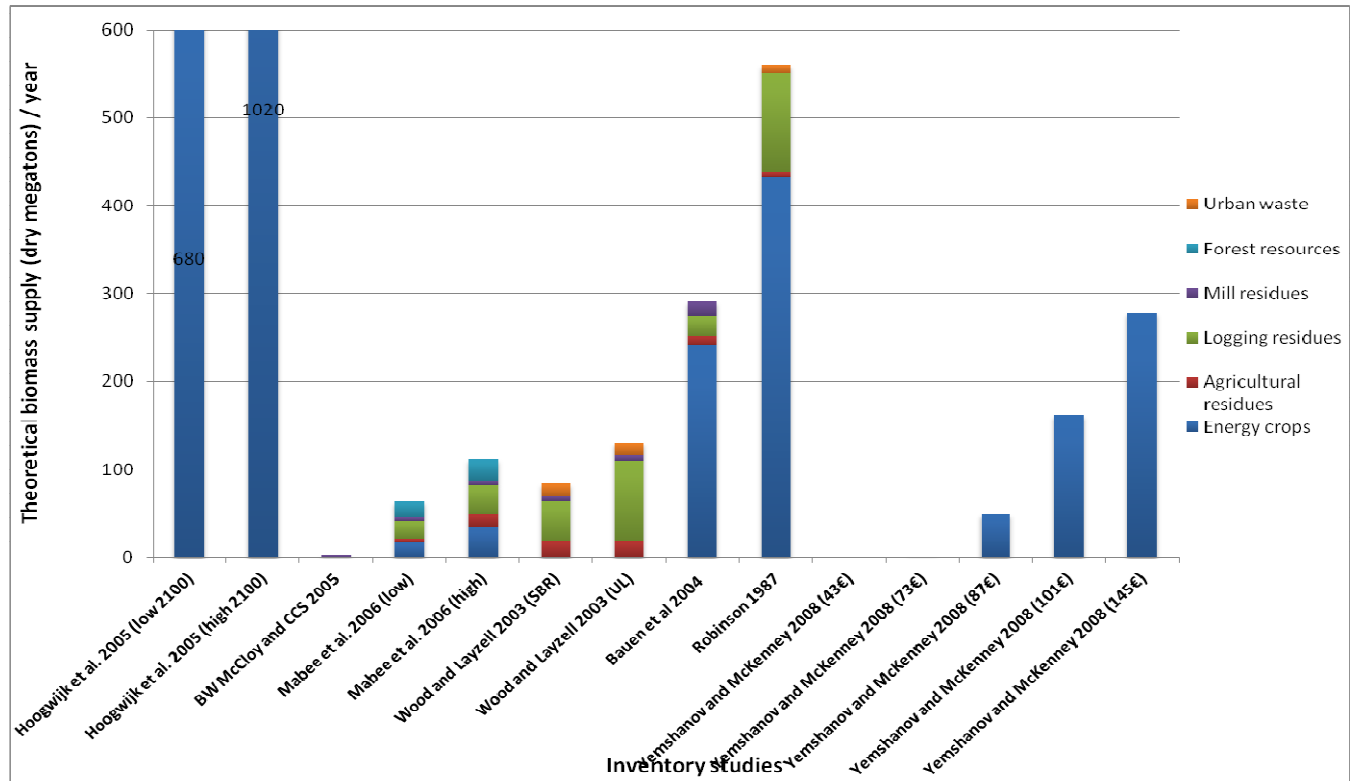
Nova Scotia also announced its Renewable Energy Plan, with a commitment of 25% renewable electricity by 2015 (by law) and a target of 40% renewable electricity by 2020. For biomass, although electricity produced from co-firing biomass will play a role in meeting the 2015 target, but will undergo review for post-2015 use to ensure sustainability. The plan caps new electricity generation from forest biomass at 500,000 dry tonnes (~600-700 GWh) above current use. Co-firing in thermal plants is capped at 150,000 dry tonnes (150 GWh).

In order to Support the production of biodiesel in **Manitoba**, the province started providing an incentive of \$0.14/L (0.11€/L) of biodiesel. To be eligible for the incentive the biodiesel must: (1) be produced in Manitoba by a producer with a valid commercial licence to manufacture biodiesel in the province; (2) meet one of the quality standards for biodiesel adopted by Manitoba; (3) be sold either in Manitoba or for export or used by the producer to make blended biodiesel that the producer then sold in Manitoba or for export.

3. Biomass Resources

Forest biomass resources as of Dec 31, 2010 are essentially as contained in Canada Report on Bioenergy 2010, Sept 15. For example, actual sawmill production at Dec 31 was almost exactly as projected Sept 15. Shown below are assessments of theoretical biomass potential.

3.1. All sources



From: Gronowska et al. 2009

Figure 6: Theoretical annual biomass supply per sector (dry megatons)

Figure 6 reports figures from various studies on the theoretical availability of biomass in Canada from various sources (from Gronowska et al. 2009). All monetary values represent the farmgate (or equivalent for forest and urban biomass) price in Euros/oven-dry ton. The biomass amount is the cumulative amount available at the price stated. Hoogwijk et al. (2005) report optimistic energy crop estimates for four scenarios for the year 2050 and four scenarios for the year 2100, with varying assumptions, such as population size and food requirements or land availability. The values indicated represent the lowest and highest estimates reported by this study. In order to show reasonable resolution of the studies' details, bars for Hoogwijk et al. are not shown to scale. Mabee et al. (2006) report green biomass quantities. Mabee et al. (2006) report two scenarios, where low and high represent more conservative and optimistic, respectively, assumptions about biomass availability (e.g., residue generation rates, yields). For Wood and Layzell (2003), SBR = sustainable biomass removal, UL = upper limit of biomass removal. Robinson (1987) reports combined logging and mill residues (indicated by one bar segment).

This study also reports the municipal solid waste (MSW) portion of urban waste in green biomass units.

Scenarios:

Hoogwijk et al. 2005 (low 2100): low estimates; year 2100

Hoogwijk et al. 2005 (high 2100): high estimates; year 2100

BW McCloy and CCS 2005; one scenario

Mabee et al. 2006 (low): low estimate

Mabee et al. 2006 (high): high estimate

Wood and Layzell 2003 (SBR): sustainable biomass removal

Wood and Layzell 2003 (UL): upper limit of biomass removal

Bauen et al 2004: 25% residues collected

Robinson 1987: one scenario

Yemshanov and McKenney 2008 (43€): \$US 57/dry t

Yemshanov and McKenney 2008 (73€): \$US 96/dry t

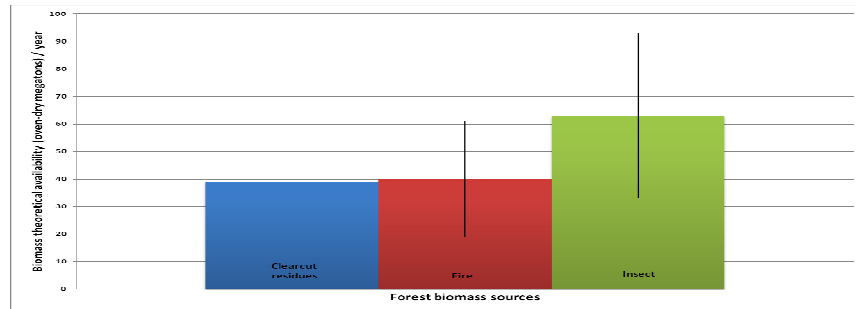
Yemshanov and McKenney 2008 (87€): \$US 115/dry t

Yemshanov and McKenney 2008 (101€): \$US 134/dry t

Yemshanov and McKenney 2008 (145€): \$US 191/dry t

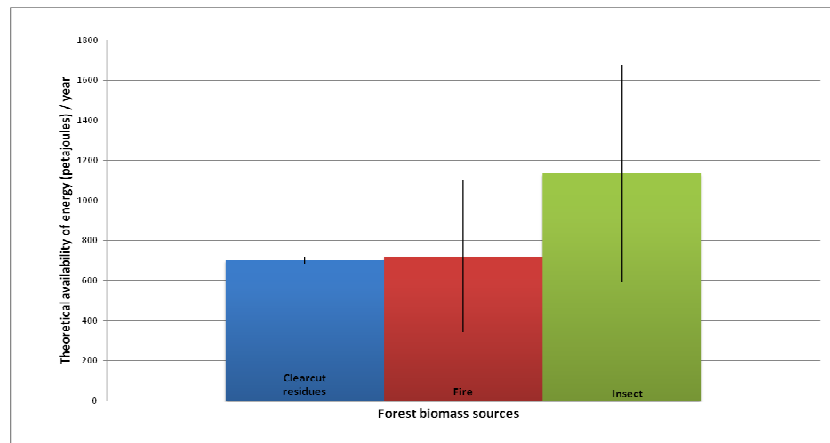
3.2. Forest

3.2.1. Canada



From Dymond et al. 2010

Figure 7: Annual theoretical availability of harvest residues and dead wood due to natural disturbances (oven-dry, megatons)

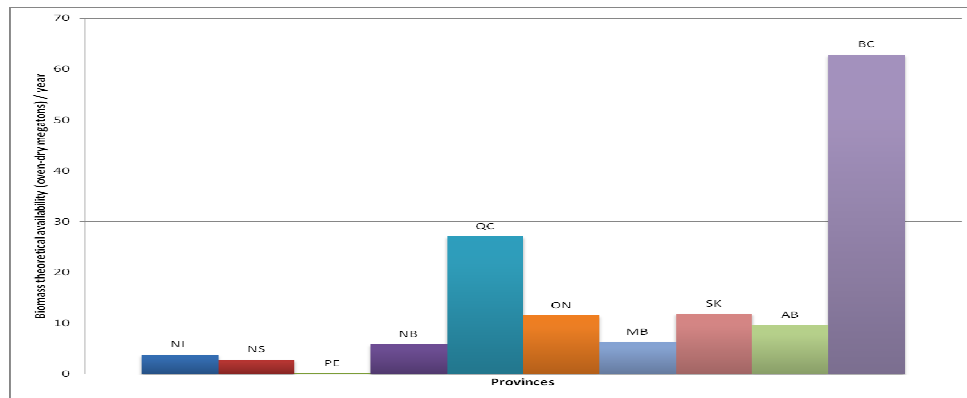


Dymond et al. 2011

Figure 8: Annual theoretical availability of energy from harvesting residues and from dead wood due to natural disturbances (petajoules)

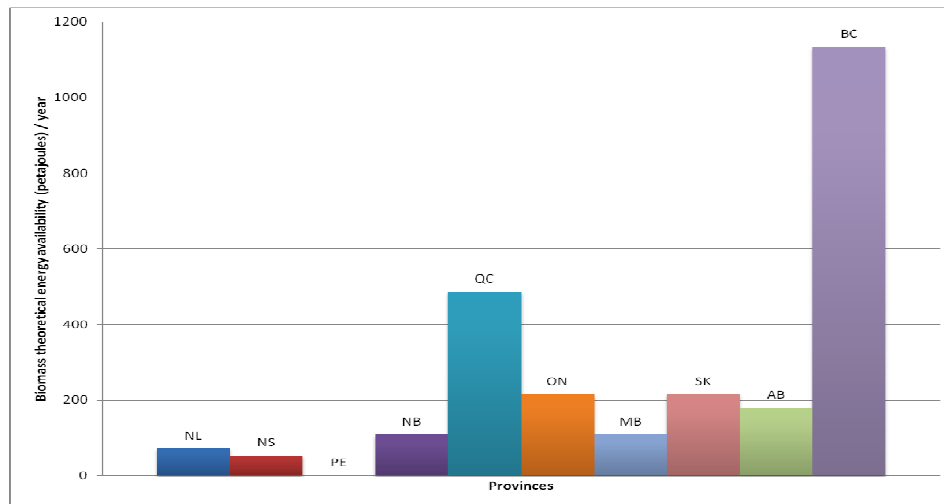
Figures 7 and 8 report potential availability of woody biomass and bioenergy from natural managed forests, estimated from modelling of forest ecosystems, using historical and projected rates of natural disturbances and harvesting (Dymond et al. 2011). Annual estimates cover the 2005-2020 period. Error bars represents annual variation. No net-down for operational, technical or ecological constraints to biomass recovery was applied. Conversion factor to calculate energy content is 18 GJ/Odt (Paré et al. 2011). Dead wood from salvage harvesting of insect-killed stands represent the greatest theoretical source, relative to harvest residues or wood from fire-affected stands. This does not take into account economics availability of biomass.

3.2.2. Availability by province



From Dymond et al. 2010

Figure 9: Annual theoretical availability of harvesting residues and of dead wood due to natural disturbances per province (oven-dry megatons)

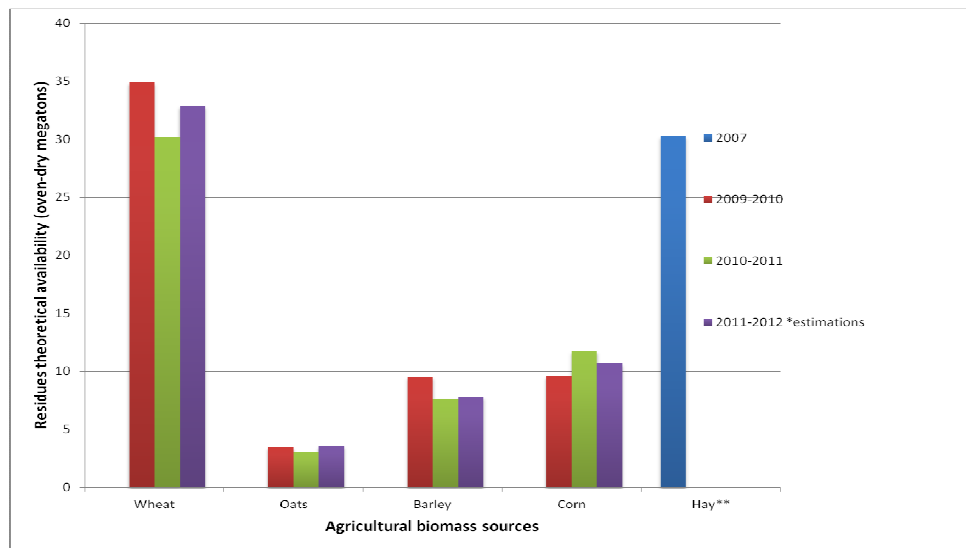


Dymond et al. 2010

Figure 10: Annual theoretical availability of energy from harvesting residues and from dead wood due to natural disturbances, per province (petajoules)

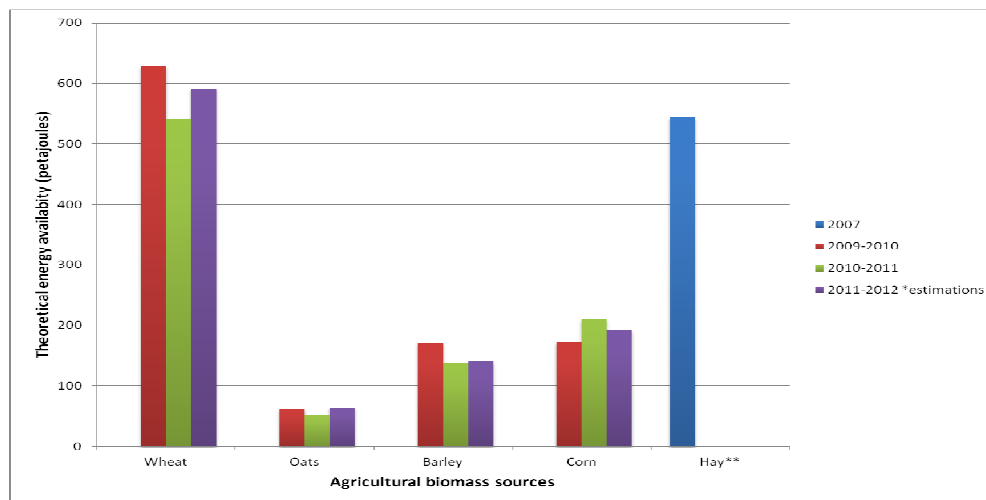
Figures 9 and 10 report potential availability of woody biomass and bioenergy from Canadian natural managed forests for the provinces (from Dymond et al. 2010). British Columbia represents the highest theoretical potential for harvest residues as well as for salvage wood from natural disturbances. Quebec ranks in second place.

