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Short-rotation Afforestation and Agroforestry on Quebec Private Land: Review of Laws, Regulations, Policies, and Programs

Pierre P. Marchand and Sylvain Masse

Information Report LAU-X-130E

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Natural Resources Canada, Canadian Forest Service

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LIBRARY AND ARCHIVES CANADA CATALOGUING IN PUBLICATION

Marchand, Pierre P.

Short-rotation afforestation and agroforestry on Quebec private land [electronic resource]: review of laws, regulations, policies, and programs / Pierre P. Marchand, Sylvain Masse.

(Information report, ISSN 0835-1570; LAU-X-130)

Electronic monograph in PDF format.

Mode of access: World Wide Web.

Issued also in French under title: Boisement et agroforesterie en courtes rotations en territoire privé au Québec.

Issued also in printed form.

Includes bibliographical references.

ISBN 978-0-662-47276-0

Cat. no.: Fo113-3/130E-PDF

1. Afforestation—Government policy—Québec (Province).

2. Afforestation—Government policy—Canada.

3. Agroforestry—Québec (Province).

4. Hedgerow intercropping—Québec (Province).

I. Masse, Sylvain, 1956-

II. Laurentian Forestry Centre

III. Series: Information report (Laurentian Forestry Centre: Online); LAU-X-130.

SD409.M37 2007

634.9'909714

C2007-980248-6

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Catalog Number Fo113-3/130E-PDF

ISBN 978-0-662-47276-6

ISSN 0835-1570

This publication is available in PDF at no charge from the Canadian Forest Service Bookstore at:
<http://bookstore.cfs.nrcan.gc.ca>

TTY: (613) 996-4397 (teletype for the hearing impaired).

Cette publication est également offerte en français sous le titre « Boisement et agroforesterie en courtes rotations en territoire privé au Québec : examen des lois, règlements, politiques et programmes » (Numéro de catalogue Fo113-3/130F-PDF).

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ABSTRACT

This information report examines the policies, laws, regulations and programs that could influence the implementation on privately owned land in Quebec of four short-rotation afforestation and agroforestry systems. The systems are: 1) short-rotation intensive culture (3-4-year cycles) of willow; 2) block plantation of hybrid poplar (15-20-year rotations); 3) alley cropping using willow and hybrid poplar; and 4) willow-based riparian buffer systems. This inventory of the regulatory framework and incentive programs allows us to identify several application issues for the systems. These issues will be studied in greater detail during a later phase of the project within which this study was conducted.

RÉSUMÉ

Ce rapport d'information examine les politiques, lois, règlements et programmes pouvant influencer l'application en territoires privés au Québec de quatre systèmes de boisement et d'agroforesterie en courtes rotations. Il s'agit de 1) la culture intensive du saule en courtes rotations (3 à 4 ans), 2) la plantation en blocs du peuplier hybride (rotations de 15 à 20 ans), 3) la culture intercalaire avec saule et peuplier hybride et 4) les bandes de protection riveraines à base de saule. Cet inventaire du cadre réglementaire et des programmes incitatifs permet d'identifier des enjeux d'application des systèmes. Ces enjeux seront examinés plus en détail dans une phase ultérieure du projet dans lequel s'inscrit cette étude.

HIGHLIGHTS

As part of a research project initiated in 2005 under the aegis of the Natural Resources Canada Technology & Innovation Program, ten Canadian research centres are collaborating to develop four short-rotation afforestation and agroforestry systems in an effort to produce energy and reduce greenhouse gas emissions. The systems are: 1) short-rotation intensive culture (3-4-year cycles) of willow and hybrid poplar; 2) block plantation of hybrid poplar (15-20-year rotations); 3) alley cropping using willow and hybrid poplar; and 4) willow-based riparian buffer systems.

One segment of this research project focuses on the political and social factors that could influence implementation of these new technologies. With this in mind, our report examines the policies, laws, regulations, and incentive programs impacting the adoption and implementation of these technologies on privately owned land in Quebec. Note, however, that short-rotation intensive culture of hybrid poplar is mainly being developed in Western Canada and will consequently not be discussed here. The report reflects prevailing conditions as of June 2006.

The various regulatory instruments and incentive programs are presented for the three levels of government (federal, provincial, and municipal). Their impact on implementation of the technologies is assessed, thus allowing identification of issues, which will be studied in greater detail during a later phase of the project. These issues include:

- A rapidly evolving legislative and political framework, as evidenced, for example, in Quebec's new 2006-2012 Action Plan on Climate Change, the announcement of a new Canadian action plan on climate change and the announcement of a provincial silvicultural investment strategy.
- The limited flexibility of the majority of incentive programs (targeting either forestry or agricultural producers), in light of an ill-defined statute of the technologies and their products that are positioned at the crossroads between conventional agriculture and forestry, especially short-rotation intensive culture of willow and alley cropping.
- For willow-based riparian buffer systems, the complementary nature of the three incentive programs (Prime-Vert, Greencover Canada and the Program for the Development of Biodiversity in Water Courses of Agricultural Regions), the latter two established in 2005.
- For afforestation systems (short-rotation intensive culture of willow, and block plantation of hybrid poplar), a complex legislative environment including conflicting laws and policies, particularly with respect to afforestation of unused farmland.
- A lack of incentive programs for short-rotation intensive culture of willow, despite the willingness expressed by some private forest development agencies.
- Eligibility of block plantation of hybrid poplar for the Financial Assistance Program for the Development of Private Forests, still limited to some of the private forest development agencies; for most of the agencies, operational standards and objectives for this afforestation system have yet to be specified.

INTRODUCTION

The adoption of new afforestation and agroforestry technologies by farmers and other land owners is in large part dependent upon social, economic, and political factors. Among these are a regulatory framework consisting of laws, regulations, and policies, and various incentive programs.

Depending upon the regulatory framework in effect and programs available, the impact on adoption of the new technologies may be: 1) incentive, encouraging adoption; 2) neutral or without impact; or, 3) restrictive, i.e. discouraging adoption. Impact may vary in intensity over a continuum.

This report inventories the laws, regulations, policies, and programs that applied as of June 2006, on privately owned Quebec land, to four afforestation and agroforestry technologies designed to sequester carbon and produce biomass for energy production and other purposes.

Among the four technologies, two involve afforestation. These are, firstly, block plantation with hybrid poplar (15-20-year cycles) and, secondly, short-rotation intensive culture of willow (3-4-year cycles). Both of these technologies are considered primarily for use on marginal agricultural land (particularly unused farmland) that meets the afforestation criteria established in the Kyoto Protocol. The other two technologies are more closely associated with agroforestry. They deal with cultivation systems involving a mixture of woody and herbaceous crops, i.e. willow and hybrid poplar-based alley cropping and riparian buffer systems.¹ Note that, for alley cropping, this inventory dealt mainly with windbreak hedges, since the regulatory framework and programs refer to windbreak hedges rather than specifically to alley cropping.

First, we will put the study into context, then we will discuss the methodology used. Findings will make up the bulk of this report. The findings are organized by jurisdictions and responsibilities incumbent upon the three levels of government – federal, provincial, and municipal. Then we provide a summary of this inventory of the regulatory authorities and programs that could have an impact on the adoption of the emerging technologies. A list of the key issues that have been identified and their relationship to regulatory instruments and/or programs completes the exercise.

¹ In agroforestry, alley cropping consists in planting crops between rows of trees or shrubs. This type of system could be considered a specific type of windbreak hedge. Indeed the dynamics of alley cropping appear progressively as we decrease the distance between the windbreaks.

1. CONTEXT

The industrialized nations that signed the Kyoto Protocol are committed, during the 2008-2012 timeframe, to reducing their greenhouse gas emissions by 5.2% on average below their 1990 baselines (Government of Canada, 2005, p. 3). Canada's goal is 6%. However, Canada's 2003 emission levels had increased by 24% over 1990 (Government of Canada, 2005, p. 42). We are therefore looking at a reduction target of some 30% by 2012.

The Kyoto Protocol allows a system of credits for the sequestration of carbon in carbon sinks created through afforestation. Afforestation refers to the conversion of non-forested land to woodlands through the planting of trees. From this standpoint, replanting a forest following harvesting is not considered afforestation.