3.3. Agricultural crops



Agriculture and Agri-Food Canada 2012

Figure 11: Theoretical availability of agricultural biomass (oven-dry megatons)



Agriculture and Agri-Food Canada 2012

Figure 12: Theoretical energy availability from agricultural residues (oven-dry megatons)

Figures 11 and 12 report theoretical biomass and bioenergy availability from agricultural residues, estimated from statistics on agricultural production of various agricultural crops (following the methodology of Mabee and Mirck 2011). The conversion factor used to calculate the energy content is 18 Giga-joules/ oven-dry ton (Paré et al. 2011). Residues from wheat represent the most significant source, followed by hay. Hay is a grass that could be used as an energy crop, although it is currently used for other purposes within the agricultural food chain (Mabee and Mirck 2011).

4. Users of Biomass

Information for this section was taken from the report entitled Economic Impact of Bioenergy in Canada- 2011, published on Jan 31, 2012 by the Canadian Bioenergy Association. Data for this report were based on a CanBio telephone/email survey April-August 2011; they mostly represent biomass users and bioenergy capacity as of mid-2011, unless otherwise specified.

4.1 Wood pellets

In 2010, there were 33 operational pellet producers in Canada with a total capacity of 2 082 500 tonnes per year (tpy); in mid-2011 there were 39 operators with a capacity of 3 222 151 tpy, as shown in Table 1. This capacity represents a 55% growth of over 1 million tonnes. Not all plants are operating at full capacity due to market conditions. The Enligna plant in Nova Scotia is currently under bankruptcy protection and it is not known whether it will re-open under new management. There are another 7 pellet plants under construction that will add 336,004 tpy of capacity. When these are complete, total capacity will be 3,558,144 tpy. Not shown are 11 plants in various stages of planning, 6 in Ontario and one each in BC, Alberta, Saskatchewan, New Brunswick and Prince Edward Island.

Table 1: Pellet capacity in Canada in 2010 and 2011

		Capacity (tonnes per year)	
Plant	Location	2010	2011
Pacific BioEnergy Corp.	Prince George, BC	180 000	350 000
Pinnacle Pellet- Burns Lake	Burns Lake, BC		320 320
Pinnacle Pellet- Houston	Houston, BC	150 000	240 240
Pinnacle Pellet- Meadow Bank	Strathnaver, BC	200 000	220 000
Pinnacle Pellet- Williams Lake	Williams Lake, BC	150 000	200 200
Premium Pellet Ltd.	Vanderhoof, BC	140 000	140 000
Pinnacle Pellet- Quesnel	Quesnel, BC	90 000	100 000
Princeton Co-Generation	Princeton, BC	90 000	90 000
Tahtsa Pellets Ltd.- Pacific Flame	Burns Lake, BC		80 000
Pinnacle Pellet- Armstrong	Armstrong, BC	50 000	61 880
Woodville Pellet-Highland Plant	Merritt, BC	29 000	60 000
Okanagan Pellet Company	West Kelowna, BC	50 000	50 000
Vanderhoof Speciality Wood Prod.	Vanderhoof, BC	30 000	30 000
SBC Firemaster	Kamloops, BC	30 000	
Gold Standard Pellet Fuel	Surrey, BC		45 000
Vanderwell Contractors	SlaveLake, AB	60 000	60 000
La Crete Sawmills	La Crete, AB	35 000	50 000
Foothills Forest Products	Grande Cache, AB	25 000	25 000

(CONTINUED)		Capacity (tonnes per year)	
Plant	Location	2010	2011
Woodville Pellet Corp.	Kirkfield, ON		60 000
Industries LacWood	Hearst, ON		7 000
Gildale Farms	St.Marys, ON	4 000	4 000
Trebio Inc.	Portage-du-Fort, QC		130 000
Energex Pellet Fuel	Lac-Megantic, QC	120 000	120 000
Granules LG	St.Felicien, QC	50 000	120 000
Lauzon Recycled Wood Energy	Papineauville, QC	40 000	60 000
Granule Boreal	Amos, QC	50 000	50 000
Lauzon Recycled Wood Energy	St. Paulin, QC	30 000	30 000
Granulco	Sacre-Coeur, QC		20 000
Granules de la Mauricie	Shawinigan- Sud, QC		22 000
Shaw Resources	Belledune, NB	75 000	75 000
Groupe Savoie	St-Quentin, NB	55 000	55 000
TP Downey	Hillsborough, NB	40 000	40 000
Crabbe Lumber	Bristol, NB	40 000	
Nashwaak Valley Wood Energy	South Portage, NB	17 500	17 500
Marwood	Tracyville, NB	10 000	12 000
Enligna	Musquodoboit, NS	105 000	100 000
Shaw Resources	Shubenacadie, NS	90 000	90 000
Finewood Flooring	Baddeck, NS	10 000	10 000
Holson Forest Products	Roddickton, NL	10 000	50 000
Exploits Pelletizing	Bishops Falls, NL	15 000	15 000
Cottles Island Lumber Company	Summerford, NL	12 000	12 000
Total Operational:		2 082 500	3 222 140

Figure 13 shows pellet capacity by province. British Columbia is clearly the dominant producer.

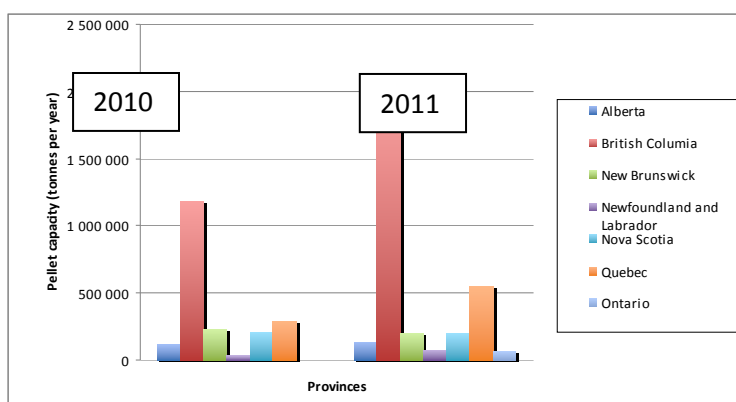


Figure 13: Pellet capacity per province (tonnes per year)

4.2 Ethanol

In Canada, as of mid-2011, there are 16 operating 1st generation ethanol plants, 3 demo 2nd generation plants, 2 plants under construction and 2 proposed plants. Total ethanol production for the 19 operating and demo plants is 1 973 million litres (Ml) or 2014 Ml when including plants under construction. A 5 Ml Enerkem plant is currently under construction at Westbury Quebec, where the syngas module is operating, using old railway ties as feedstock. The methanol module is in the test phase, and construction on the ethanol module is under way.

Table 2: Ethanol Capacity (Million Litres per year)

Plant	Location	Capacity (Mmly)
CR Fuels	Wheatland County, AB	140
Permolex Int., L.P.	Red Deer, AB	42
Husky Energy Inc.	Lloydminster, SK	130
NorAmera BioEnergy	Weyburn, SK	25
North West Terminal Ltd.	Unity, SK	25
Pound-Maker Agventures	Lanigan, SK	13
Terra Grain Fuels Inc.	Belle Plaine, SK	150
Husky Energy Inc.	Minnedosa, MB	130
Amazingly Green	Collingwood, ON	54
GreenField Ethanol Inc.	Chatham, ON	195
GreenField Ethanol Inc.	Johnstown, ON	155
GreenField Ethanol Inc.	Tiverton, ON	27
Kawartha Ethanol	Havelock, ON	80
Iogen Corp. - Demo	Ottawa, ON	2
Suncor St. Clair Ethanol	Sarnia, ON	400
Enerkem Inc. - Demo	Sherbrooke, QC	0.475
GreenField Ethanol Inc.	Varenes, QC	230
Atlantec Bioenergy Corp.	Milford, NS	13
Operating Total		1973

Figure 14 illustrates ethanol capacity by province. Almost half of the plants and 60% of capacity are in Ontario. Most plants in the East use corn as feedstock, and most of in West use grain.

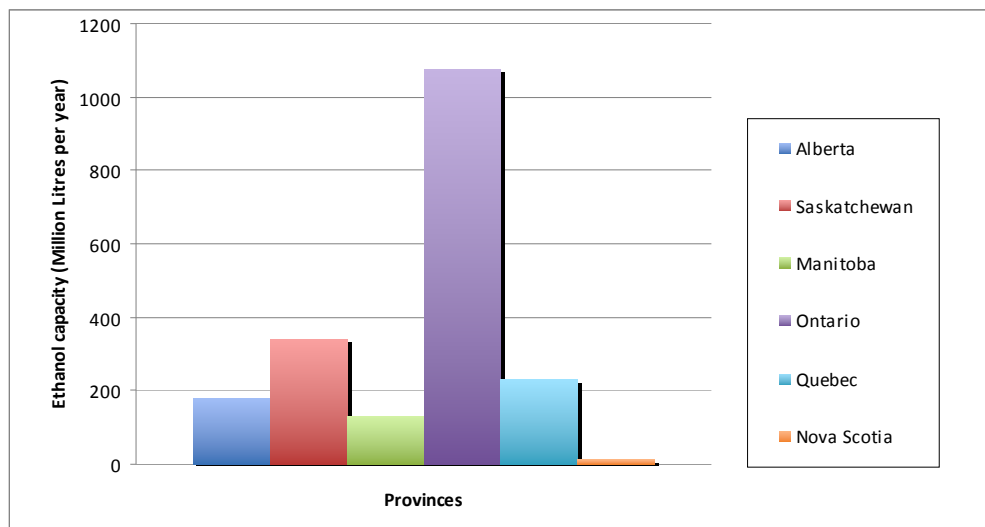


Figure 14: Ethanol capacity per province (Million Litres per year)

4.3 Biodiesel

As of mid-2011, there are 13 operating biodiesel plants including one demonstration facility with total production of 209.9 ML, shown in Table 3. Two plants are under construction that will have capacity of 116 ML, raising total capacity to 326 ML, and 7 plants are proposed, with total capacity of 896 ML. If built, these plants could increase the overall production to 1,222 ML.

Table 3: Biodiesel Capacity (Million litres per year)

Plant Name	Location	Capacity (Mmly)
Consolidated Biofuels Ltd.	Delta, BC	10.9
City-Farm Biofuel Ltd.	Delta, BC	10
FAME Biorefinery - Demo	Airdire, AB	1
Milligan Bio-Tech Inc.	Foam Lake, SK	20
Speedway International	Winnipeg, MB	20
Eastman Bio-Fuels Ltd.	Beausejour, MB	5
Bifrost Bio-Blends Ltd.	Arborg, MB	3
BIOX Corporation	Hamilton, ON	66
Noroxel Energy Ltd.	Springfield, ON	10
Methes Energies Canada	Mississauga, ON	5
Rothsay Biodiesel	Montreal, QC	45
Bio-Lub Canada.com	St-Alexis-des-Monts, QC	10
QFI Biodiesel Inc.	St-Jean-d'Iberville, QC	5
Total Operating		209.9

Figure 15 illustrates biodiesel capacity by province. More than half of national production is in Ontario. Each Western province has production, but there is none in the Atlantic Provinces.

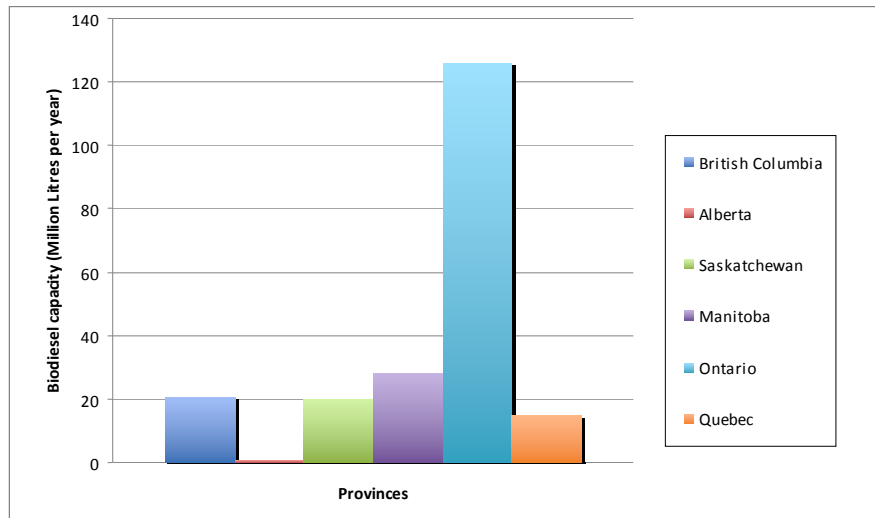


Figure 15: Biodiesel capacity by province (Million Liters per year)

4.4 Cogeneration

4.4.1. Pulp & Paper and Sawmills

As of mid-2011, 39 operating cogeneration plants were identified at pulp & paper mills and sawmills across Canada. There were 59 such plants in 2000, but 20 have shut down after the closure of several pulp mills as a result of lack of competitiveness in a new global arena. Total operating capacity is 1,349 MW_e and 5,331 MW_{th}. NewPage has a 60MW cogen project approved, but with the mill in bankruptcy proceedings as of mid 2011 it is uncertain whether a new organization or project will emerge.

As seen in figure 16, British Columbia has the greatest cogen capacity.

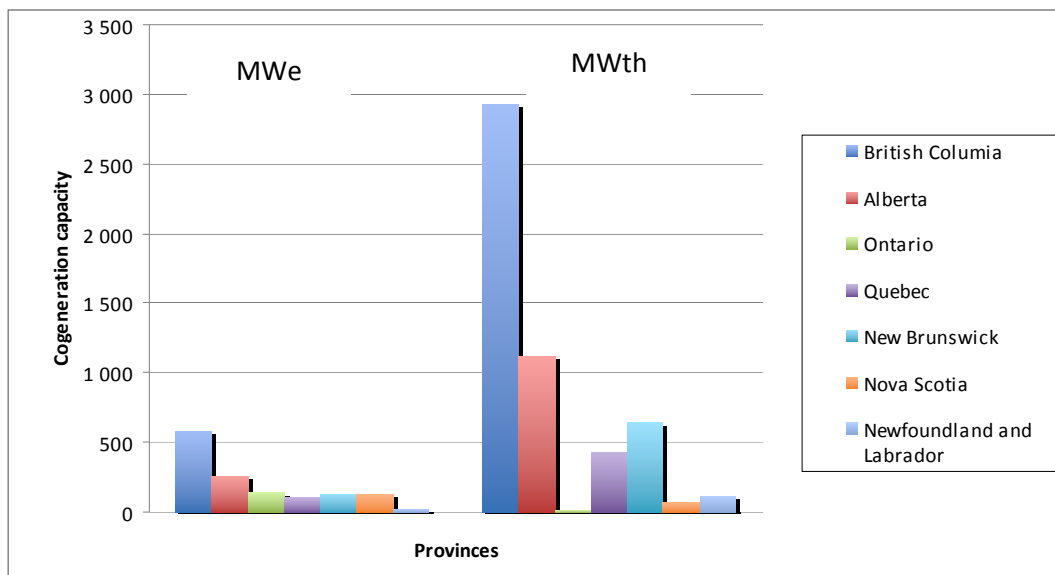


Figure 16: Cogeneration capacity from Pulp&Paper and Sawmills

4.4.2. Independents

As of mid-2011, there are 16 independent power producers with total capacity of 466 MWe and 20 MWth, shown in Table 4. Hydro-Québec signed 6 biomass power contracts for power supply in 2012 and these projects are under construction. A new gasification heat and power plant is under construction at the University of British Columbia; one plant is planned for Quesnel, BC.

Table 4: Independent Cogeneration capacity

Plant Name	Location	MWe	MWth
Canadian Gas & Electric	Grande Prairie, AB	25	15
Drayton Valley Power	Drayton Valley, AB	16	0
Whitecourt Power Partnership	Whitecourt, AB	28	0
Verdant Energy Ltd.	Westlock, AB	16.5	0
Capital Power Income LP	Williams Lake, BC	68	0
Capital Power	Hearst, ON	40	0
Delta Energy Atikokan Cogen	Atikokan, ON	10	0
Northland Power	Kirkland Lake, ON	139	0
Northland Power	Cochrane, ON	42	0
Robert O.Pickard Environment Ctr	Ottawa, ON	2.4	2.5
Humber Treatment Plant	Etobicoke, ON	4.7	2.9
Energy+2000	Ajax, ON	0.7	
St. Felicien Cogeneration Project	Saint-Felicien, QC	21.4	
Probyn	Chapais, QC	27	
Societe en Commandite Gazmont	Montreal, QC	25	
Total		465.7	20.4

Figure 17 illustrates capacity by province. Ontario dominates with half of Canada's productive capacity. While pulp mills are major heat hosts and cogen operates efficiently with a higher proportion of thermal energy, independents have a much higher proportion of electric energy.

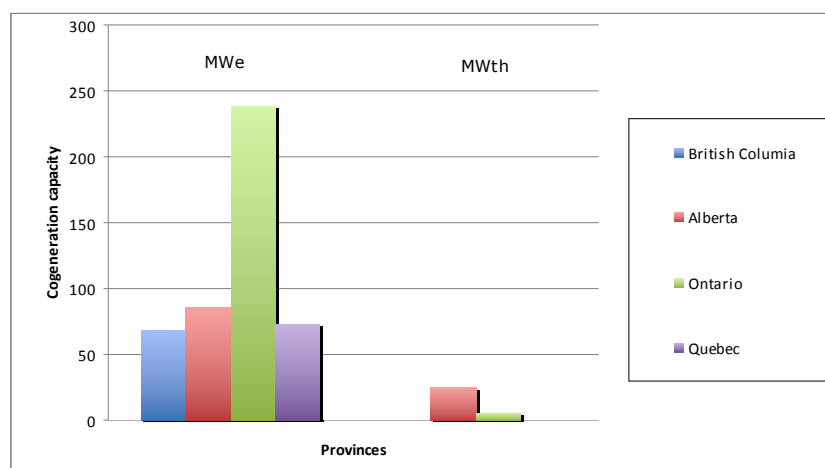


Figure 17: Cogeneration capacity from independents

4.5 Bioheat

The greatest growth in bioenergy in Canada is in bio-heat, many in small communities. In 2000 there were only two systems in Canada, the Charlottetown plant in PEI and the Cree First Nation Plant in Oujebougamou Quebec, both built in the 1980s. Revelstoke BC developed the first new community heat plant in 2005, which was expanded in 2008. But, in the last 2-3 years there has been a proliferation of development, primarily in Quebec and BC. In Quebec a new incentive to convert heavy and light oil heat to biomass, resulted in a number of new bio-heat developments. In BC, the BC Bioenergy Network (BCBN) was established in 2008. BCBN acts as a catalyst for deploying near-term bioenergy technology capital at pilot and full-scale demonstration phases, as well as providing support for bioenergy capacity development, education and advocacy for the sector. By 2011, 10 capital and 11 capacity building projects were supported. Also in BC, the Rural and Remote Communities Green Heat Initiative project supports development of BC's bio-energy heat sector by providing market and industry development assistance, pre-feasibility study assistance, professional education and training. By 2011, over 18 projects were identified or supported for potential deployment.

Table 5: Community heat capacity

Plant Name		MWth
Revelstoke Community Energy Corporation	BC	1.5
Cree First Nation Community	QC	2.7
PEI Energy Corp.	PE	22
UNBC - Nexterra Gasification system	BC	1.9
UNBC - Biomass Pellet project	BC	4.4
Kruger Products LP	BC	21
Tolko Ind. Ltd.- Gasification System- Heffley	BC	11

Dockside Green- Residential/Commercial gasification	BC	2
False Creek SEFC & Olympic Village	BC	?
Kluane First Nation	YU	?
Rosa Flora	ON	1.044
Grassy Narrows First Nation	ON	
Chateau-Richer, Abitibi-Bowater	QC	3
Domaine-du-Roy, Centre de Sante	QC	4.5
CF Matapedia- CSSS Amqui	QC	0.41
CF Girardville- Garage Transport Guy Harvey	QC	0.005
CF Girardville- Usine d'extraction d'huiles essentielles	QC	0.015
CF Girardville- Bureau CFG	QC	0.007
CF Girardville- Nettoyeur Net plus	QC	0.027
Operating Total:		75.511

4.6 Pyrolysis oil

Canada remains the world leader in commercialization of pyrolysis oil. Information is limited on pyrolysis oil producers: Ensyn, Dynamotive and Titan Clean Energy. Ensyn of Ottawa has been producing pyrolysis oil since 1989, with 6 small plants in the US. Its largest plant was built in Renfrew in 2004, with capacity of 100-tpd, and it has been operating since then. All production is sold into the US, some in the food and chemicals market, and some for building heat. The second dominant producer is Dynamotive, which built a 100-tpd pilot plant in West Lorne Ontario in 2005 and subsequently expanded the plant to 130-tpd. A major portion of production was fed into a 2MW Orenda turbine to make power for the Ontario grid under the Feed-In-Tariff (FIT) program. The remainder was sold into the US heat market. The West Lorne mill was shut down in 2008 on loss of feedstock from the neighbouring furniture factory, and unwillingness to undergo a new environmental assessment of 2-year duration simply to change feedstock. Dynamotive built the largest pyrolysis plant in the world, a 200-tpd plant in Guelph that was designed to operate using post-industrial waste from the City of Toronto. Lacking a significant off-take agreement, this plant was shut down before operating fully. Ensyn in 2011 announced a new plant would be built in High Level Alberta, the new largest pyrolysis plant in the world, with capacity of 400-tpd. The entire production will be fed into diesel engines to make power. Titan Clean energy operates a small plant in Saskatchewan targeting the char market.

5. Biomass Prices

This section is not updated from the Canada Report 2009 submitted on March 23 2010.

6. Imports and Exports

6.2. Pellets

Almost all Canadian pellet production is exported. While world demand for pellets is ramping up quickly, the opening of large plants in the South East US created temporarily poor export market conditions for Canada. Shipments in 2010 were 1.5 MT vs. capacity of 2.1 MT, reflecting 72% capacity utilization. Many plants were shut down or operating below capacity due to market conditions. 1.4 MT or 94% was exported, of which 1.35 MT, or 90%, went to Europe. In mid 2011 it was estimated that exports would be 1.8 MT, of which 50,000 tonnes would go to a new market, Korea.

Table 6: Pellet Shipments and Capacity- Tonnes (WPAC- July 2011)

	<u>2010</u>	<u>2011LE</u>
Europe	1,350,000	1,700,000
Japan	60,000	60,000
Korea	<u>0</u>	<u>50,000</u>
Exports	1,410,000	1,810,000
N America	<u>90,000</u>	<u>90,000</u>
Shipments	1,500,000	1,900,000
Capacity	2,082,500	3,224,000
Capacity Util.	72%	59%

6.2 Ethanol

Canada produces a growing amount of ethanol, but still Canada must import to enable achievement of federal renewable fuel objectives. In 2010 Canada produced 1.36 billion litres, and imported 87 million litres, all from the US.

Table 7: Ethanol Production and Trade Million Litres

	<u>2009</u>	<u>2010</u>
Production	1,056	1,359
Use	<u>1,704</u>	<u>1,446</u>
Imports	647	87

7. Barriers and Opportunities to Trade

This section is not updated from the Canada Report 2010 submitted on Sept 15 2010.

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Appendix 1. Summary of bioenergy policies in Canada

Initiative/Program	Start date	End date	Type of initiative	Target area	Description	Fundings \$M
Federal						
Agriculture and Agri-Food Canada (AAFC)						
Agri-Opportunities Program	Announced January 23, 2007 / Launched February 2007	March 31, 2011	Program	Agricultural producers	Aims to accelerate the commercialization of new agricultural products, processes or services that are currently not produced or commercially available in Canada, and are ready to be introduced to the marketplace by providing a maximum repayable contribution of up to \$10 M per project and per recipient regardless of the number of projects, over the life of the program.	\$134 M / 5 years
Agricultural Bioproducts Innovation Program (ABIP)	Announced December 20, 2006	March 31, 2011	Program	Government/ Industry/ University	Creates Networks of talent, creativity and resources from academia, industry and government to build greater research capacity in agricultural bioproducts and bioprocesses in Canada. Promotes research, development, technology transfer and commercialization in areas such as biofuels, other forms of bioenergy, industrial chemicals, biomaterials and health products.	\$124 M.
Agriculture - Co-operative Development Initiative (Ag-CDI)	October 2006	March 2009 (integrated in the renewed CDI 2009-2013)	Initiative	Agricultural producers	Promotes sustainable livelihoods for Canadian farmers by assisting the development of biofuel and value-added agricultural co-operatives.	Nearly \$2 M.
Co-operative Development Initiative (CDI)	Launched in 2003 / renewed in 2009	March 31, 2013	Initiative	Co-ops	CDI is designed to help people develop co-ops and to research and test innovative ways of using the co-operative model. CDI encourages research and dissemination projects that will advance our understanding of co-operatives's contributions to addressing challenges in the 3 following program priority areas: local community economic development, changing community demographics and low-carbon communities. The upper limit of funding for Innovative Co-operation projects is \$75 000 per year per project. The minimum proponent contribution for Innovative Co-operation projects is 25% per individual project.	

Biofuels Opportunities for Producers Initiative (BOPI)	Announced July 2006	March 31, 2008	Initiative	Agricultural producers	Designed to help farmers and rural communities hire experts to assist in developing business proposal and feasibility and other studies that are necessary to create and expand biofuels production capacity by agricultural producers. Individual project funding is capped at \$300 000 and at least 25% of the project cost must be provided by the industry applicant.	\$20 M. (Up to \$13 M was available in 2006-2007 and \$7 M. is available in 2007-2008)
ecoAgriculture Biofuels Capital Initiative (ECOabc)	Announced December 2006 / Launched April 23, 2003	March 31, 2011; extended to September 30, 2012	Initiative	Agricultural Producers	The ecoAgriculture Biofuels Capital Initiative (ecoABC) is a four year, \$200 million federal program that provides repayable contributions of up to \$25 million per project for the construction or expansion of transportation biofuel production facilities. Funding is provided for projects that use agricultural feedstocks to produce biofuels and that have new agricultural producer equity investments in the projects equal to, at minimum, five percent (5%) of the total eligible project costs. Offered in all provinces.	\$200 M. (186 millions is available for contributors)
Bio-Products and Bio-Fuels Inquiries Line	October 29, 2007	February 29, 2008	Inquiries Line	Agriculture Clients	Provided agriculture clients with information about bio-product and bio-fuel programs that are offered by Agriculture and Agri-Food Canada	
Agriculture and Agri-Food Canada (AAFC) and Natural Resources Canada (NRCan)						
Ethanol Expansion Program (EEP)	Announced August 2003 / Launched October 20, 2003	March 31, 2007	Program	Industry/ Infrastructure	Aims to increase the production and use of fuel ethanol in Canada and reduce transportation related GHG emissions by providing repayable contributions, amounting to \$99.3 M. for the construction or expansion of ethanol plants. The EEP sets the goal of having 35% of the consumption of gasoline-type fuels be E10 by 2010, ethanol demand should represent 3.5% of all gasoline-type fuels by 2010. Although project submissions to the EEP terminated in 2005, program activities are expected to last until 2018 (9 ethanol projects are supported for which contributions are repayable in the coming years). This program is a component of the Future Fuels Initiative.	\$100 M. / 3 years

Future Fuels Initiative	2001	Initiative	Industry / Infrastructure / Consumers	Plans to accomplish a four-fold (by 750 M L) increase in Canada's annual ethanol production and use. That could mean 25% of Canada's total gasoline supply would contain 10% ethanol. Contingent loan guarantees are provided to encourage financing for new plants that produce ethanol from biomass if all or part of the excise gasoline tax on ethanol is imposed before December 31, 2010. This initiative promotes increased supply and use of ethanol produced from biomass; provides for funding of activities such as public education on fuel ethanol, analysis of fuel ethanol markets, and producer economics; and provides a liaison with provinces/territories and industries that are interested in ethanol plant expansion.	\$3 M. over 5 years to provide market information to retail consumers \$140 M. in contingent loan guarantess from the NBEP
Department of Finance Canada					
Accelerated Capital Cost Allowance for Class 43.1 and 43.2	1996	Accelerated Capital Cost Allowance	Businesses/ Industry	Encourages business and industry to reduce energy waste and to use renewable energy sources for energy production equipment by providing an accelerated capital cost allowance . Eligible investments include co-generation and specified waste-fuelled electrical generation systems, heat recovery systems, and specified waste-fuelled heat production equipment. Provides an accelerated CCA rate of 30% per year (on a declining balance basis) for certain renewable energy and energy conservation equipment, Class 43.2 provides an accelerated CCA rate of 50% per year (on a declining balance) for property includes in the Class. In general, class 43.2 applies to property described in class 43., if the property is acquired on or after February 23, 2005 and before 2020. Unlike Class 43.1, if the property applies to co-generation equipment described in paragraphe (a) to (c) of Class 43.1 only if the heat efficiency of fuels used in the eligible co-generation system does not exceed a 4,750 BTU requirement instead of a 6,000 BTU requirement.	
Tax Exemptions for Renewable Fuels (Excise Tax Act)	1992 (ethanol) / 2003 (biodiesel)	April 1, 2008 Tax exemptions	Producers / Suppliers	To encourage the use and the production of renewable fuels in Canada, under Excise Tax Act, renewable fuels were exempt from the federal excise taxes of \$0,10/L on gasoline and \$0,04/L on diesel fuel, that would otherwise apply to their use as motive fuels.	