Further, the combustion of biomass, particularly of forest biomass and its derived biofuels, by replacing fossil fuels, is not considered a debit in terms of this Protocol and is therefore another means to reaching greenhouse gas emission reduction objectives. However, details that will eventually govern credit earning and trading in a national carbon market have yet to be specified.

The Canadian Biomass Innovation Network Technology and Innovation Program (T&I – CBIN) is under the aegis of Canada's Action Plan on Climate Change (2002). The project, *Developing short-rotation willow plantation/agroforestry systems for bioenergy generation in Canada* (TID8 31), commenced in June 2005 as part of the Technology and Innovation Program. The general objective is to increase knowledge and develop new technologies to establish 1.3 million hectares of agroforestry systems and short-rotation plantations in Canada by 2025. These crops could contribute to the production of 23 million tonnes of biomass yearly, reduce greenhouse gases by 30 megatonnes (including more than 14 megatonnes due to increased productivity resulting from this project), and produce 4.1% of the total energy consumption in Canada.

Through its various sub-projects, the project is designed to:

1. select native willows for short-rotation intensive culture;
2. develop short-rotation willow and hybrid poplar culture², block plantation of hybrid poplar, and willow and hybrid poplar-based agroforestry systems for energy production;
3. develop mechanized harvesting systems for willow grown in short rotations;
4. study energy production and potential greenhouse gas emission reductions associated with short-rotation afforestation and agroforestry systems;
5. develop models on the economics of afforestation and agroforestry systems for bioenergy generation;
6. analyze the laws, programs, and social factors that have an impact on adoption of short-rotation afforestation and agroforestry systems.

This study addresses this last objective. Indeed, few studies have dealt systematically with the regulatory environment (laws, regulations, policies) and programs affecting the technologies developed in this project. In Canada, note the study by Gilsenan (2003), which dealt with programs available in Canada and abroad. For Ontario (Copestake, 2003) and the Prairie

² Short-rotation intensive culture of hybrid poplar is mainly being developed in Western Canada and will consequently not be discussed in this report.

provinces (Smith et al., 2005), the authors essentially provide a preliminary overview of incentives. This study strives to correct this shortcoming for Quebec.

2. METHODOLOGY

Initial research examined the greenhouse gas issue, the Kyoto Protocol, and the new technologies developed as part of the present research project. It was conducted using published documents and Web-based information.

Next, a meeting in November 2005 with two professionals from the Canadian Forest Service – Laurentian Forestry Centre, enabled us to identify contacts in federal, provincial, and municipal departments and non-government agencies.

A preliminary working paper enabled us to target information research for each of the four technologies for each of the three levels of government, i.e., federal and Quebec departments and municipalities (including regional county municipalities, or MRCs). Information sources were also obtained from farmers' associations and regional organizations.

Working meetings with key information sources were held in December 2005 to satisfy the need for information and validate certain information that was already available. The gathering of information ended in June 2006. Lastly, specialists from various organizations reviewed the draft versions of the report for accuracy.

3. FINDINGS

The findings are presented separately for each level of government. For each, we discuss current laws, regulations, and policies as well as programs and incentives that apply. The information is sorted for each of the four technologies under review, i.e. 1) block plantation of hybrid poplar; 2) short-rotation intensive culture of willow; 3) windbreak hedges; and 4) riparian buffer strips.

3.1 Government of Canada

3.1.1 Laws, regulations, and policies

There is no federal law or regulation dealing specifically with the technologies developed in the T&I project, since forestry and agriculture are both under provincial jurisdiction. However, other aspects of the federal regulatory framework have an impact on adoption of these technologies.

A. Measures affecting the four technologies under review

A.1 Canada's Action Plan on Climate Change

In April 2005, the Government of Canada published a document entitled *Moving Forward on Climate Change: A Plan for Honouring Kyoto*. This document replaced Canada's *2002 Action Plan on Climate Change*, which identified carbon sequestration as a means to achieve Canada's reduction target under the Kyoto Protocol. The 2002 Plan made it possible to

implement the Forest 2020 Plantation Demonstration Assessment Program described in Section 3.1.2.

The 2005 Plan does not announce any additional measures. It recalls that the 2002 Plan projected potential carbon sequestration through forest practices at 20 megatonnes. However, the net figure could fall to zero as a result of the Mountain Pine Beetle (*Dendroctonus ponderosae*) infestation in Western Canada and significant forest fires in British Columbia (see Plan, p. 36).

The Plan also notes that “an incremental sink of 4 Mt beyond BAU (business as usual) levels may be possible through practices such as afforestation, reforestation, and avoided deforestation which could be incented through the Climate Fund.” (p. 36) The purpose of the Climate Fund is to create “a permanent institution for the purchase of emissions reduction and removal credits on behalf of the Government of Canada.” (p. 25)

The Conservative government elected in 2006 expects to modify Canada’s direction on climate change. It plans to announce its plan of action on climate change in the fall of 2006. With this in mind, on May 11, 2006, the Minister of the Environment announced his intention to set average biofuel content of gas at 5% (Environment Canada, 2006) without specifying a deadline³.

A.2 Canadian Environmental Assessment Act

When a project is funded in whole or in part by the federal government (e.g., Agriculture and Agri-Food Canada, Natural Resources Canada), the department in question must verify whether the project is subject to an environmental assessment under the Canadian Environmental Assessment Act (CEAA). A regulation of the Act lists activities (inclusion list) required by law to conduct an environmental assessment. In this respect, the department in question must determine if the project is subject to the CEAA. A project may be physical work or a tangible activity unrelated to physical work. Other departmental powers may also initiate application of the CEAA, for example, being a project proponent, yielding land rights, or issuing a permit or licence.

Note that the four technologies constitute physical activities, generally unrelated to physical work, which are not found on the inclusion list. Consequently, they are not subject to environmental assessment in terms of this Act. However, the Quebec Department of Agriculture, Fisheries, and Food (MAPAC⁴) as program administrator, must apply a process equivalent to the CEAA process when a buffer strip is to be created as a complement to work to stabilize eroded sites in agricultural zones. The process involves:

- compliance with all provincial and federal legislation and regulations;
- use of the operational methods detailed in technical specifications;
- implementation of environmental impact mitigation measures.

From this standpoint, MAPAQ advisors (or private sector consultants under MAPAQ supervision) must produce an equivalent environmental assessment report based on legally established criteria. This report, prepared in concert with the agricultural producer, specifies the

³ The 2010 deadline was specified by the Minister on December 20, 2006.

⁴ Section 6 presents the English translation and the French version of terms specific for the Quebec context.

nature of the work to be done, mitigation measures to be applied, and permits to be obtained prior to start-up. Projects likely to cause deterioration, destruction, or disturbance of a habitat may require a permit from the Quebec Department of Natural Resources and Wildlife (MRNF), Wildlife Sector or from Fisheries and Oceans Canada. These projects usually consist of landscaping or the installation of stones, bridges, or culverts. Windbreak hedge projects are not subject to environmental assessment, though projects to create buffer strips along watercourses may be.

B. Measures affecting specific technologies

B.1 Agricultural Policy Framework

The Agricultural Policy Framework (APF) establishes the federal agricultural policy, which contains five elements:

1. Business risk management
2. Food safety and quality
3. Science and innovation
4. Environment
5. Renewal

The environment element deals specifically with nonpoint source pollution in agricultural zones. It provides for funding for beneficial management measures, such as the development of windbreak hedges and riparian buffer strips, two technologies under review in the Technology and Innovation project.

In this framework, the federal government, represented by Agriculture and Agri-Food Canada, signed on July 7, 2003 an agreement with Quebec on an Agricultural Policy for the 21st Century. The accord is in effect from 2004 to 2008.

With this, MAPAQ agrees to provide the National Farm Stewardship Program in Quebec. This is part of the provincial Prime-Vert Program and supports, among other things, establishment of windbreak hedges and riparian buffer strips, as you will see further on. The 2004-2008 accord also encompasses Agriculture and Agri-Food Canada's Greencover Canada Program, an initiative that has numerous similar elements and will also be discussed later on.

B.2 Fisheries Act

Section 35 of the Fisheries Act applies across Canada and prohibits the deterioration, destruction, or disturbance of fish habitat without prior authorization from the Minister of Fisheries and Oceans or a ruling pursuant to the Fisheries Act. Thus, the Fisheries and Oceans Canada Fish Habitat Management Policy is designed to avoid a net loss of habitat where projects or activities affect fish habitat.