Environment Canada						
Notice of intent to develop a federal regulation requiring renewable fuels	Announced in December 2006 / Effective December 15, 2010 (gasoline) / Effective July 1, 2001 (diesel fuel and heating oil)	Compliance period ending December 31, 2012 (diesel fuel and heating oil)	Regulation	Petroleum Fuel Producers and Importers	Announces that the regulation would require petroleum fuel producers and importers to have: (1) An average renewable fuel content of at least 5% based on the volume of gasoline, commencing in 2010; (2) An average 2% renewable fuel content in diesel fuel and heating oil, upon successful demonstration of renewable diesel fuel use under the range of Canadian conditions (intended to come into effect by no later than 2012)	
Natural Resources Canada (NRCAN)						
Canadian Transportation Fuel Cell Alliance (CTFCA)	June 2001	April 2008	Alliance	Government/ Industry	Different combinations of fuels and fuelling systems will be demonstrated by April 2008 for light-, medium- and heavy-duty vehicles. The CTFCA will analyse the ways fuel can be delivered to vehicles, establish safety standards for fuelling stations and develop training and certification programs for people who install and maintain those stations. The program will also assess the greenhouse gas (GHG) reductions achieved when fuel cell technology is used. It will work with the provinces and territories to address regulatory barriers to the increased use of fuel cell vehicles.	\$33 M.
Renewable Fuels Strategy	2006		Strategy	Gouvernement	The government's comprehensive strategy for renewable fuels has four components: (1) Increasing the retail availability of renewable fuels through regulation; (2) Supporting the expansion of Canadian production of renewable fuels; (3) Assisting farmers to seize new opportunities in this sector; (4) Accelerating the commercialization of new technologies.	

ecoENERGY for Biofuels	Announced July 5, 2007 / Effective April 1, 2008	March 31, 2017	Biofuel Producers	Supports the production of renewable alternatives to gasoline and diesel and encourages the development of a competitive domestic industry for renewable fuel. Upon signing a Contribution Agreement, eligible producers of renewable alternatives to gasoline can receive an operating incentive of up to \$0.19/L of eligible sales for the first year in the program, declining thereafter. Due to the less-established nature of the industry, producers of renewable alternatives to diesel are eligible for an incentive of up to \$0.20/L of eligible sales for the first year in the program, declining thereafter. Individual production facilities can receive the incentive for up to seven years.	\$1,5 B. / 9 years
ecoENERGY for Renewable Power	Launched in April 2007	No new contribution agreements will be signed after March 31, 2011 / but many projects will continue to receive payments up to March 31, 2021	Electricity Suppliers	Provides incentives to increase Canada's supply of clean electricity from renewable sources such as wind, biomass, low-impact hydro, geothermal, solar photovoltaic and ocean energy. The program will provide an incentive of \$0.01/kWh for up to 10 years to qualifying projects.	\$1,48 B. / 15 years
ecoENERGY Technology Initiative (ecoETI) Bio-based Energy Systems Portfolio	January 2007; First funding announcement in October 2007 / Funding is fully allocated	March 2012	Government / Industry / University	Invests in the research, development and demonstration of clean transformational energy technologies and systems. The Initiative is directed towards increasing clean energy supplies, reducing energy waste and reducing pollution from conventional energy.	\$230 M.

ecoENERGY Innovation Initiative (ecoll)	Launched in August 2, 2011	Calls for LOIs for Demonstration Projects and calls for LOIs for R&D Projects are closed since September and October 2011	Initiative	Electricity and Gaz Utilities/ Compagnies/ Industry Associations/ Research Associations/ Standards Organisations/ Aboriginal and Community Groups/ Canadian Academic Institutions/ Provincial, Territoiral, Regional and Municipal Governements and their Departments and Agencies	The program's objective is to support energy technology innovation to produce and use energy in a more clean and efficient way. This Initiative is a key component of the Government of Canada's actions to achieve real emissions reductions, while maintaining Canada's economic advantage and its ability to create jobs for Canadians. The ecoEII will also help in the search for long-term solutions to reducing and eliminating air pollutants from energy production and use. The Initiative consists of two separate funding streams: one for R&D projects, and one for demonstration projects. Both are being launched with requests for Letters of Expression of Interest (LOIs). An LOI is not a complete project proposal but rather an outline of what a complete project would be, with preliminary cost estimates and timeline. This approach allows potential project proponents time to develop collaborations and consortia, and to build upon their initial project idea with those collaborators, before committing to preparing a full project proposal. Proponents of LOIs that are accepted for consideration for funding from the ecoENERGY Innovation Initiative will be asked to prepare a full project proposal. Eligible recipients for funding from the ecoENERGY Innovation Initiative are legal entities validly incorporated or registered in Canada.	\$97 M.
Program for Energy Research and Development (PERD) Bio-based Energy Systems and Technologies (BEST) Program		On-going	Program	Government / Industry / University	PERD funds research and development designed to ensure a sustainable energy future for Canada in the best interests of both our economy and our environment.	

Promoting Forest Innovation and Investment Program's Management Control Framework (Forest Industry Long-Term Competitiveness Initiative)	2006-2007	2008-2009 / Extended to 2009-2010	Program	Government / Industry	PFII's mandate is to enhance economic opportunities for Canada's forest sector as a product of increased investment in forest innovation. The PFII is made up of three components: Consolidation, Transformative Technologies Program (TTP) and Canada Wood Fibre Centre (CWFC). Supports 3 initiatives: (1) Restructuring the Forest Innovation System-Consolidation of Forest Engineering Research Institute of Canada (FERIC), Forintek Canada Corporation, and the Pulp and Paper Research Institute of Canada (PAPRICAN) into FPInnovations for greater efficiency and strength in innovation and R&D; (2) Investing in Transformative Technologies - Investments in forest innovation will provide for pre-competitive, non-proprietary research to address the development and adaptation of emerging and breakthrough technologies, such as forest biomass, forest biotechnology, and nanotechnology; and (3) Implementing the Canadian Wood Fibre Centre (CWFC) - The CWFC will focus on wood fibre research from forest to end use to increase Canada's knowledge of wood fibre quality and how best to grow and utilize it in the long term.	\$70 M., \$120 M. added in budget 2009
Technology and Innovation Research and Development (t&I R&D) Biotechnology Program	October 2003	March 2008	Program	Government / Industry / University	The objective of the T&I R&D Initiative is to focus on projects that would advance promising technologies to achieve long-term GHG reductions and strengthen Canada's clean energy technology capacity. Through the T&I R&D Initiative, the Government of Canada identified five strategic areas as high-potential areas for significant reductions in GHG emissions: Biotechnology, Cleaner Fossil Fuels, Decentralized Energy Production, Hydrogen Economy, and Advanced End-use Efficiency.	\$115 M.
Technology Early Action Measures (TEAM)	1998	2008	Program	Government / Industry	Technology Early Action Measures (TEAM) is an interdepartmental technology investment program. TEAM supports projects that are designed to demonstrate technologies that mitigate greenhouse gas (GHG) emissions nationally and internationally, and that sustain economic and social development. TEAM's unique approach brings together industry, community, and international partners to encourage additional investment in innovative technology. TEAM's position in the technology innovation process has enabled the Government of Canada to support a wide range of technology options and paths for mitigating GHGs	\$56 M.

National Renewable Diesel Demonstration Initiative (NRDDI)	Launched December 2008	May 29, 2009 / Projects must be completed by June 2010	Initiative	Industry	Supports projects that demonstrate how renewable diesel fuel will perform under Canadian conditions in advance of the proposed renewable fuels regulation that would require an average annual 2% renewable content in diesel fuel and heating oil by 2011 or earlier, subject to technical feasibility. Non-repayable contributions were made to approved projects designed to demonstrate cold weather operation, long-term storage, impacts on engines and equipment, and distribution of the fuel. In order to be eligible for funding, a project must: take place in Canada; address Canadian stakeholders' questions regarding renewable diesel use; and include multi-stakeholder steering and technical committees in the development, implementation and reporting stages of the project. Natural Resources Canada can contribute up to 50% of the total project costs of an approved project up to a maximum of \$1,000,000 per fiscal year. Total government assistance (federal, provincial/territorial and municipal governments) for a funded project cannot exceed 75% of total project costs.	
Program of Energy Research and Development (PERD)			Program	Federal Departments and Agencies	PERD funds research and development designed to ensure a sustainable energy future for Canada in the best interests of both our economy and our environment. Please note that PERD only provides funding to federal departments and agencies. It is not a general funding or grant program for companies, associations or individuals.	2005-2006 R&D Budget: \$50 M.

Clean Energy Fund Program	May 19, 2009	There is no current call for proposal	Program	Industry (Canadian compagnies)	The Clean Energy Fund is investing in large-scale carbon capture and storage demonstration projects and smaller-scale demonstration projects of renewable and alternative energy technologies. Expected outcomes of the CEF include the availability of a suite of clean energy technologies, knowledge to ensure uptake of the technologies; involvement and collaboration of the research community and key stakeholders; awareness and understanding of technologies and processes associated with reducing greenhouse gas emissions; a capability to develop new and improved energy systems and technologies that contribute to clean air objectives; and market opportunities for Canadian companies.	\$1B M.
Other						
Sustainable Development Technology Canada						
Next Gen Biofuels Fund	September 12, 2007	March 31, 2017	RD&D	Canadian Industry / Infrastructure	This fund is aimed at supporting the establishment of first-of-its-kind commercial scale demonstration facilities for the production of advanced renewable fuels and co-products. The purpose is to encourage retention and growth of technology expertise and innovation capacity for cellulosic ethanol and biodiesel production in Canada. This program is able to fund up to 40% of eligible project costs, or to a maximum of \$200M. All cellulosic ethanol and new biodiesel technologies, once they have been successfully demonstrated at the pilot scale, are also eligible. This outcome will enable larger volumes of advanced renewable fuels to be produced, helping Canada achieve its current renewable fuel standard using environmentally superior technologies. Advanced biofuels are derived from non-traditional renewable feedstocks, such as corn stocks, wood chips, fast-growing grasses, agricultural residues, and forest biomass.	\$500 M.

SD Tech Fund	April 4, 2002 (August 31, 2011?)	June 18, 2010	RD&D	Industry (Canadian compagnies) / Infrastructure	The Tech Fund is aimed at supporting the late-stage development and pilot, pre-commercial demonstration of clean technology solutions, like advanced renewable fuels. This important one-time investment bridges the gap between development and demonstration that is critical for an emerging industry, such as renewable fuels. Advanced renewable fuels contribute to clean air, clean water and clean land, which address climate change and improve the productivity and the global competitiveness of the Canadian industry. SDTC does not require any repayments of the financial contributions it provides to funded projects through the SD Tech Fund. This fund will ensure that Canadian companies can innovate and compete on a level playing field with our international competitors.	\$550 M.
Provincial - Territorial						
Québec						
Ministère des Finances (Revenu Québec)						
Fuel tax refund in respect of biodiesel incentive (Special 2006-2007 budget)	March 24, 2006		Tax refund	Biodiesel Consumers	Tax refund (\$0,172) on the purchase of pure (B100) biodiesel fuel (<3000 L) that is not blended with any other type of fuel (provided the biodiesel is consumed in Quebec).	
Tax credit for the production of cellulosic Ethanol (2011-2012 Budget Plan)	March 17, 2011	April 1, 2018	Tax credit	Cellulosic Ethanol Producers	Refundable tax credit of up to \$0,15/L for cellulosic ethanol (> 40 millions L / taxation year) produced in Quebec from renewable materials exclusively by means of thermochemical process and sold either as a product to be mixed directly with gasoline or as an input in the reformulation of gasoline or the production of ethyl tertiary-butyl ether (provided the cellulosic ethanol is sold in Quebec)	
Refundable tax credit for the production of ethanol (2005-2006 budget, changes in 2011-2012 Budget Plan)	April 1, 2006	March 31, 2018	Tax credit	Ethanol Producers	Refundable tax credit of \$0,185/L maximum for ethanol (between 9 665 740 and 10 013 355 L/ month) produced in Quebec from renewable materials and sold as a product to be mixed directly with gasoline or as an input in the reformulation of gasoline or the production of ethyl tertiary-butyl ether (provided ethanol is sold in Quebec). It specifically excludes eligible cellulosic ethanol.	

Ministère des Ressources naturelles et de la Faune					
Québec Energy Strategy 2006-2015 «Using energy to build the Québec of tomorrow»	2006	2015	Strategy	Gouvernement	Orientation 4) Innovate in the energy field - Priority action 2: Develop a renewable fuel (ethanol and biodiesel) industry in Québec. Using forest and agricultural residues and urban waste to produce ethanol. Increase distribution and market penetration of biodiesel in Québec.
«Developing the value of forest biomass» an Action Plan	February 2009		Program	Gouvernement	Encourages the startup and development of a new economic activity. The action plan could mean the use of 1.5 million AMT of forest biomass - or 22.6% of available volume - per year, resulting in the creation of 850 jobs across Québec, including 680 forest-based positions. The plan's primary objectives are to: (1) Make forest biomass available from public forests; (2) Encourage the replacement of fossil fuels; (3) Support investment; (4) Support Innovation; (5) Stimulate demand for forest biomass.
Forest Biomass Allocation Program	June 25, 2008	March 31, 2011 (request for proposal) / March 31, 2016 (annual management permit)	Program	Biomass Producers	Objectives: (1) Create and support new economic development initiatives; (2) Reduce Québec's dependence on fossil fuels; (3) Facilitate the implementation for forest management strategies; (4) Promote regeneration of mixed wood and hardwood forests. Biomass allocation will be carried out by means of a competitive bidding process using set evaluation criteria for various regionally specific projects. RFPs will specify geographical areas and will include an estimate of the volume available, by biomass type. Promoters whose projects are selected will obtain annual management permits allowing forest biomass to be harvested in amounts sufficient to meet project specifications. The MOU between promoters and MRNF may be : An allocation agreement for the long term harvest of available volumes of forest biomass conferring upon the promoter the right to an annual management permit for a period of up to five years. An agreement for the short term harvest of available volumes conferring upon the promoter the right to a management permit for a fixed period of time of less than five years.
Hydro-Québec					
Power Purchase Program for electricity derived from forest biomass cogeneration (PAE)	Launched December 20, 2011	December 20, 2013	Program	Electricity Producers (Biomass cogeneration)	Hydro-Québec Distribution launches a program for the purchase of one 150 MW block of electrical energy generated from forest biomass cogeneration. Each project is limited to a maximum of 50 MW. The duration of the contracts varies between 15 and 25 years.

Hydro-Québec call for tenders for biomass cogeneration	October 20, 2009	Call	Electricity producers (Biomass cogeneration)	Hydro-Québec Distribution will issue a call for tenders for the purchase of one 125 MW block of electrical energy generated from biomass. The call for tenders is intended to encourage heavy industry to use biomass—particularly the forest variety—and to provide Hydro-Québec Distribution with a new, renewable-energy electricity source.	
Ministère des Ressources naturelles et de la Faune (Agence de l'efficacité énergétique)					
Technoclimat (Green technologies demonstration program)	June 2008	Program	Any compagny	Technoclimat® is composed of a main component that supports the demonstration of innovative and emerging technologies in Québec or the demonstration of an adaptation of an existing technology. Technoclimat® also comprises a second component that supports trial implementation activities for technologies created in the province of Québec whose development is complete. Main component: Eligible clientele: Any company established in Québec wishing to refine or adapt a technology or an innovative process that serves to reduce GHG emissions or any company that holds the rights to a technology developed by a Québec institution. Financial assistance: 50 % of eligible expenses; \$3 M. maximum per project; the amount requested by the applicant. Eligible clientele: Any legally constituted organization, enterprise or association that is established in Québec that wishes to use or market a proven GHG emission reduction technology that has weak market presence or no market presence in Québec. Financial Assistance: 50 % of eligible expenses; \$1 M. maximum per project; the amount requested by the applicant.	\$110 M.

Energy Innovation Assistance Program (PAIE)			Program	Persons/ Corporations/ Agencies	Aims to encourage the development of new technologies or innovative processes focussing on energy efficiency or emerging energy sources. Eligible clientele: Any person, corporation or agency, whether governmental or non-governmental, with an establishment in Québec is eligible. These projects must also respect sustainable development principles. Projects must be performed in Québec and not exceed a period of 36 months. Financial assistance: The maximum amount of financial assistance granted for one project cannot exceed \$1 M. Research, experimentation, development or upgrade and transfer: 75% of eligible expenses up to \$100,000 for college or university research centres, 25% of eligible expenses up to \$100,000 for other applicants ; Demonstration – Energy efficiency project: 50% of eligible expenses or \$250,000; Demonstration – Emerging energy: 50% of eligible expenses or \$1M; Measurement:100% of eligible expenses or \$15,000; Pre-market : 50% of eligible expenses or \$50,000; Market release: 50% of eligible expenses or \$10,000.	
Program to support the use of forest biomass residues for heating (pilot)	2009	March 31, 2012	Program	Managers of governments-owned institutional establishment / owners of commercial and religious buildings/ managers of heat systems	Program objectives: Promote the development of energy production from residual forest biomass, replace fossil fuels on a permanent bases, reduce GHG emissions. Eligible clientele: Managers of government-owned institutional establishments, owners of commercial and religious buildings, managers of heat systems. Financial assistance: 75% of costs: Assistance required to reduce the ROI to 4 years; \$25, 000 per site for feasibility studies: 50% of costs; \$25,000 per site for supply studies: \$40 per tonne of GHG reduced, \$500,000 per project, original amount requested by applicant. The applicant must contribute a minimum of 25% of the costs if other sources of funding have been obtained.	\$10 M.
Heavy fuel oil consumption reduction program	June 2008	2013	Program	Heavy fuel oil consumers (Any corporation)	Program objective: Reduce GHG emissions by 1 M tonnes annually by 2012. Eligible clientele: Any corporation using heavy fuel oil and with an establishment in Québec. Component B: Switching to forest biomass: Objective: Permanently reduce the use of heavy fuel oil by switching to residual forest biomass. Financial assistance: 50% of costs (feasibility and supplies): Assistance required to reduce the ROI to one year; \$50,000/site: 75% of implementation costs; Integration analysis: Maximum of \$5 M. per project, \$40/tCO2e over the commitment period (maximum 10 years).	\$150 M.

Manufacturing sector support program (MSSP)	June 2008		Program	Fuel consumers (manufacturing sector)	Objective: Obtain a permanent reduction in the use of targeted fuels (8 M litres of light fuel oil, 17 M litres of propane and butane), and in associated GHG emissions (50,000 tonnes of CO ₂ e by 2012) by the implementation of energy efficiency measures. Eligible clientele: Any corporation in the manufacturing sector that has an establishment in Québec and that uses certain targeted fuels for heating and manufacturing processes. Financial assistance: 50% of costs: Assistance required to reduce the ROI to one year; \$25,000 per site for energy analyses and feasibility studies: 75% of costs; \$100,000 per site for integration analyses: \$250,000 per project (maximum \$1.5 M per site). The applicant must contribute a minimum of 25% to the costs if other sources of funding have been obtained.	\$15 M.
Ministère du Développement durable, de l'Environnement et des Parcs						
2006-2012 Action Plan «Québec and climate change, a challenge for the future»	2006	2013	Action Plan	Gouvernement/ Gasoline distributors	Measure 1: Implement a financing program aimed at energy efficiency for individuals, industries, institutions, companies and municipalities in Quebec. Measure 4: Aim to have gasoline distributors include a minimum of 5% ethanol in their total fuel sales by 2010. Measure 15: Set up support programs for manure processing and for the energy valorization of agricultural, forest and municipal biomass. Measure 20: Implement a program to support technological research and innovation for the reduction and sequestration of GHGs.	Measure 1: \$185 M. Measure 4: \$30 M. Measure 15: \$124 M. Measure 20: \$13.5 M.
Ministère du Développement économique, de l'innovation et de l'Exportation						
A development strategy for Quebec's environmental and green technology industry	May 2008		Strategy	Government	The purpose of the development strategy for Québec's environmental and green technology industry is to combine economic development with the achievement of environmental objectives. The aim is to make the industry an international beacon of innovation. Area for action 2 : Support green technology development: For fields related to climate change, new energies, energy efficiency, cellulosic ethanol, CO ₂ capture and sequestration, water treatment, and soil decontamination, the strategy aims to: support industrial research; help disseminate information on university research projects in green technology; support technology refinement and demonstration projects; improve environmental certification mechanisms and the implementation of measures to facilitate the execution of demonstration projects.	\$ 237.5 M. for area of action 2 (Support green energy development)

Ministère de l'Agriculture, des Pêcheries et de l'Alimentation					
Prime-Vert Program	Effective on April 1, 2009	March 31, 2013	Program	Agricultural operations/ agri-food processing plants/ stakeholders, etc.	Component 9: Replacement of energy sources and development of biomass energy or geothermal energy (1) Replacement of fossil energy with biomass energy or geothermal energy: financial assistance covers up to 30% of the expenses (\$ 50 000 for biomass equipment) and \$100 000 for geothermal equipment) for labour and professional services; (2) Replacement of fossil-fuelled maple sap boilers: financial assistance covers up to 30% (< \$7 500) of the eligible expenses to purchase the equipment; (3) Development of energy derived from agricultural biomass: Financial assistance covers up to 30% of the eligible expenses (< \$200 000) to implement a process to treat agricultural or agri-food biomass with a view to energy development. Component 10: Large-scale projects for reducing greenhouse gas emissions (through the development of biomass energy): Financial assistance covers up to 25% of the eligible expenses(< 1,000,000 per project) for labour and professional services.
Nova Scotia					
Nova Scotia Department of Finance					
Biodiesel Incentive	Effective July 1, 2006		Tax exemption	Biodiesel consumers	Fuel tax exemption of \$0,154/L (current rate of tax on biodiesel) for biodiesel produced in Nova Scotia (only the biodiesel portion of the mix) that meets the American Society for Testing and Materials fuel-quality specification. up to \$1 M. / year
Nova Scotia Department of Environment					
Nova Scotia's Climate Change Action Plan «Toward a Greener Future»	January, 2009		Action Plan	Gouvernement	Action 16: Develop a bio-resource strategy by 2011 to determine the best potential uses and the best policies to encourage the use of bio-energy-based fuels. The strategy will take account of GHGs and other air emissions produced throughout the life cycle of various bio-fuels. Action 17: To support the development of biomasse for electrical generation, provide the forest industry with funds from the Community Development Trust to study the feasibility of potential biomass generation projects. Action 18: To support the other uses for forests biomass, provide funds from de Community Development Trust to improve our understanding of forest biomass availability and the potential of forest biomass projets to improve site productivity.

Nova Scotia Department of Energy				
Renewable Electricity Plan «A path to good jobs, stable prices and cleaner environment»	April 2010	Plan	Government	Targets: The commitment: 25% Renewable Electricity by 2015 (by law) and A New Goal: 40% Renewable Electricity by 2020. ***Biomass: proceed with Caution: Electricity produced from co-firing biomass will play a role in meeting the 2015 target, but will undergo review for post-2015 use to ensure sustainability. The plan caps new electricity generation from forest biomass at 500,000 dry tonnes (~600-700 GWh) above current use. Co-firing in thermal plants is capped at 150,000 dry tonnes (150 GWh)
Nova Scotia's 2009 Energy Strategy «Toward a Greener Future»	January, 2009	Strategy		Sets a 2016 interim requirement for renewable electricity energy. Sets a 2020 target of at least 25 per cent for renewable electricity and work with stakeholders to identify opportunities to exceed the target (40 per cent). Creates new opportunities for small-scale producers of renewable energy.
Prince Edward Island				
Department of Environment, Energy and Forestry				
Prince Edward Island Energy Strategy «Securing our Future: Energy Efficiency and Conservation»	Released in 2008	Strategy	Government	A provincial E5 and B10 (or B10 renewable equivalent) mandate will be introduced by 2013 and doubled by 2018. The Government will review existing codes and regulatory barriers affecting the further development of biomass in PEI, will lead by example in demonstrating biomass technologies in select public buildings across the island, will actively promote the use and encourage the installation of biomass heating systems in homes and businesses, will further investigate the use of biomass in urban district heating systems and the potential for cogeneration facilities with the Island utilities. It will identify and explore opportunities and applications for the utilization of pure plant oils. It will consider the instruction of escalating Renewable Fuel Standards for ethanol and biodiesel. It will endorse the concept of a Low Carbon Fuel Standard (LCFS) through the increased use of environmentally sustainable alternative biofuels, and will engage the neighboring Provinces and States in formulating a collaborative regional approach to GHG reduction through the adoption of low carbon fuel standards.

Prince Edward Island and Climate Change « A Strategy for Reducing the impacts of Global Warming»	Released in 2008		Strategy	Government	Same as the Energy Strategy
Newfoundland - Labrador					
Department of Natural Resources					
Strategic Plan 2011-14	April, 2011	March, 2014	Strategic Plan	Government	Mines and Energy: Goal 3: By march 31, 2014 the Department of Natural Resources will have enhanced legislation and/or policy necessary to advance renewable energy in the province: Measure 1: Enhanced legislation and/or policy. Indicator: Initiated implementation of biofuels policy. Forestry and Agrofood: Measure 2: Implemented programs to sustains the province's forest ecosystems and strengthen the forest industry to create sustainable economic opportunities in Newfounslan and Labrador: Indicator: Promoted industry diversification by supporting the development of new value-added wood manufacturing and bioenergy facilities in the province.
Newfounland Labrador Energy plan «Focusing our Energy»	November 2005	2041	Plan	Gouvernement	Other Generation Technologies: Policy actions: The Government will: Pursue other generation opportunities when they are technologically and economically feasible and develop and implement a net metering policy for small generation developers.
New Brunswick					
Department of Environment					
Climate Change Action Plan 2007-2012	2007	2012	Action Plan	Government	The province will: Undertake a study of the feasibility of constructing new small-scale hydroelectricity generation projects; Assess and foster development of a range of renewable energy generation opportunities, such as biomass, solar, wind and tidal; and Implement a forest biomass policy. Fuels for transportation: The province will: Offer incentives for New Brunswickers to switch to alternative fuel and fuel-efficient vehicles; Encourage research and development of biofuels produced from either agricultural products such as corn, barley or wheat, or from wood waste, which help establish availability for this alternate fuel in the market; and in co-operation with the federal government, support the use of biofuels with a view to requiring a minimum average of 5% ethanol in gasoline and 5% biodiesel in diesel fuel sold for vehicles or heating fuel use in New Brunswick.