The development of riparian buffer strips could in theory result in the deterioration, destruction, or disturbance of fish habitat. However, the nature of this work, particularly the use of environmentally benign technology (as opposed to waterfront riprap), and the implementation of best practices during construction, minimize or eliminate the risks of disturbing the fish habitat. Further, the strips are generally beneficial to habitat (e.g. plant covering reduces leaching of fertilizers into waterways).

C. Summary of laws, regulations and policies of the Canadian government

Table 1 presents a summary of the impact of the foregoing laws, regulations, and policies on the technologies under review.

Table 1. Government of Canada laws, regulations, and policies: impact on implementation of technologies

Technologies	Legislation, regulations, and policies	Impact
Block plantation of hybrid poplar; short-rotation intensive culture of willow	Canadian Environmental Assessment Act (CEAA)	Little or no impact (=)
	Agricultural Policy Framework (APF)	No direct impact (=)
	Canada's Action Plans on Climate Change	Beneficial impact of 2002 Plan through the Forest 2020 Program (+) Objective of average biofuel content of gas at 5% (+) New plan to come; impact to be determined (?)
Windbreak hedges	CEAA	No impact (=)
	APF	Impact via Prime-Vert and Greencover Canada programs (+)
	Canada's Action Plans on Climate Change	New plan to come; impact to be determined (?)
Riparian buffer strips	Fisheries Act	Protection of fish habitat through mitigation measures. Little or no impact (=)
	CEAA	No impact (=)
	APF	Impact via Prime-Vert and Greencover Canada programs (+)
	Canada's Action Plans on Climate Change	New plan to come; impact to be determined (?)

Note: Characterization of impact

+: positive impact

=: neutral

-: negative impact

?: impact to be determined

3.1.2 Programs and incentives

A. *Block plantation of hybrid poplar*

A.1 *Forest 2020 Plantation Demonstration Assessment Program*

Established pursuant to Canada's Action Plan on Climate Change 2002, the Forest 2020 program was administered from 2003 to 2006 by the Canadian Forest Service of Natural Resources Canada. The program was the result of a vision, also known as Forest 2020, approved by the Canadian Council of Forest Ministers (CCFM).

The main goal of the program was to explore the potential for plantations of fast-growing species to meet the objectives of combating climate change (carbon sequestration associated with a reduction in greenhouse gases), and other economic objectives. It was a program to assess and demonstrate lumber producing plantations and explore the potential to sequester atmospheric carbon through the afforestation of non-forested land.

In Quebec, a federal-provincial agreement between Natural Resources Canada and MRNF to implement this program was signed for the 2004-2005 and 2005-2006 periods. Pursuant to this agreement, the criteria for a station's eligibility for the Forest 2020 Program (Ménétrier et al., 2005) were the following:

- unregenerated site in terms of the Kyoto Protocol;⁵
- minimum width of units: 30 metres;
- accessible site, topography allows use of machinery;
- drainage varies from rapid to sub-standard;
- fine to coarse soil texture;
- minimum soil depth: 30 centimetres.

During the 2004-2006 period, the federal government contributed some \$412,000, of which approximately \$269,000 allowed the planting of 98 hectares of hybrid poplar blocks on land administered by seven Quebec regional private forest development agencies.

The key activities funded by the federal contribution include:

- plant production;
- site preparation;
- planting;
- plantation maintenance during the term of the agreement, including one pruning.

Since 2006, the regional private forest development agencies have been responsible for funding the maintenance of these plantations.

⁵ A site is considered to be regenerated in terms of the Kyoto Protocol if the trees that have grown through natural regeneration, reforestation, or seeding are likely to reach at least 5 metres in height at maturity, with surface coverage of 30% or more.

B. Agroforestry systems

B.1 Greencover Canada Program

The Greencover Canada program is a relatively recent federal initiative designed mainly to support water quality protection in agricultural zones. It is a program under the Agricultural Policy Framework (APF). Greencover Canada has four objectives:

1. protecting land against wind and water erosion;
2. protecting water quality;
3. enhancing biodiversity;
4. increased sequestration of carbon in the soil.

Greencover Canada supports the planting of trees and shrubs used in windbreak hedges and riparian buffer strips.

The program was launched in Quebec in July 2005 and is managed by the Council for the Development of Agriculture in Quebec (CDAQ). CDAQ was created in 1996 as a result of an agreement between the Farm Producers Union (UPA) and Agriculture and Agri-Food Canada (AAC). CDAQ's mission is to promote the adaptation and development of sustainable agriculture throughout Quebec by encouraging the community to take charge of its own future.

The CDAQ General Meeting consists of 41 UPA members, including the 16 regional federations and 24 specialized syndicates and federations. The Board of Directors consists of seven directors, including one AAC representative from Quebec and one MAPAQ representative. The latter two are non-voting directors.

Pursuant to an agreement signed with Agriculture and Agri-Food Canada, CDAQ provides technical support and is responsible for implementing Greencover Canada in Quebec from 2005-2008.

The program funds collective initiatives (two or more farmers) to establish the following beneficial management practices (BMP):

1. riparian area management;
2. erosion control measures (riparian buffer strips);
3. planting of windbreak hedges;
4. consultation services to evaluate watercourse protection needs.

Two of these practices impact directly on the agroforestry systems in the T&I project, i.e., riparian buffer strips and alley cropping (a specific instance of a windbreak hedge).

A CDAQ program committee reviews and evaluates the projects, which are submitted on relatively detailed forms. The committee includes representatives of MAPAQ, AAC, Quebec Department of Sustainable Development, Environment, and Parks (MDDEP), Environment Canada, UPA, and CDAQ.

The program committee meets four times a year to evaluate the submissions.

Eligibility criteria stipulate that:

1. the project must involve two or more agricultural producers. In the case of windbreak hedges and wooded corridors, the properties of the agricultural producers must be contiguous. On the other hand, for riparian buffer strips, the properties of the producers need not be contiguous, but they must be located in the same watershed area;
2. the project must not be complete or underway; and
3. each of the producers must hold an agro-environmental plan (PAA).

Note that the assistance application form must contain all of the data required to complete an environmental assessment equivalent to the process established by the Canadian Environmental Assessment Act.

The evaluation criteria total a maximum of 100 points, allocated as follows:

1. consistency with program objectives (30 points);
2. environmental impact (20 points);
3. quality of the proposal (30 points);
4. support from the sector (20 points).

Eligible funds are allocated, until they run out, to the projects that have achieved the best cumulative score (at least 60% of the points allowed for each of the four criteria described above).

Eligible expenses related directly to completing beneficial management practices (BMP) cover:

1. mechanized work for laying out and setting up the targeted BMP;
2. purchase of various materials such as stones, plants, and seeds;
3. professional fees and labour costs directly related to completion of the work;
4. work that the applicants choose to carry out themselves with their own equipment and using family labour.

In Quebec, for the period from July 2005 to March 2008, the Greencover Canada budget envelope available for implementation of beneficial management practices, including riparian buffer strips and windbreak hedges, is approximately \$3,069,700.

Windbreak hedges

The maximum available amount is 70% of eligible expenses to a maximum of \$10,000 per farm for the duration of the program.⁶

According to information from CDAQ, a project involving alley cropping would be eligible, at first glance, since it contributes not only to protecting soil against wind and water erosion, but also helps to sequester carbon in the soil and enhance biodiversity. Thus, an alley cropping project could be submitted and considered by the evaluation committee according to the general objectives of Greencover Canada. However, the notion of contiguity between the properties must be respected to ensure project eligibility.

⁶ Since April 1, 2006, as a result of a CDAQ-MAPAQ agreement, up to 20% of these eligible expenses come from the Prime-Vert Program – Component 12.

The future harvesting of the trees does not pose any constraint, since Greencover Canada does not place any express limitations on this practice. However, pruning costs are not eligible for funding.

Riparian buffer strips

The maximum amount available for riparian area management is 70% of eligible expenses to a maximum of \$20,000 per farm for the duration of the program.⁷

Eligible work involves the establishment of buffer strips (via the planting of fodder, trees, and shrubs) and erosion control measures in riparian areas.