Department of Energy					
Electricity Act - Electricity from Renewable Resources Regulation, NB Reg 2006-58	July, 2006		Regulation		The standard requires that 10% of electricity sales must come from new renewable source by 2016.
The New Brunswick Energy Blueprint	October 2011	2021	Blueprint	Government	Energy Action Plan (key actions): Electricity: 7. Implement a Large Industrial Renewable Energy Purchase Program; Renewables and Climate Change: 8. Increase Renewable Portfolio Standard to 40% of NB Power's total sales by 2020 with priority on Demand Side Management; 9. Develop Renewable Energy Resources (support local and First Nations small-scale renewable projects, Develop solar, bio-energy and other emerging renewable energy technologies); 10. Optimize energy output from biomass resources, with specific focus on pellets.
Ontario					
Ontario Power Authority					
Feed-in Tariff Program (FIT Program) divided into two streams : FIT Program and microFIT program (program review under way)	May 14, 2009		Feed-In Tariff Program	Electricity Suppliers	Comprehensive guaranteed pricing structure for renewable electricity production in Ontario. It offers stable prices under long-term contracts for energy generated from renewable sources (Biogas (on- and off-farm), renewable biomass, landfill gas). FIT: projects over 10 kW, Biomass FIT Prices: <10 MW: \$0,138/kWh (20% escalation percentage), >10 MW: \$0,130/ kWh (20% escalation percentage) ; microFIT: small renewable energy projects of 10 kW or less, Biomass microFIT Prices: \$0,138/kWh (Contract term: 20 years, 20% escalation percentage)
Ministry of Agriculture, Food and Rural Affairs					
Ontario's Alternative Renewable Fuels 'Plus' Research and Development Fund	2004	ongoing	Fund	Universities / research institute/ industry/ governments/ organizations or partnership networks	The program funds research leading to new and alternative products and technologies that helps the agri-food industry expand into new markets at home and abroad. Grants up to \$200,000 per project may be available for the entire project duration.

Ontario Ethanol Growth Fund (OEGF)	Launched in 2005 / started in July, 2007	OEGF is fully subscribed and applications are no longer being accepted	Fund	Ethanol Producers	Provides: (1) capital assistance (not exceeding \$0.10/L of plant capacity) in the form of capital grants or loan guarantees for eligible new or expanding ethanol plants being built in Ontario to help meet financial challenges; (2) operating grants (not exceeding \$0.11/L of ethanol produced in a particular year for a maximum of 750 M litres per year paid over a period of up to 10 years) to eligible producers in production from 2007-2016 to address changing market prices; (3) support for independent blenders of ethanol and gasoline; and (4) a R&D fund to pursue opportunities for research and innovation.	\$520 M. over 12 years (up to \$32.5 M available for capital assistance for all proponents combined)
Ministry of Environment						
Ontario Regulation 535/05: Ethanol in gasoline (Under the Environmental Protection Act)	Passed October 7, 2005 / Effective January 1, 2007		Regulation	Fuel suppliers	Requires fuel suppliers to ensure an annual average of 5% ethanol in their gasoline.	
Ministry of Finance						
Fuel Tax Act (tax exemption for biodiesel fuel)	Effective after June 17, 2002		Tax Exemption	Biodiesel fuel consumers	Exemption from the \$0.143/L tax under the Fuel Tax Act would be provided for biodiesel fuel (Canadian General Standards Board), regardless of whether it is mixed with diesel fuel.	
Saskatchewan						
Enterprise Saskatchewan						
Renewable Diesel Mandate	Comes into effect on July 1, 2012		Mandate	Fuel distributors	Inclusion of 2% renewable content in the average annual diesel fuel pool for fuel distributors	
Saskatchewan Renewable Diesel Program	April 1, 2011	March 31, 2016	Program	Renewable ethanol producers	Support production of renewable diesel (B100) and will provide an incentive of \$0.13/L to qualifying producers in Saskatchewan for use in all diesel fuel application renewable diesel produced at facilities located in Saskatchewan, sold and delivered. The maximum number of litres of Saskatchewan renewable diesel eligible for an incentive in a fiscal year per producer is 20 M litres. The total program incentive cap is set at 40 M litres per fiscal year.	\$26 M.
Ethanol Grant Program (EGP)	2002	Extended into 2012	Grant Program	Ethanol producers	Provides a \$0.15/L grant to eligible distributors who blend Saskatchewan produced ethanol within Saskatchewan for sale in Saskatchewan.	
Renewable Fuel Mandate	January 15, 2007		Mandate	Fuel distributors	As of 15 January 2007, Saskatchewan fuel distributors are required to blend an average of 7.5% ethanol into gasoline sales.	

Regional Economic and Co-operative Development						
Saskatchewan Biofuels Investment Opportunity Program (SaskBIO)	Announced June 12, 2007/ Start date September 1, 2008	January 1, 2011	Program	Agricultural Producer)	Provides repayable contributions of up to \$10 million per project (at least 5% farmer-community investment in the project) for the construction or expansion of transportation biofuels production facilities in Saskatchewan. Program contribution rates increase with increasing percentage of farmer-community investment up to a maximum \$10 millions. Corporations (including co-operatives), individuals or partnerships are eligible to apply for funding.	\$80 M.
Manitoba						
Manitoba Finance						
Manitoba Retail Sales Tax Exemption for Biomass - Retail Sales Tax Act (2011 Budget)	Expended May 1, 2011		Tax exemption	Vendors	The retail sales tax (7%) exemption for straw pellets, used for eating and cooking, is expanded to include other biomass materials. To qualify for the exemption, biomass materials must be made 100% from wood, wheat, flax, oats, barley, sunflower, hemp or corn. The materials can be sold in the form of pellets, cubes, pucks, logs, or in loose form.	
Emission tax on coal	Commencing January 1, 2012		Tax	Coal consumers	Coal used in Manitoba will be subject to a new Emission Tax equal to \$10 per tonne of carbon-dioxide equivalent emissions.	
Manitoba Agriculture, Food and Rural Initiatives						
Manitoba Biomass Energy Support Program (MBESP)	January 2012	Submission deadline March 2012	Support Program	Biomass consumers, users and processors	Provides support to Manitobans in the transition to the processing and use of biomass for heating in place of coal, prior to a coal ban anticipated for 2014. There are 2 components to the program: (1) a consumer component to assist coal user to purchase approved biomass (Payment is subjected to a maximum of \$20 per purchased tonne of biomass, with a program maximum of \$12,000 per applicant); and (2) a capital component to assist biomass users and processors to establish or upgrade infrastructures and facilities (Successful applicants may be eligible for cost-shared supports of up to \$50,000 each, to a maximum of 50% of the total cost).	
The Manitoba Bioproducts Strategy «Growing Green»	January 20, 2011		Strategy	Government	By 2020, Manitoba's bio-products industry will generate \$2 billion in revenue annually, at least 80% of which comes from rural and northern Manitoba. Focus on and excel in: sustainable biomass production and supply, biofuels and bioenergy, biofibres and biomaterials, biochemicals.	

Manitoba Innovation, Energy and Mines					
The Biofuels Act	Assented to December 4, 2003		Act	Biofuels producers and consumers	Establishes the legislative framework for establishing a biodiesel sales mandate, licensing biodiesel manufacturers and adopting biodiesel fuel quality standards. It is in Manitoba's economic and environmental interest to encourage and support the production and use of cleaner fuels, such as ethanol and other biofuels. Biofuel Program (Ethanol Grant Program, Biodiesel Grant Program, Ethanol Fund, Biodiesel Fund)
Manitoba's Denatured Ethanol Sales Mandate	January 1, 2008		Mandate	Fuel suppliers	The mandate requires fuel suppliers in Manitoba to replace at least 8,5% of their gasoline available for sale with ethanol. This pool average will result in roughly 130 million litres of ethanol used in Manitoba each year. The mandate will start on January 1, 2008 with 5% denatured ethanol content for the first quarter of 2008, ramping to up to 8,5% for the remainder of 2008 and subsequent years.
Ethanol General Regulation	December 12, 2007		Regulation	Ethanol manufacturers	Under Manitoba's Biofuels Act, ethanol-blended fuel (gasohol) must meet specified fuel quality standards. These standards are contained in the Ethanol General Regulation. The Ethanol General Regulation defines gasohol as blend of denatured ethanol and gasoline with a denatured ethanol content of least 3% of the total volume.
Ethanol Grant Incentive (Ethanol Fund Grant Regulation)	December 12, 2007	March 31, 2015	Grant Incentive	Ethanol producers	For the first two years (2008 & 2009), ethanol producers will receive \$0,20/L of ethanol produced and sold in Manitoba to fuel suppliers, followed by \$0,15/L for the next three years (2010-2012) and \$0,10/L for the remaining three years (2013-2015) of the incentive program. Annual payouts will be capped by the amount of ethanol required to meet the mandate and taxable sale of gasoline.
Biodiesel Mandate For Diesel Fuel Regulation	November 1, 2009. Amendments in July 2011 and November 2011		Mandate	Fuel suppliers	The mandate will require fuel suppliers to blend 2% biodiesel in their overall sales of on and off-road diesel fuel. The 2% blend percentage is based on an average. Suppliers have the flexibility to blend other percentages of biodiesel to meet the 2% target. At a 20% average, it is expected that Manitoba will use at least 20 millions litres of biodiesel per year.

Biodiesel (General) Regulation	Registered November 24, 2008/ Amendment July 2011		Regulation	Biodiesel manufacturers	Details of the licensing and reporting requirements for biodiesel manufacturers, as well as the fuel quality standards, can be found in the regulations.
Biodiesel Grant Program (Biodiesel Fund Grant Regulation) (Replace the fuel tax exemption for biodiesel (\$ 0,115/L) since April 1, 2010)	April 1, 2010	March 31, 2015	Grant Program	Transport Fuels	Supports the production of biodiesel in Manitoba. The incentive is \$0,14/L of biodiesel. To be eligible for the incentive the biodiesel must: (1) Be produced in Manitoba by a producer with a valid commercial licence to manufacture biodiesel in the province; (2) Meet one of the quality standards for biodiesel adopted by Manitoba; (3) Be sold either in Manitoba or for export or used by the producer to make blended biodiesel that the producer then sold in Manitoba or for export. The maximum number of litres of Manitoba biodiesel eligible for an incentive in a 12-month period is 20 millions litres. There are also quaterly caps (April-June: 7 million litres; July-September: 7 million litres; October-December: 2 million litres; January-March: 4 millions litres)
Alberta					
Alberta Energy					
Alberta's Nine-Point Bioenergy Plan	2006		Plan	Forestry and Agriculture Sectors	3 grant programs: (1) Commercialization/Market Development Program; (2). Bioenergy Infrastructure Development Grant Program (3). Renewable Energy Producer Credit Program; 6 Proposed Policy Initiatives: (1). Energy Microgeneration Sandards and Policy revisions; (2) Bio-industrial network development; (3). Taxation and Investment Intruments for the Bioenergy Sector; (4). National Renewable Fuel Standard and Energy Market Targets; (5).Specified Risk Material (SRM) Disposal Protocol; (6). Investment Support through Existing Programs that align with Bioenergy Development.

Bioenergy Infrastructure Development Program	Fiscal year 2007/2008	Fiscal year 2010/2011 (March 31, 2011)	Program	Infrastructure	Leverages industry / investors / municipal funds (maximum is 35% of eligible costs for capital projects) to develop and expand the distribution infrastructure to connect Alberta produced ethanol, biodiesel, and biogas (methane) to the marketplace. This initiative accommodates micro-generation interconnections and biogas processing and pipeline infrastructure and supports rural development regional distribution priorities facilitating the application of new technology in biofuel and energy transmission and distribution infrastructure. This approved initiative is part of Alberta's Nine-Point Bioenergy Plan.	\$6 M. through 2008-2009
Biorefining Commercialization and Market Development Program	Fiscal year 2007/2008	Fiscal year 2010/2011 (March 31, 2011)	Program	Industry	Leverages industry funds (maximum is 20% of eligible costs for capital projects and 50% of eligible costs for non-capital projects) to focus on biofuel research commercialization, technology transfer, new generation co-operatives, capacity building, market development, and advocacy for ensuring market acceptance. This program develops / expands / strengthens Alberta's biodiesel, biogas, and ethanol production capacity in response to market opportunities. Feasibility studies, opportunity analysis, and product development costs related to concept and technology evaluation, technical assistance, and equipment development; in addition to market research costs related to specific product opportunities, costs related to buyer presentations, product reformulation, and transportation of samples are covered as part of this program. This approved initiative is part of Alberta's Nine-Point Bioenergy Plan.	\$24 M. through 2008-2009
Bioenergy Producer Credit Program (BPCP) (extension and expansion of the old program)	Old BPCP started in April 1, 2007 New BPCP starts in April 2011	Old BPCP expires in March 31, 2011 New BPCP expires in March 2016 (extended)	Program	Industry (Suppliers)	Encourages the development of a wide variety of bioenergy products including renewable fuels, electricity and heat with a credit per litre or kilowatt-hour. The four programs under new BPCP are: Program 1: liquid biofuels; Program 2: biogas; Program 3: biocarbon, commercial wood pellets and biosludge pellets; Program 4: incineration of biomass. Incentive rates: Between \$0,06/L and \$0,14/L for Liquid biofuels (Production for < or > 150 million litre per year); Between \$0,017 per kWh and \$0,06 per kWh for Electricity (production from capacity less or up to 3 megawatts)	\$209 M. from 2007-2011

Renewable Fuel Standard (RFS)	Implemented in April 2011	Standard	Transport Fuels	An RFS is a government requirement to blend renewable fuels such as ethanol or biodiesel into fuels that are sold to customers, like gasoline and diesel. Requires an average of 2% renewable diesel in diesel fuel and 5% renewable alcohol in gasoline sold in Alberta. Renewable fuels used to meet the RFS must demonstrate at least 25 % fewer greenhouse gas emissions than the equivalent petroleum fuel.
Provincial Energy Strategy «Launching Alberta's Energy Future»	Announced December 11, 2008	Strategy	Government	Lever 1. Address environmental footprint: Encourage Complementary Energy Sources; Lever 4. Innovate: Develop and deploy technology
Alberta Environment				
Alberta's 2008 Climate Change Strategy «Responsibility / Leadership / Action »	January 2008	Strategy	Government	Goal: To transform the way we produce energy and to further introduce cleaner, more sustainable approaches to energy production. Actions: (1) Use the funds contributed by industry in the Climate Change and Emissions Management Fund coupled with government funding to drive innovation, test and implement new technologies, and achieve the goal of greening energy production; (2) Further remove barriers and consider incentives for expanding the use of renewable and alternative energy sources including challenges small producers face trying to access the electricity grid and the development and market introduction of new bio-energy products; (3) Increase investments in demonstration and deployment of clean energy technologies and value-added energy technologies.
Climate Change and Emissions Management Fund	Launched April 2008	Fund	Projects and technology that reduce greenhouse gas emission in Alberta	Invests in projects and technology to reduce greenhouse gas emissions in Alberta. Potential investment areas including, energy conservation and efficiency, demonstration and use of new technologies that reduce greenhouse gas emissions such as carbon capture and storage, development of carbon offset projects and climate change adaptation programs and measures. Alberta gave companies three options for meeting the reduction: improve the energy efficiency of their operations, buy carbon credits in the Alberta-based offset system or pay \$15 into the Climate Change and Emissions Management Fund for every tonne over their reduction target. Facilities could also choose a combination of the options.
Alberta Finance				
Alberta Ethanol and Biodiesel Producers tax return		Tax return	Ethanol and Biodiesel Producers	Tax return (Alberta's Fuel Tax) of \$0.09/L for ethanol and biodiesel producers

British Colombia					
Ministry of Finance					
Motor Fuel Tax and Carbon Tax (tax exemption for ethanol and biodiesel)	January 1, 2010	Tax exemption	Biodiesel and Ethanol Consumers	Biodiesel and ethanol are classified as alternative moter fuels for all purposes. (January 1, 2010). Ethanol and biodiesel will no longer be exempt from tax under the Motor Fuel Act. Motor fuel tax will apply to ethanol and biodiesel at the same rate as the fuel with which it is blended. Motor fuel tax will apply to 100% ethanol at the same rate as clear gasoline, and to 100% renewable diesel fuel at the same rate as motive fuel (clear diesel).	
Ministry of Energy, Mines and Petroleum Resources					
The BC Energy Plan: A Vision for Clean Energy Leadership	February 27, 2007	Plan	Domestic Renewable Fuel Industry	Implement a 5% average renewable fuel standard for diesel by 2010 to help reduce emission and advance the domestic renewable fuel industry; Support the federal action of increasing the ethanol content of gasoline to 5% by 2010. Establish a new Innovative Clean Energy Fund (\$25 millions) to support the development of clean energy and energy efficient technologies in electricity, alternative energy, transportation and oil and gas sectors.	
BC Bioenergy Strategy «Growing Our Natural Energy Advantage»	January 31, 2008	Strategy	Agriculture secto / Forest sector/ Energy sector	Opportunities for Rural British Columbia (1) Establish \$25 M. in funding for a provincial Bioenergy Network for greater investment and innovation in B.C. bioenergy projets and technologies. (2) Establish funding to advance provincial biodiesel production with up to \$10 millions over three years.(3) Issue a two-part Bioenergy Call for Power, focusing on existing biomass inventory in the forest industry. Benefits for British Colombians (1) Aim for B.C. biofuel production to meet 50% or more of the province's renewable fuel requirements by 2020. (2) Develop at least 10 community energy projets that convert local biomass into energy by 2020. (3) Establish one of Canada's most comprehensive provincial biomass inventories that creates waste to energy opportunities.	\$25 M. (provincial bioenergy Network); \$10 M. (biodiesel production), etc.