The objective regarding partial cutting of buffer strips, designed, among other things, to harvest quality lumber, remove diseased trees, prepare to replace felled trees and avoid tree fall that could cause erosion, is compatible with Greencover Canada objectives. The Program considers that trees have an expected lifespan at the end of which they must be harvested. Thus, the project evaluation committee had to consider a lumber production project within a riparian buffer zone and showed some openness to this idea.

Restrictions

The maximum cumulative amount of the assistance for windbreak hedges and riparian buffer strips is limited to \$50,000 per agricultural producer to defray the costs of the overall beneficial management practices (BMP) for the duration of the program, including assistance granted since 2003 or received under Component 10 (reducing nonpoint source pollution) of MAPAQ's Prime-Vert Program. Assistance from other sources (federal, provincial, municipal, or private) may be used to defray expenses not covered by the program.

C. Summary of programs and incentives of the Canadian government

Table 2 summarizes the impact of Government of Canada incentive programs associated with the technologies under review.

⁷ Since April 1, 2006, as a result of a CDAQ-MAPAQ agreement, up to 20% of eligible expenses come from the Prime-Vert Program – Component 12.

Table 2. Government of Canada programs: impact on implementation of technologies

Technologies	Programs	Impact
Block plantation of hybrid poplar	Forest 2020 Plantation Demonstration Assessment Program (concluded)	Demonstration and assessment of establishment of plantations on a semi-operational scale (+)
Short-rotation intensive culture of willow	No program	
Agroforestry systems	Greencover Canada program	Assistance for 70% of eligible expenses (+) ⁸

Note: Characterization of impact

+ : positive impact

= : neutral

- : negative impact

3.2 Government of Quebec

3.2.1 Laws, regulations, and policies

A. *Forest Act*

In Quebec, forest management is governed by the Forest Act, approved in 1986, later amended, particularly in 1996, following the 1995 Sommet sur la forêt privée. This summit brought together representatives of the major private forest sector partners, i.e., private woodlot owners, the municipal sector, the forest industry, and the MRNF.

The preface to the Act underscores the principle of sustainable forest management. In 1996, the Government of Quebec incorporated into the Act the six sustainable forest development criteria approved by the Canadian Council of Forest Ministers (CCFM).

The Act identifies five global objectives for the Quebec forest system:

1. protect the forest environment;
2. respect the forest allowable cut;
3. increase industry accountability for forest development;
4. develop the forestry sector; and,
5. protect public interests.

⁸ Since April 1, 2006, as a result of a CDAQ-MAPAQ agreement, up to 20% of eligible expenses come from the Prime-Vert Program – Component 12.

Developing Private Forests

While Title I of the Act deals with public forests, Title II is devoted specifically to the development of private forests.

Chapter 1, Title II deals with plans and programs. It allows the Department to develop programs based on increased yield and to grant financial assistance to any person or organization, including regional private forest development agencies.

Definition of Forest Producer

Chapter 2, Title II of the Act deals with the forest producer. Section 120 stipulates that a certified forest producer is a person or an organization that satisfies the following requirements:

- Owns a unit of forest designated land of not less than four hectares, for which a forest management plan has been certified by a forest engineer and consistent with the bylaws of the competent regional agency for private forest development;
- Registers with the Minister, or any person or organization designated for such purpose, all the forest designated land of the assessment unit within the meaning of Section 34 of the Act respecting municipal taxation (Chapter F-2.1);
- Moreover, pursuant to the Regulation respecting the fees payable by certified forest producers, pay registration fees of \$20 at a location designated by the MRNF. In return, the producer receives a forest producer's certificate that is valid for a period of 10 years.

By this definition, besides rural owners, several municipalities and at least one MRC presently hold the status of certified forest producer.

As for the notion of *forest designated land*, it is important to note that, in the application of this Act, this vocation is not restricted to current use. Consequently, current, potential, envisioned, or future vocations of a minimum 4-hectare surface area are considered.

However, two or three producers with contiguous lots totalling a minimum of 4 hectares cannot qualify as a certified forest producer. Each producer must have a separate, single-unit 4-hectare section. For example, this could consist of 2 hectares that are already forested to which is added 2 hectares of unused farmland.

Certified forest producer status has a number of benefits. Indeed, it provides access to real estate tax refunds and financial and technical support from private forest development agencies. These benefits are associated with programs that will be discussed later in Section 3.2.3.

Finally, the Government of Quebec's 2006 budget announced income averaging measures for private forest owners. The producers may distribute up to 80% of annual revenue from wood cut in their private forest over 4 years.

Regional private forest development agencies and their partners

Definition and Objectives

Following the Private Forest Summit of 1995, the Forest Act was amended, in particular to institute 17 private forest development agencies. According to the Act, the purpose of the agencies, from a sustainable development perspective, is to guide and enhance the development of private forests in their region, especially through:

1. preparation and implementation of a private forest protection and development plan (PPMV);
2. financial and technical support for the protection and development of private forests.

The 17 regional private forest development agencies are therefore responsible for administering the assistance programs to certified forest producers in each of Quebec's administrative regions. Some of these regions have more than one agency.

A regional private forest development agency is a not-for-profit corporation consisting of a board of directors made up of representatives of four groups of partners:

1. forest owners' associations;
2. regional permit holders for wood processing plant operations that purchase wood from private producers within the agency's region;
3. regional county municipalities (MRCs); and
4. MRNF.

Within these agencies are two types of forest owners' organizations. First, there are wood producer syndicates and marketing boards. These are not-for-profit organizations that are made up and managed by wood producers, with the goal to protect the interests of all woodlot owners. As managers of joint marketing plans, the syndicates and marketing boards negotiate fair wood prices, optimize wood transportation, and ensure an orderly market for harvested wood.

Secondly, there are joint management groups (OGC) that are companies and cooperatives belonging to shareholders and co-operators and that are eligible to all forest owners in the area covered by their OGC. These organizations provide expertise, particularly from forestry advisors certified by the agencies, and labour required to conduct forestry activities.

An agency's board of directors plays a key role in setting annual priorities and orientations based largely on the PPMV for the private forests in their region.

The PPMV as well as the orientations and priorities selected each year are the elements considered by the forestry advisors assisting the forest producers in their dealings with the agency, to ensure access to financial and technical assistance for various forestry activities recommended in the owners' forest development plans. The forestry advisors accredited by the agency are forest engineers or firms that employ one or more forest engineers.

The regional private forest development agencies must be authorized by MAPAQ and local UPA syndicates before financing afforestation projects on land within an agricultural zone, especially on unused farmland.

Private forest protection and development plan (PPMV)

Prepared by the agencies (or delegated to a third party under their supervision), the PPMVs, within any MRC, must satisfy the objectives of the MRC master plan pursuant to the Land Use Planning and Development Act. Note here that the major cities (Laval, Longueuil, Lévis, Gatineau, Québec, Montréal) are considered MRCs. The agency must submit a copy of its PPMV to any MRC within its jurisdiction for review and approval. The plan is updated every 5 years. As part of PPMV preparation, the agency submits orientations that favour sustainable development of private forests, its intended actions, and the criteria to be used to measure the achievement of the various objectives selected.

The PPMV for private forests has three major components:

1. context and description of the environment;
2. problems with orientations and issues;
3. strategies and an action plan.

The private forest development agency is responsible for preparing, implementing, and using performance indicators to monitor the plan.

Funding for the Agencies

Most of the funding for the agencies comes from the Government of Quebec (60%). Roughly 20% of the budget comes from forest industries purchasing lumber in the particular agency's area of jurisdiction. In the latter instance, anyone holding a wood processing plant operator's licence (sawmill, pulp and paper mill) must use the agency's prescribed formula and satisfy its conditions to declare the quantity of wood it has purchased from private forests (within the agency's jurisdiction) during the previous reporting period. The agency sets the fee based on a per-cubic-metre-of-wood rate, which is regulated by the government. In 2005, the rate was \$1.20 per cubic metre. On May 18, 2006, the Quebec Forest Industry Council (CIFQ) announced an increase in its contribution to the agencies of 25% over 2 years in exchange for increased access to lumber from private forests (media release: <http://www.cifq.qc.ca>).

Private woodlot owners, without contributing directly to funding of their particular agency, cover a portion of the expenses for forest projects conducted on their lands. Their share is an estimated 20% of the project costs, with the remainder coming from the private forest development agency in question.

Since 1996, the amount of MRNF funding for an agency has been based on allocation criteria that take into account such items as surface area of the managed territory, number of certified forest producers, and the value of the forest projects in question.

In 2004-2005, MRNF decreased its contribution to the agencies by 13%. This affected the number of forest projects receiving funding from the Assistance Program for the Development of Private Woodlots. Such a decrease in funding could force an agency to review its priorities, most of which are identified in its private forest protection and development plan (PPMV).

A new forest development intensification policy could have an impact on the legislative framework and its associated policies. With this in mind, Minister Corbeil announced on March 7, 2006 that, during 2006, a forest investment strategy should be discussed among the regional players and partners affected. The terms and conditions of such a strategy would be identified

later on, making it possible to assess the financial impact on the private forest development agencies and the programs they administer.

Further, the Government of Quebec 2006-2007 budget speech announced an envelope totalling \$75 million over 4 years for the future forest investment strategy. The strategy must be approved by government authorities and will contain actions, to be announced later, for public and private forests.

The Quebec Minister of Natural Resources and Wildlife, Pierre Corbeil, invited private forest partners (municipalities, private forest producers, forest industry representatives), in May 2006, to a meeting to update the terms and conditions of private forest protection and development, including municipal bylaws, regional agency operations, development funding, and taxation as it affects woodlot owners. Following this meeting, Minister Corbeil confirmed, for the next 5 years, an annual \$30 million envelope for the Assistance Program for the Development of Private Woodlots. To this is added a budget of \$5 million for commercial work in private forests in 2006 and 2007 (for media release, see <http://www.mrnfp.gouv.qc.ca>).

B. Forest Protection Strategy

The Forest Protection Strategy was adopted in 1994 as a result of an extensive consultation conducted in 1991 by the Environmental Public Hearings Office (BAPE). The strategy contains 20 technical commitments associated with the implementation of preventive forestry practices and the use of chemical-free pest control methods (insecticides and phytocides). As a consequence of this strategy, the government no longer subsidizes the use of chemical pesticides (via the private forest development agencies). Forest owners may continue to use these products, but at their own expense.

The effect of this strategy is to increase the cost of establishing, and, perhaps, maintaining hybrid poplar plantations. However, we have no economic studies assessing the impact of application of this strategy on the private forest producers. We estimate that abandoning the use of chemical pesticides would result in general in a 100% increase in the establishment cost of plantations; this is not necessarily the case for hybrid poplar plantations.

C. Act Respecting the Preservation of Agricultural Land and Agricultural Activities

The agricultural protection system instituted by the Act Respecting the Preservation of Agricultural Land and Agricultural Activities is designed to “secure a lasting territorial basis for the practice of agriculture, and to promote, in keeping with the concept of sustainable development, the preservation and development of agricultural activities and enterprises in the agricultural zones established by the regime.” (Section 1.1). The Commission for the Protection of Agricultural Land in Quebec oversees application of the Act, particularly by reviewing requests for authorization for the inclusion or exclusion of a lot within an agricultural zone. It may also issue opinions regarding any other matter referred to the Commission for comment.

The Act refers to the notions of designated agricultural area (list of municipalities listed in the Appendix to the Act) and of an agricultural area included within a local municipality.

The MAPAQ and local UPA syndicates must give their approval before a program finances an afforestation project in agricultural zones.

In practice, pursuant to a MAPAQ-MRNF interdepartmental agreement, the owner, through his forestry advisor, must apply to MAPAQ for authority to afforest land within an agricultural zone (this is generally unused farmland). More specifically, the forestry plan prepared for the forest producer must note afforestation as one of the objectives.

However, the issues of agricultural zoning and the vocation of unused farmland vary from one region to another. For example, in the region administered by the Lower St. Lawrence Private Forest Development Agency, the 2001 Plan for protection and development of commercial forests included inventories of unused farmland showing forestry potential. With this in mind, a mechanism was established to authorize afforestation on unused farmland.

Thus, the owner and his forest advisor complete a relatively simple afforestation request form and have the package signed by a forest engineer. The form specifies the surface area to be afforested, former type of agricultural use or crop, the number of years idle once cultivation was abandoned, interest of farmers in the area in question, and the reasons for the request to plant. It also shows the condition of the land (relief, drainage, etc.) and species targeted for afforestation.

Once it has reviewed the application, the local syndicate indicates its acceptance or rejection and specifies the reason for its decision. It forwards copies of the decision to the owner's forest advisor, to the regional private forest development agency and to MAPAQ. In the event of rejection, the owner may file an appeal with MAPAQ. Moreover, pursuant to the agreement, an owner cannot, within 5 years of the initial application, submit a new application for one that has been refused previously.

It is also interesting to note that the definition of agriculture specified in the Act includes, among other items, "the cultivation of the soil and plants, leaving land uncropped or using it for forestry purposes..." We can see here that, according to the Act itself, agriculture does not automatically exclude use for forestry purposes.

Given this loophole in the Act, we contacted a regional office of MAPAQ to check whether the intensive culture of willow could be considered a form of agriculture, since it is related, with regular harvesting every 3 to 4 years. Our verification revealed the complexity of the process of having this type of woody crop certified as an agricultural practice.

The Farm Producers Act defines an agricultural product as "any agricultural, horticultural, avicultural, livestock or forest product in its raw state or partly or wholly processed by or for the producer, and any beverage or food product derived thereof; aquaculture products are considered to be agricultural products."

In fact, this definition has been extended to products such as Christmas trees and small shrubs. Corn is certified as an agricultural product used *a priori* to feed animals and/or humans, even though it may be destined for a processing plant for the production of biofuels such as ethanol. Furthermore, for a farmer to be certified as such, he must maintain annual production of a certified product yielding a minimum annual gross revenue of \$5,000.

Short-rotation intensive culture of willow produces willow stems. To determine whether these are considered an agricultural product, a farmer would have to submit a request for approval to the MAPAQ regional office. Once it is obtained from head office, a reply would be sent to the producer. This decision would serve as a sort of jurisprudence for other MAPAQ regions.

If willow stems were to be certified as an agricultural product, this crop could be the focus of a future demonstration project with financial support from a MAPAQ regional office.

D. Act Respecting the Marketing of Agricultural, Food and Fish Products and the Farm Producers Act

Two acts may influence the marketing of woody products with respect to the application of the technologies under review. These are the Act Respecting the Marketing of Agricultural, Food and Fish Products and the Farm Producers Act.

According to these acts, and under certain conditions, the marketing of certain agricultural and wood products may be handled under a joint plan. Under these conditions, a wood producers' syndicate or marketing board, by decision of the producers covered by the plan, could be granted a monopoly for the marketing of wood products, for example, softwood pulpwood from private forests within its region.

To do so, a group of producers (i.e. association, cooperative, group of at least 10 agricultural producers) must submit to the Quebec Agriculture and Agri-food Market Board an application and project for a joint plan identifying, among other items, the category of producer, the target product, the product's place of origin, and the buyer or purpose for which the product is destined.

The project plan submitted to the Board must be approved by a resolution of the group's board of directors approving the plan and authorizing presentation thereof. The group must indicate in its application the reasons, if any, for which the proposed plan was not submitted to a referendum, pursuant to the Act respecting the marketing of agricultural, food and fish products. In the event that the Board opts to hold a referendum among interested producers, the project plan must be approved by at least two thirds of voting producers, with minimum participation of 50%.

A joint plan is administered (applicant's choice) by a farmers' marketing board, or by a syndicate or federation of specialized syndicates. The plan applies to all of the individuals and/or firms that produce the product covered by the plan, whether or not they voted in the Board's referendum.

E. Land Use Planning and Development Act

Quebec's Land Use Planning and Development Act governs land development in urban settings as well as in peri-urban and agricultural sectors. It defines the responsibility of the MRCs for preparing their land development plans (master plans). A land development plan must determine, for example, the major planning guidelines and land use designations for the various parts of its territory. In an agricultural zone within its territory, a land use plan must also ensure that land use planning and development standards are compatible with the objective of ensuring priority land use for agricultural activities and, within that framework, the harmonious coexistence of agricultural and nonagricultural uses (Section 5).

Moreover, an MRC development plan can also determine guidelines designed to promote sustainable development of private forests within the meaning of the preliminary provision of the Forest Act, pursuant to Section 6 of the Land Use Planning and Development Act.