BC Government Fund for liquid fuel from biomass		Closing date for applications January 7, 2009	Fund	Technology companies/ Electricity Suppliers	Supports the production of liquid biofuels with demonstrated low greenhouse gas emissions. Funding for liquid biofuels will support eight projects to develop cellulosic ethanol, biodiesel, and biofuels technologies. The approved projects represent over \$100,6 M. in total value and will create about 450 temporary and full time jobs in seven B.C. communities. Increased biofuels production will help meet the provincial standard of five per cent minimum annual average renewable content for gasoline and diesel used in B.C. by 2010.	
BC Government Initiative Clean Energy (ICE) Fund, (Round 1 and 2)	2007	Not accepting applications at this time	Fund	Entrepreneurs / Communities / First Nations	The Innovative Clean Energy Fund was created to encourage the development of new sources of clean energy and technologies to help support local economies and livelihoods in communities across B.C.. The key goals of the fund are to: (1) Address specific British Columbia energy and environmental problems that have been identified by government; (2) Showcase B.C. technologies that have a strong potential for international market demand in other jurisdictions because they solve problems that exist both in B.C. and other jurisdictions; (3) Support pre-commercial energy technologies that are new or commercial technologies not currently used in B.C.; (4) Demonstrate the commercial viability of new energy technologies.	\$25 M. (Round 2)
BC Hydro call for power	First phase 2008; Second phase March 5, 2009	Second phase July 2011	Call for power	Biomass Producers	BC Hydro is carrying out a two-phase call for power to utilize wood infected by the mountain pine beetle as well as other wood fibre fuel sources. The Bioenergy Call will assist in enabling B.C. to be electricity self-sufficient as outlined in the new Energy Plan and allow BC Hydro to secure firm, clean energy. In Phase Two, BC Hydro will conduct a two-stream call process. The first stream is a competitive call for larger-scale biomass projects. Any form of biomass will be eligible and it will include wood waste sourced from new forest tenure enabled through provincial legislation in May 2008. The target is to acquire 1,000 gigawatt-hours per year of energy through this stream. The second stream will focus on innovative, community-level electricity supply solutions using biomass. Through a request for qualifications, BC Hydro will seek to identify at least two such projects that can provide cost-effective electricity for ratepayers, as well as other quantifiable, local benefits such as improved reliability.	

Ministry of Environment						
BC Air Action Plan	June 2008 / All initiatives underway by 2009		Action Plan	Government	Action 5: Retro-fit heavy-duty diesel vehicles; Action 11: Use biodiesel in government diesel vehicles; Action 21: Turn more wood waste into energy	\$28,5 M. / 3 years
Yukon						
Energy, Mines and Resources Yukon						
Yukon Energy Strategy	January 2009		Strategy	Government	Renewable Energy: Strategies. Ex: Developing a wood based bio-energy industry in Yukon by building a local market for wood energy technologies and wood fuel products. Priority Actions: ex: Increase renewable energy supply in Yukon by 20% by 2020; Conduct pilot studies to assess the feasibility of renewable energy initiatives; Support the development of a wind, hydro, solar, wood or geothermal project in a diesel powered community.	
Yukon Energy Strategic Plan 2010-2012	January 10, 2010		Strategic Plan	Government	To avoid future diesel use the resource plan will also assess several options like geothermal, biomass and wind to see if they can be part of the energy mix solution.	
Good Energy Rebate Program	April 1, 2011	February 28, 2012	Program	Homes and Businesses	Heating appliances: Woodstove/furnaces or EPA white tag rated wood boiler - \$300- woodstove/furnaces:EPA 40 CFR Part 60 or CSA - B415.1-M92 approved; Woodboilers: EPA White Tag certified ; Wood pellet stoves, pellet furnaces / boilers- 20% of the pre-tax purchase cost up to \$600 - ULC certified	
Environment Yukon						
Yukon Government Climate Change Action Plan	February 2009		Action Plan	Government	Goal 3 - Reduce our Greenhouse Gas (GHG) Emissions : Develop wood energy opportunities for residential and institutional heating - Burning wood efficiently to heat buildings produces less GHG emissions than burning oil. Supporting ways to efficiently use wood heat will help reduce GHG emissions as well as develop local economic opportunities for Yukon's forestry industry.	
The Northwest Territories						
Department of Environment and Natural Resources						

NWT Greenhouse Gas Strategy «A Strategy to Control Greenhouse gas Emissions in the NWT»	March 2007	2011	Action Plan	Government	Action # 2: NWT Housing Corporation Energy Conservation Initiatives (Wood burning stoves are offered with home ownership packages, which allow owners to heat using carbon neutral wood) ; Action #3: Community woodlot Planning (Community woodlot planning can promote sustainable forest yield while offsetting heating oil used for space heating) ; Action #27: Biofuels (Ethanol, Biodiesel) ; Action # 28: Biomass (Wood pellet boiler pilot project) ; Action # 36: Northern Research into Energy Technologies (Research on wood pellet heat).
Northwest Territories Biomass Energy Strategy	Announced February 23, 2010		Action Plan	Gouvernement	Four broad objectives: (1) Increasing education and awareness of biomass as heating option for residents and businesses; (2) Promoting biomass heating options; (3) Promoting greater stability in the supply of biomass in the NWT; (4) Promoting combined heat and power technologies.
Nunavut					
Department of Environment					
Renewable Energy Inventory (Northern Premiers Forum) with the Northwest Territories and Yukon	2009		Inventory	Governments	At the 2009 Northern Premiers' Forum, the three territorial Premiers committed to developing an inventory of current and future renewable energy resources. This inventory describes the current state of renewable energy use in the territories, outlines actions being taken and describes policies under development to increase renewable energy use in the North. Finally, the inventory highlights the geographic and policy contexts faced by each territory that shape our distinct opportunities and challenges in the development of renewable energy.

Appendix 2. Overview of sustainability issues and research on forest biomass



Forest biomass from managed forests, in the form of harvest residues and dead wood from naturally-disturbed stands, represents by far the largest potential biomass feedstock currently available for bioenergy production in Canada. It is estimated that 141 Mt (oven-dry) per year would be available from these sources (when no net-down for operational, technical or ecological constraints is applied; Dymond et al. 2010, *Forest Ecology and Management* 260: 181-192); this would translate into an energy production of 2,5 Exajoules/year (assuming 1 oven-dry ton=18 Gigajoules). The sheer extent and variability of the Canadian forest landbase and the huge potential from naturally-disturbed stands are key features of the Canadian biomass resource that set it apart from other countries.

A large proportion of Canadian forests are under environmental certification (Figure 1). Therefore Canadian forest products are considered to come from sustainable practices. However, the interest in the utilization of biomass for bioenergy from Canadian forests raises concerns that biomass harvesting practices (such as removal of tree tops and branches along with the stem in final cutting operations) may threaten the productivity and health of forests across the country, since it increases the pressure on ecosystems in a way that may not be adequately captured by current internationally approved forest certification schemes. These concerns were crystallised in a recent report from Greenpeace (*Fuelling a Biomess*, November 2011), which severely condemned the recent push towards development of forest bioenergy in Canada, and stated that

Canada did not have sufficient policy and regulatory safeguards to ensure the sustainable use of forest resources for bioenergy production.

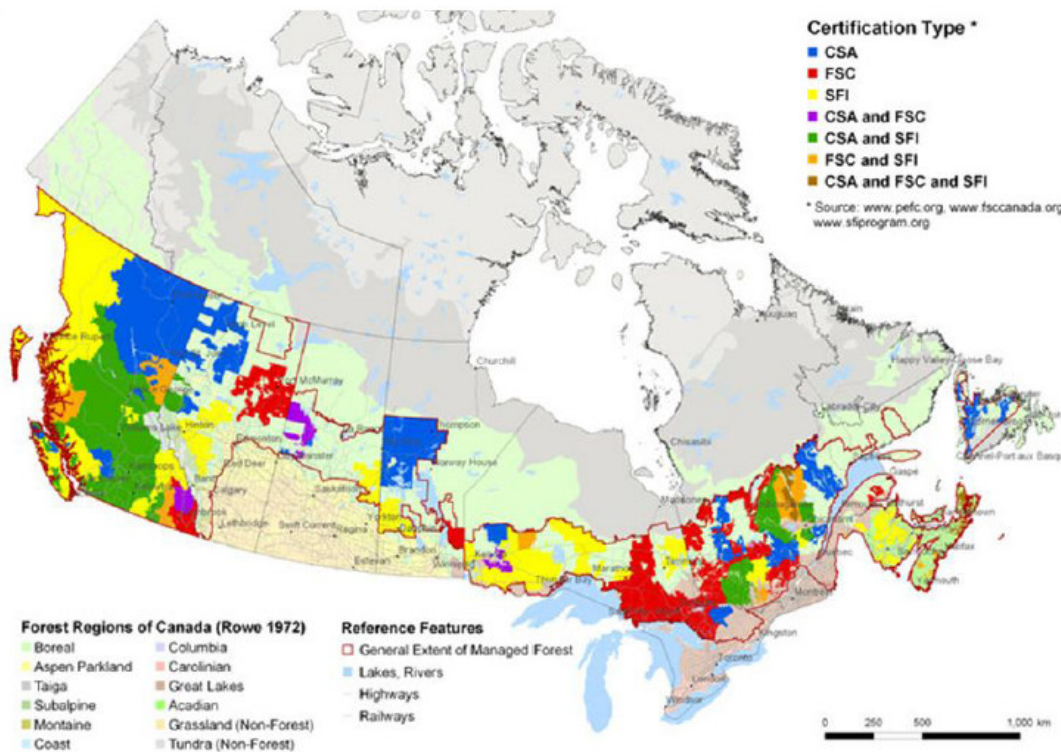


Figure 1. Certified forest areas in Canada. (Source: Forest Products Association of Canada).

Nevertheless, since the time of the oil crisis of the 1970s, research has been carried out in Canada on environmental sustainability of biomass harvesting from managed forests for bioenergy, to support and inform the development of policies and guidelines. Initial research focused on developing theoretical nutrient budgets for estimating nutrient losses in biomass removals, and then moved on more dynamic predictive models. An extensive series of biomass harvesting field trials were initiated in the 1980s' and 1990's across Canada to provide empirical knowledge (Figure 2). New innovative field trials are now being set up to develop quantitative estimations of the amounts of biomass that can be sustainably harvested for a wide range of site and stand conditions, which will lead to more refined and precise guidelines (Figure 3). This all puts Canada at the cutting edge of research on sustainability of forest biomass harvesting.

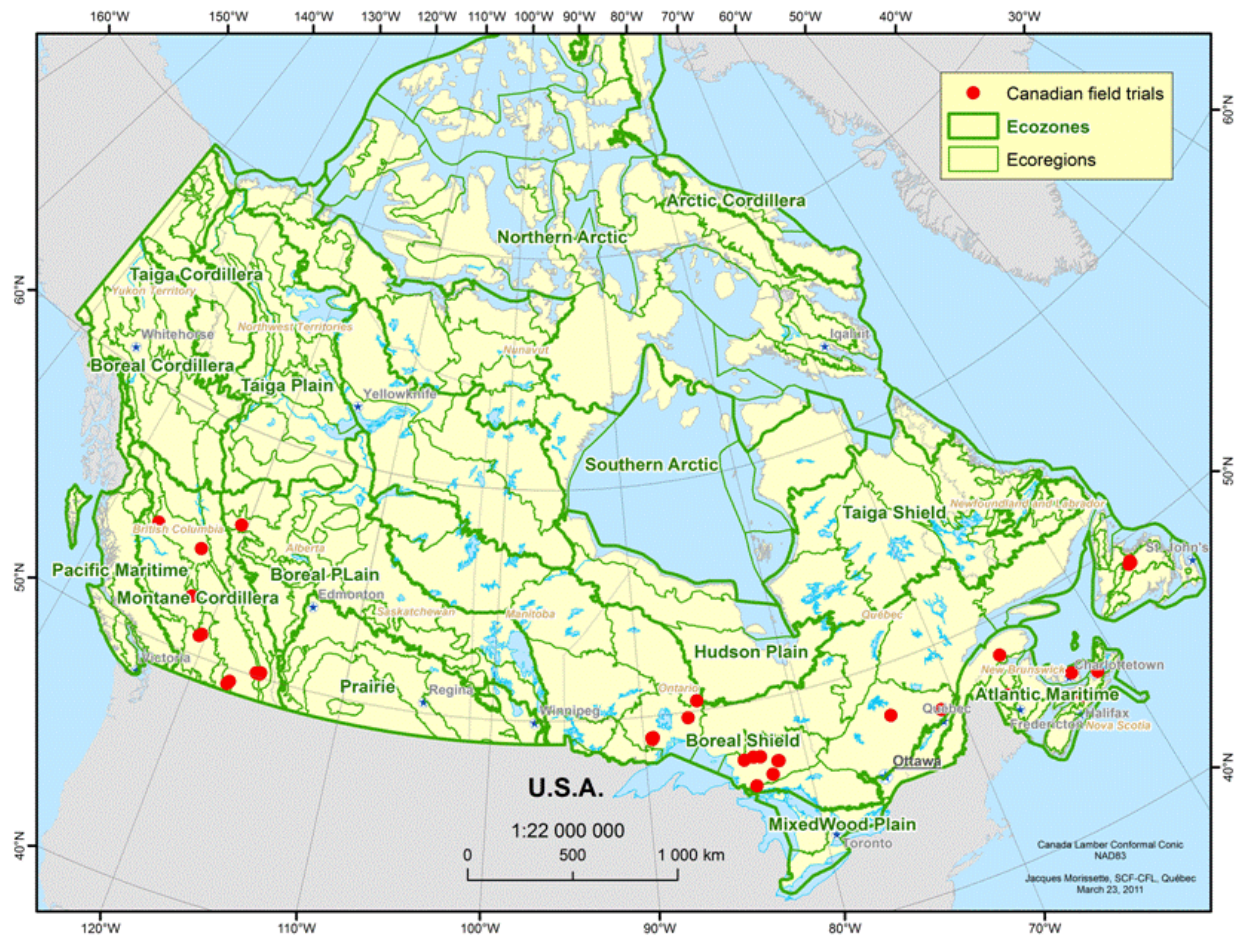


Figure 2. Canadian network of field trials on the sustainability of forest biomass harvesting.