A private forest protection and development plan (PPMV) may apply within an MRC if it meets the objectives of the MRC master plan.

F. Municipal Powers Act

Since January 2006, the new Municipal Powers Act has given regional county municipalities (MRCs) "jurisdiction over continuously or intermittently flowing watercourses, including those artificially created or modified." The said jurisdiction also extends to lakes. Pursuant to this Act, an MRC may carry out work to "create, improve, or maintain a watercourse." This work may be carried out in the bed, on the banks, or on the land bordering the watercourse. This responsibility regarding the work is exclusive to an MRC and thus a local municipality cannot undertake such work.

G. Environment Quality Act

Administered by the MDDEP, the Environment Quality Act (EQA) applies mainly to the development of riparian buffer strips.

Section 4 of the Agricultural Operations Regulation stipulates that "except for fording across watercourses, it is prohibited to allow livestock to access watercourses and bodies of water and their shoreline." The same regulation limits the quantity of hog manure that can be spread on agricultural land.

H. Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains

In Quebec, the minimum standards for the protection of shorelines and floodplains are identified, through the notion of shoreline, by the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains, adopted by the government in 1987 and later amended in 1991, 1996, and 2005.

The Policy establishes that the width of the zone to be protected (extending inland from the high water mark of the waterway) is measured horizontally and is at least 10 metres wide where the slope is less than 30% or where the slope is greater than 30% with a bank less than 5 metres high. The minimum width of the lakeshore or river bank is at least 15 metres wide where the slope is greater than 30% with a bank over 5 metres high.

However, cultivation of soil in an agricultural zone is permitted provided that a strip of vegetation at least 3 metres wide is preserved between the crop and the watercourse. Further, where there is a bank and the top of this bank is less than 3 metres from the high water mark, the width of the strip to be protected must include at least 1 metre at the top of the bank. This means that, for cultivation of the soil in an agricultural zone, the residual buffer strip is at least 3 metres wide.

Pursuant to Section 3.1 of the Policy, any changes to the vegetation cover of a lakeshore or riverbank, including afforestation or the creation of buffer strips, require prior authorization.

Moreover, Section 3.2 e) indicates the following vegetation-related undertakings and work among the types permitted on lakeshores and riverbanks:

- forest management activities subject to the Forest Act and its regulations;

- sanitation cutting;
- harvesting of 50% of stems 10 centimetres or more in diameter, provided that at least 50% of the forest cover is maintained in private woodlots used for forestry or agricultural purposes;
- in order to reestablish a permanent and long-lasting vegetation cover, seedlings and the plantation of herbaceous species, trees and shrubs and the work required to carry this out.

The width of the buffer strip to be protected in agricultural zones, especially with respect to swine production was subjected to BAPE consultations. In the end, the positions of the various groups consulted varied considerably; however, there was consensus on the need for a buffer strip of 5 metres or more in width (Nolet, 2004, pp. 11-12).

I. Civil Code of Quebec

The Civil Code of Quebec can have an impact on the establishment of windbreak hedges in rural areas or within municipal boundaries.

Section 986 of the Civil Code is often cited to confirm the 5-metre (15 feet) standard. According to this section, an owner may compel his neighbour to fell all of the trees along and not more than 5 metres from the dividing line if they are causing problems concerning his property.

This article emphasizes the notion that the owner must prove that the trees or hedge are damaging his property. Article 1457 of the Civil Code specifies that the plaintiff is free to demand reparation if actual damage has been caused.

In practice, a farmer wishing to plant a windbreak hedge near the lot line with his neighbour is encouraged to reach an agreement with his neighbour. A notarial act showing the agreement between the two parties is usually enough to provide certainty for the party planting the hedge. This agreement is only valid between current owners.

Lastly, it should be recalled that the planting of windbreak hedges may be regulated by some municipalities.

J. Act Respecting the Conservation and Development of Wildlife

The MRNF, wildlife sector, administers this Act, which dates back to the existence of the former Quebec Department of Recreation, Hunting and Fishing (MLCP). With the Act Respecting the Conservation and Development of Wildlife, the Department strives to ensure the protection of wildlife habitats and species. This Act stipulates that “no person may, in a wildlife habitat, carry on an activity that may alter any biological, physical or chemical component peculiar to the habitat of the animal or fish concerned.”

A project may therefore require authorization or notice of certification from MRNF prior to start-up and call for the implementation of impact mitigation measures.

K. *Act Respecting Farm-Loan Insurance and Forestry-Loan Insurance*

The Act Respecting Farm-Loan Insurance and Forestry-Loan Insurance is the legal authority that allows the Agency for Agricultural Funding in Quebec to provide loan guarantees to certified forest and agricultural producers, for example, under the Forest Management Funding Program detailed in Section 3.2.3. The loans for forest producers are granted for the purpose of acquiring areas of more than 60 hectares.

L. *Commission on the Future of Agriculture and Agri-food in Quebec*

On 28 June 2006, the Government of Quebec announced the creation of the Commission on the Future of Agriculture and Agri-food in Quebec. The purpose of the Commission is to assess current issues and challenges in the sector, examine the effectiveness of current public intervention processes, establish a clear diagnosis and formulate a set of recommendations. These will consider the challenges of agricultural revenue and competitiveness, societal expectations, and development of regional potential. With a working document as a base, public hearings will enable the three commissioners to table their report no later than January 2008.

M. *Quebec Energy Strategy*

In May 2006, the Government of Quebec published the document, *Using Energy to Build the Quebec of Tomorrow*, which sets out the Quebec energy strategy for 2006-2015. The following section describes the document, which outlines a more comprehensive strategy for dealing with climate change.

Although Quebec is staying the course on the use of hydroelectricity as its main source of “clean” energy, without abandoning the potential for hydrocarbon deposits in the St. Lawrence Estuary, one strategy objective aims to use energy more efficiently. To do so, the strategy specifies that the various proposed actions will contribute to the fight against climate change by eventually preventing 9.4 million tonnes of greenhouse gas emissions from being released each year by 2015.

The Strategy declares the government’s intent to promote renewable fuels (biofuels) such as fuel ethanol. Its goal is to achieve an average of 5% ethanol in all gasoline sold by 2012. However, rather than focussing solely on ethanol produced from grain corn, the Strategy proposes the development of biomass from forestry and agricultural operations as well as from urban waste. The document details the government’s wish to establish a pilot cellulosic ethanol plant in 2007 to begin operation by 2008, so that the technology can be developed by 2010 and production facilities opened by 2012.

The document also mentions the establishment of a university research chair to stimulate research in this area and the creation of a task force to look into the question of raw material supplies. The Strategy also notes that the government is aware of and interested in the work being done on short-rotation silviculture, particularly by the Université de Montréal, Institut de recherche en biologie végétale (IRBV), for the production of pulp and biomass for energy production, using hybrid poplar and willow to replace cereals and grains.

N. *2006-2012 Quebec Action Plan on Climate Change*

On June 15, 2006, the Government of Quebec published its 2006-2012 Action Plan on Climate Change, *Quebec and Climate Change, A Challenge for the Future*. This document involves expenses of \$1.2 billion over 6 years.

The Plan calls for a reduction in greenhouse gas emissions by 10 Mt of CO₂ equivalent by 2012, which will enable Quebec to meet its obligations under the Kyoto Protocol by an emission level of 1.5% under the 1990 reference mark (i.e. 85.3 Mt).

The plan includes 24 actions that are designed to reduce or prevent greenhouse gas emissions in various activity sectors. Among the actions, the following ones are relevant to this project and the technologies under review:

- aim to have gas distributors include 5% ethanol in total fuel sales by 2012;
- raise public awareness of solutions to the issue of climate change;
- train Quebec companies and organizations on the different CO₂ credit systems;
- implement a program to support technological research and innovation for the reduction of greenhouse gas emissions and sequestration of carbon.

The Quebec Plan invites the Government of Canada to contribute approximately \$328 million for an additional 3.8-Mt reduction of greenhouse gas emissions, a reduction of 6% below the 1990 reference mark.

3.2.2 Summary of Government of Quebec laws, regulations, and policies by technology under review

A. *Block plantation of hybrid poplar*

Block plantation of hybrid poplar in 15-to-20-year rotations on private land is governed primarily by the Forest Act when owners receive subsidies from private forest development agencies.

Thus, landowners who hold less than 4 hectares of forest designated land cannot be considered certified forest producers. By the same token, these owners and organizations are not eligible for either the technical and financial support provided by the private forest development agencies, or for real estate tax refunds (see Section 3.2.3). However, a project is currently under review by the Montérégie Private Forest Development Agency to reach owners holding less than 4 hectares of forest land.

However, satisfying the criterion of 4 hectares of forest designated land does not compel a forest producer to plant trees on all of his untreed forest land. In principle, the afforestation objectives should be included in the forest development plan (PAF), which identifies forestry work that may be carried out on part or all of a forest area.

Furthermore, the owner of an agriculturally zoned property who wishes to plant trees must receive prior authorization for afforestation from MAPAQ and the local UPA.

B. Short-rotation intensive culture of willow

The same legislative and regulatory framework that governs block plantation of hybrid poplar applies here.

C. Windbreak hedges and riparian buffer systems

The development of windbreak hedges and riparian buffer systems generally falls under regulatory instruments other than those related to the Forest Act.

Windbreak hedges

The establishment of windbreak hedges is governed by the Civil Code of Quebec. In brief, a farmer who wishes to plant a windbreak hedge should first obtain his neighbour's agreement in a notarized document if the hedge is located less than 5 metres (15 feet) from his neighbour's property. Failing this, he may be subject to legal action if his action causes demonstrable prejudice to his neighbour.

Riparian buffer strips

The regulatory framework governing the establishment of riparian buffer strips is more complex. The Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains, which identifies minimum standards, is the key document for this area.

Moreover, the Agricultural Operations Regulation, pursuant to the Environment Quality Act, prohibits livestock access to waterways and their associated riparian zones. This regulation may promote the management of buffer strips by stopping livestock from grazing and trampling the vegetation therein.

Note that, in discussions among stakeholders in the sector, there may be some confusion regarding the notion of "shoreline." In the terms of the Protection Policy, the term refers to a bank at least 5 metres high measured from the high water mark in an agricultural zone. In the event of the creation of a buffer strip, the shoreline may be confused with the strip itself or be considered a separate entity, depending upon the situation. In fact, part of this is usually covered by herbaceous vegetation.

Tables 3 and 4 show summaries of the impact of the Forest Act and of other Government of Quebec legislation and regulations, respectively, on implementation of the technologies under review:

Table 3. Forest Act: impact on implementation of technologies

Technologies	Impact
Block plantations of hybrid poplar, short-rotation intensive culture of willow, and, to a lesser extent, windbreak hedges and riparian buffer strips	Regional private forest development agencies and partners (+), private forest protection and development plan (PPMV) (+,-, =), development programs (+), annual priorities and guidelines based on budget availability (+, -, =) Certified forest producer status: eligibility for agency funding for silvicultural projects (+), real estate tax refund (+), minimum 4-ha designated forest land (-)

Note: Characterization of impact

+: positive impact

=: neutral

-: negative impact

Table 4. Other Government of Quebec laws, regulations, and policies: impact on implementation of technologies

Technologies	Legislation, regulations, and policies	Impact
All of the technologies under review	Land Use Planning and Development Act Municipal Powers Act Act Respecting the Marketing of Agricultural, Food and Fish Products and Farm Producers Act Commission on the Future of Agriculture and Agri-food Quebec Quebec Energy Strategy Quebec Action Plan on Climate Change	Must comply with land management master plans (-, =, +) Regulation of waterways and lakes and authority to implement projects in these areas delegated to the MRC (+) Depending upon the region, marketing of certain wood products via joint plans (-,=,+) To be determined based on report to be tabled by 2008 Objective to promote biofuels (+); Pilot cellulosic ethanol plant (+); University bioenergy research chair (+); Task force on raw materials supply (+); Cellulose as feedstock for energy production (+) Objective of 5% ethanol content in gasoline by 2012 (+); Announcement of greenhouse gas reduction R&D program (+); Announcement of project to offer training on CO ₂ credits (+)

Technologies	Legislation, regulations, and policies	Impact
Block plantation of hybrid poplar, short-rotation intensive culture of willow	Forest Protection Strategy Act Respecting the Preservation of Agricultural Land and Agricultural Activities Forest investment strategy	No subsidies for chemical pesticides: negative economic impact (-) Authorization required to subsidize afforestation in agricultural zones, with regional variations (-); Definition of agriculture including forestry, but certification process to be assessed (=,+) Investments for private forests. Strategy expected in 2006 (?)
Windbreak hedges	Civil Code of Quebec	5-metre standard for hedges along lot lines (-)
Riparian buffer strips	Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains Environment Quality Act Act Respecting the Conservation and Development of Wildlife	Minimum protection standards for lakeshores, riverbanks, littoral zones and floodplains (+) Livestock access to watercourses and buffer strips prohibited (+) Mitigation measures to protect wildlife species and habitats (+)

Note: Characterization of impact

+: positive impact

=: neutral

-: negative impact

?: impact to be determined

3.2.3 Programs and incentives

A. *Programs for certified forest producers*

A.1 *Assistance Program for the Development of Private Forests*

The Assistance Program for the Development of Private Forests is administered by the 17 regional private forest development agencies. The program provides financial and technical assistance to certified forest producers. It is the best known program and the most accessible for owners interested in the afforestation of unused farmland.

The activities of this program are designed to protect and develop any registered designated forest land. Note here that the term forest land is not restricted to the actual condition of a minimum 4-hectare area, but may also refer to a future or planned vocation for this land surface. Afforestation may involve part or all of a designated forest area.

As mentioned above, unused farmland in an agricultural zone is subject to authorization from MAPAQ and the local UPA syndicate for any proposed afforestation subsidy.

Forestry activities eligible for financial assistance

Activities covered by the private forest development program:

1. preparation of forest development plans;
2. technical assistance;
3. assistance to carry out silvicultural activities; and
4. provision of plants for afforestation.

The activities covered by the program vary somewhat from agency to agency; however, they can be categorized generally under the following headings:

- Site preparation activities (group 05)
- Reforestation (group 06)
- Maintenance of young plantations (group 07)
- Commercial treatments (group 08)
- Non-commercial treatments (group 09)
- Road work and drainage (group 10)
- Forest development plans (group 11)
- Contacts with the owner (group 12)
- Intermediate cutting (group 13)

Rates (per hectare, per plant, per forest development plan, etc.) are set by each private forest development agency. Generally, activities are financed to 80% of actual estimated costs. The remaining 20% is deemed to be the contribution of the certified forest producer. The MRNF provides hardwood and softwood plants free of charge, via the agency. See the example in Appendix 1, which shows the 2006-2007 financial assistance schedule for the Quebec 03 Private Forest Development Agency. The agencies generally grant a yearly maximum of \$20,000 to a certified forest producer for eligible work, whether the producer is an individual or an organization such as a private company or a municipality.

However, amounts vary from one agency to another. Thus, the maximum annual amount per forest producer in 2005 was \$30,000 in the Montérégie and Beauce regions, \$25,000 in Bas-Saint-Laurent, \$20,000 in Estrie (\$40,000 for 2 years) and the Appalaches regions. In the Quebec agency region, the maximum annual amount was \$51,000 per forest producer. However, the forestry advisors had to respect a \$6,000 limit per producer on average (excluding the forest development plans).

Discussions with these six private forest development agencies enabled us to confirm which activities are eligible with respect to short-rotation (15-20-year cycle) of hybrid poplar. The activities are eligible for technical and financial support from four of these agencies. However, the Montérégie Private Forest Development Agency, after having declared a moratorium on hybrid poplar afforestation following negative experiences, again funded this type of plantation in 2006, on an experimental basis, on total surface areas of less than 10 hectares, with each selected owner limited annually to work covering a maximum of 2 hectares. Finally, the Appalaches Private Forest Development Agency plans to provide technical and financial

support in 2006. As for the financed work on hybrid poplar, the consultation highlighted the following points:

- site preparation and planting are funded to 80%;
- weed control is conducted by ploughing and harrowing. The agencies fund 80% of this activity, required during the first 3 or 4 years, for 2 or 3 treatments per year;
- mechanical disease and insect control may be subsidized for 3, 4 or even 5 years, while some agencies provide funding on an as-needed basis. However, the program does not fund the use of insecticides and fungicides. This guideline complies with the Quebec Forest Protection Strategy (cf. Section 3.2.1). Forest producers may use chemical pesticides, but must do so at their own expense;
- pruning is funded by four of the six agencies;
- neither synthetic nor organic fertilization is eligible for financial assistance.