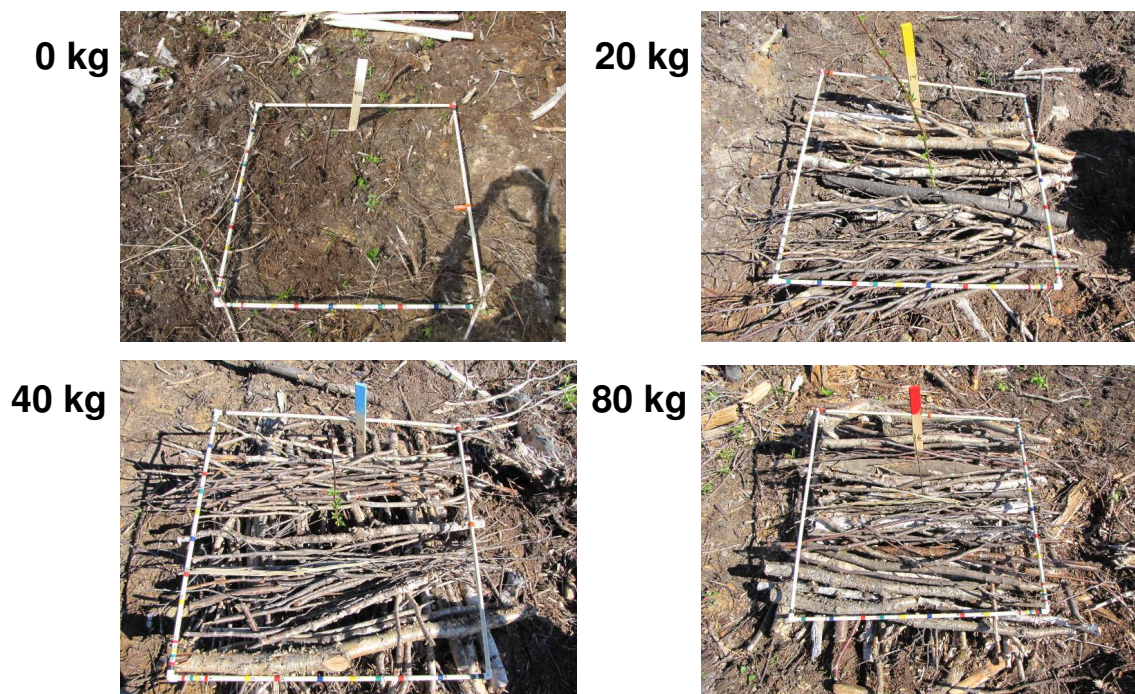


Figure 3. Example of trial on the quantitative assessment of harvest residue effects on trees and soils.

Using results from Canadian field trials, as well as existing guidelines for forest biomass harvesting from various jurisdictions in boreal and temperate climates, key issues related to sustainability of forest ecosystems can be recognized, and sensitive site conditions are identified and linked to mappable spatial variables, allowing the production of maps of site suitability to forest biomass harvesting (Figure 3). Such maps are currently being produced and used at regional level in Canada for forest management decisions and biomass allocation, as well as for the whole of the Canadian commercial forest landbase for estimations of ecologically sustainable availability of forest biomass. They are also being used as the basis of a national monitoring program of the ecological effects of biomass harvesting, which serves to validate the mapping and further refine scientific knowledge. Industrial and community stakeholders involved in operational forest biomass harvesting are invited to participate to the program by establishing monitoring plots, under guidance of the Canadian Forest Service (Figure 4).

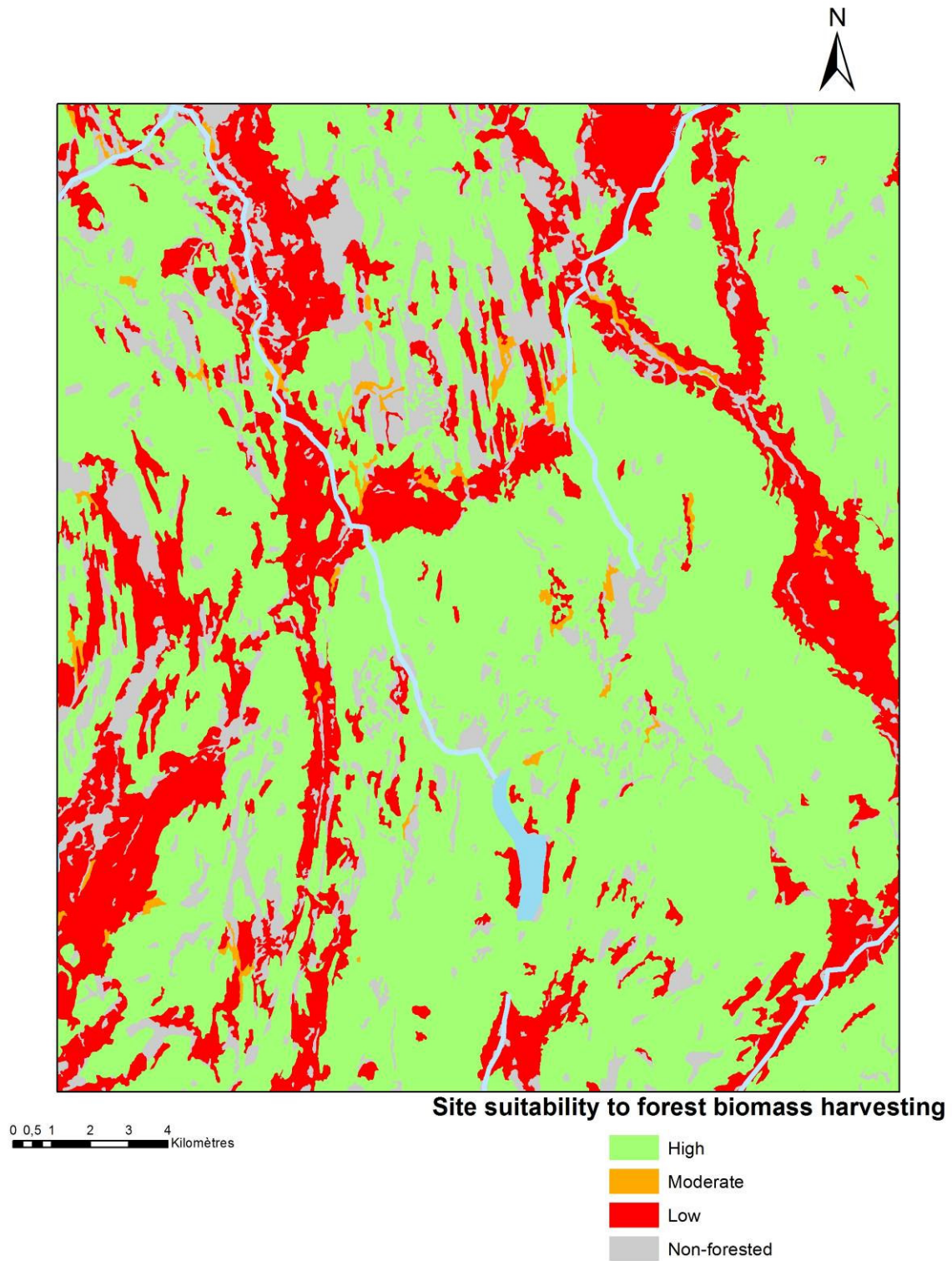


Figure 4. Example of map of site suitability to forest biomass harvesting.



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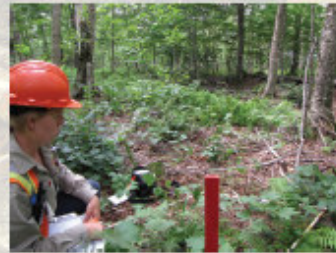
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GUIDELINES

Establishing Permanent Plots for Monitoring the Environmental Effects of Forest Biomass Harvesting

Evelyne Thiffault
David Paré
Sébastien Dagnault
Jacques Morissette



Natural Resources Canada
Canadian Forest Service
Laurentian Forestry Centre

February 2011

Canada

Figure 5. Practical guide for the establishment of monitoring plots.

Based on a case study in the boreal forest of Quebec, it is estimated that 26% of the forest territory, although suitable for conventional stem-only harvesting, is unsuitable for more intensive biomass harvesting (removal of residues, i.e., branches and tops) due to concerns and risks posed by intensive biomass removal for ecosystem services (e.g. soil fertility, biodiversity, water quality). Unsuitable sites correspond to 29% of the total potential volume of residues available (Source: Thiffault and St-Laurent Samuel, 2012; available in French at: <http://www.foretmodeledulacsaintjean.ca/fr/publications/>).

On the other hand, because of operational constraints associated with residue removal technology, only 55% of the total potential volume of a suitable site can be recovered for bioenergy production. When adding ecological constraints, the ecologically+technically available volume of residues represents 39% of the total potential of the territory, which still represents a sizable amount of biomass (Figure 6). However, when very strict criteria for protection of ecosystems are applied, the availability of residues drops to 16% of its total theoretical potential.

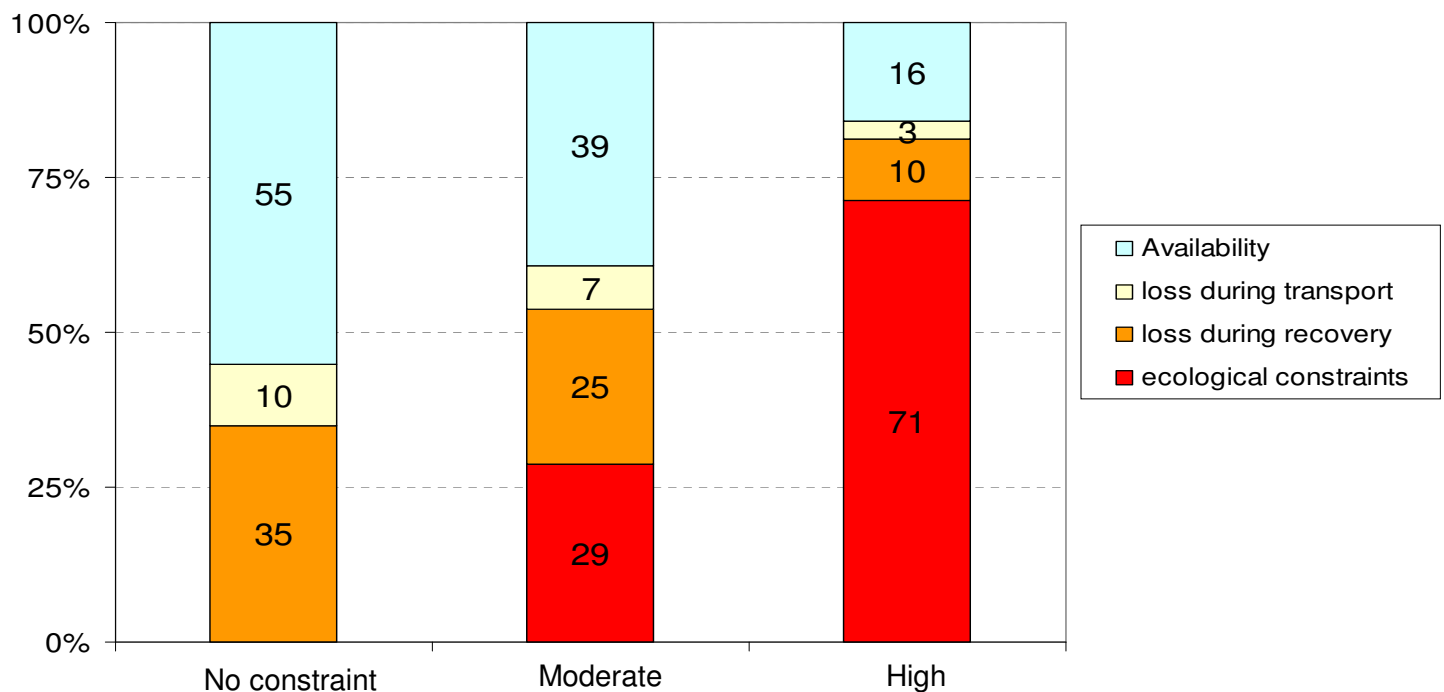


Figure 6. Availability of forest biomass relative to its theoretical potential, according to operational and ecological constraints to recovery.

Applying ecological constraints by excluding unsuitable sites raises the cost of biomass supply on the territory by increasing the transport distance for the procurement of a given volume of biomass to the processing plant. In the case study, this increase ranges from 1 to 4% when sensible but moderate criteria for protection of ecosystems are applied, and up to 15% when very strict criteria are applied; this effectively represents the opportunity cost of applying standards for the protection of ecological services when designing forest biomass supply chains.

The results make it possible to evaluate forest bioenergy production systems according to different sets of sustainability criteria in order to analyse how guidelines, policies and certification systems can affect supply and costs. As the forest bioenergy sector is still nascent in Canada, new knowledge, regulations and market conditions are bound to appear in the coming years. It is thus critically important to develop tools that are flexible enough so that new information can be incorporated as it emerges, and sensitivity analyses can be carried out.