It is important to note that hybrid poplar must be fertilized in some cases to ensure significant yield. When required, this fertilization is the responsibility of the private woodlot owner.

In 2005, the number of afforested hybrid poplar plants varied considerably from one agency to another, from zero for two of the agencies, to 5,000 for two others, and 10,000 and 30,000 respectively for the last two. This variation is due in large part to agency guidelines. Appendix II, which shows the area afforested with hybrid poplar in private woodlots in Quebec for the 1990-2002 period, confirms the wide variation among agencies. Note that hybrid poplar afforestation practices were refined over the same period. For example, the specific methods used in the Forest 2020 Program reflect this change.

The six private forest development agencies also were consulted on the potential for short-rotation intensive culture of willow. Their responses indicate that this type of culture is not among current priorities, since these focus mainly on lumber production. We were told on several occasions that there is some uncertainty regarding short-rotation intensive culture, especially in terms of profitability, demand, and markets. On the other hand, if a requirement for biomass were identified, there would be some interest in pilot projects.

Regarding technical and financial support for the development of windbreak hedges, four of the agencies said that they do not subsidize this type of project. One agency indicated a willingness to fund this type of work, providing that the resulting hedges include more than 500 trees for future harvest. Another agency noted that, before making a decision, it must consider the stated objective and look at the potential use of the wood.

We also consulted the six private forest development agencies regarding opportunities for technical and financial support for the creation of riparian buffer strips. Three of the agencies indicated that this type of work is not eligible. The other three, however, were receptive. One said that it was ready to fund the creation of riparian buffer strips consisting of more than 500 trees. Another agency, without specifying a minimum number of trees, requires the strips to show significant forestry potential. The last agency specified that riparian buffer strips could be created on unused farmland.

A.2. Forest Resources Development Program – Component II

The objectives of the Forest Resources Development Program – Component II are:

1. to contribute to regional social and economic development;
2. to stimulate job creation by promoting activities to maintain or enhance the protection, development, or processing of forest resources.

Component II targets forest sector players, i.e., legally incorporated individuals and organizations interested in forest development. These include, for example:

1. wood producers' syndicates and marketing boards;
2. resort owners associations;
3. joint management organizations (OGCs) and forest cooperatives;
4. municipalities and regional county municipalities (MRCs);
5. controlled wildlife harvesting zones (ZECs) and outfitters.

A project may be carried out on Crown land, intramunicipal lots, forest preserves, or private forests.

Component II promotes the comprehensive development of forest resources and activities of a silvicultural, faunal, recreational, educational, or environmental nature that contribute to sustainable development of the region. However, the proposed activities must satisfy the priorities and guidelines of forest development established by the region, and meet government requirements (compliance with legislation and regulations, permits, authorizations, funding agreements, etc.).

Eligible activities include:

1. silvicultural projects, including tree felling and harvesting, reforestation, stand tending, combating insect infestations, disease, and competing vegetation;
2. development or restoration of wildlife habitat, for example, white-tailed deer habitat;
3. establishment or enhancement of recreational or educational facilities, such as hiking trails;
4. construction or improvement of forest roads into a multi-resource development area;
5. preparation of a multi-resource development plan;
6. completion of exploratory, prefeasibility and/or feasibility studies.

Regional councils of elected officials (CRÉs) or delegates designated by the CRÉs determine project eligibility and the extent to which planned work may be eligible for financial assistance. The CRÉs select the projects that they intend to promote from among eligible projects, with consideration given for available funds, and they establish a project selection process that accurately mirrors regional resource development interests and priorities. Incidentally, the Bas-Saint-Laurent and Montérégie regions have identified afforestation using hybrid poplar as one of their priorities.

The Forest Resources Development Program – Component II contributes up to a maximum of 90% of eligible project expenses. The promoter is responsible for covering at least 10% of eligible estimated project expenses. For a promoter that is a not-for-profit organization, up to 100% of eligible expenses may be covered, providing that the organization provides volunteer support equal to at least 10% of project costs.

A.3 Real Estate Tax Refund Program

The program permits tax credit refunds to certified forest producers to a maximum 85% of real estate taxes (municipal and school taxes). The program is governed by the Regulation respecting the reimbursement of real estate taxes of certified forest producers pursuant to the Forest Act, which is based on Section 200.3 of the Act Respecting Municipal Taxation (Chapter F-2.1) pertaining to registered forest areas within an assessment unit. A forest producer's certificate provides confirmation of whether the forest areas in an assessment unit meet eligibility criteria. The certificate is valid for a period of 5 years.

Section 123 of the Regulation stipulates that the person applying for a tax refund must have a forest engineer's report showing eligible expenses for protection and development equal to an amount at least equal to the amount of real estate taxes that may be claimed in an application for reimbursement.

The appendix to the Regulation lists the amounts that are eligible for each type of work (i.e., site preparation, plantation, fill planting, enrichment planting, maintenance, etc.), depending upon whether they receive funding from the local private forest development agency.

A producer who, during the course of a calendar year or fiscal year, has incurred eligible expenses for an amount less than the real estate taxes may carry the expenses forward to the following two calendar years or fiscal years, as the case may be, for the purposes of requesting a refund.

Where the amount of eligible expenses incurred and declared by the producer in the course of a calendar or fiscal year exceeds real estate taxes paid by the producer, the surplus expenses may be eligible for a real estate tax refund in the following 10 years if the producer continues to satisfy all of the conditions for certification.

A.4 Forest Management Funding Program

The purpose of the Forest Management Funding Program, instituted pursuant to the Act Respecting Farm-Loan Insurance and Forestry-Loan Insurance, is to provide financial assistance for private forest sector firms wishing to develop and consolidate.

The program is designed for woodlot owners wishing to acquire and develop a corporate-sized forest production unit of 60 hectares or more; prior to May 3, 2006, this threshold was set at 80 hectares. The program also targets any person wishing to create or develop a forest service enterprise whose main objective is to carry out development projects.

Since May 3, 2006, the program permits loan guarantees to a maximum of \$750,000 for a maximum of 30 years. In the past, this amount was fixed at \$500,000. The interest rate is based on the mortgage interest rate. Loans are covered by the farm-loan and forestry-loan insurance funds. The loans may be used to fund projects such as the purchase of woodlots or forest enterprises, the purchase of forestry machinery or equipment, building construction or renovation, forest development work, the purchase or buy-back of interest (stock, shares) and debt refinancing for forestry purposes. The Agency for Agricultural Funding in Quebec administers this program.

B. *Programs for agricultural producers*

B.1 *Prime-Vert Program*

A federal-provincial agreement to implement the Agricultural Policy Framework, signed in 2004, includes joint funding until 2008 for several components of the MAPAQ Prime-Vert Program. Note that MAPAQ has administered this program since 2001. We assume that the program will be extended beyond 2008.

The purpose of the Prime-Vert Program is to:

1. promote and disseminate agricultural best practices;
2. support agricultural operations to ensure their ability to comply with environmental legislation, regulations, and policies;
3. assist agricultural producers to meet the challenge of respect for the environment and peaceful cohabitation of land uses.

Via components 10 (reducing nonpoint source pollution) and 12 (addition of funding to subsidies from Greencover Canada for group projects), this program grants financial assistance for projects involving the establishment of windbreak hedges and riparian buffer strips as complementary measures to prevent livestock from accessing watercourses or to stabilize erosion in waterfront areas.

Only agricultural operations striving to resolve nonpoint source pollution issues are eligible for the program. Municipalities, MRCs, native communities, and other organizations such as industry are not eligible.

Financial assistance may be granted for agricultural operations in designated watershed areas (for example, Ste-Anne, Richelieu, Boyer, Fouquette, Rivière du Nord, Batiscan, l'Assomption) or for other situations that the MAPAQ regional office may deem important, in consultation with local interested parties.

Available funds cover up to 70% of investments toward reducing nonpoint source pollution, to a maximum of \$30,000 (total of federal and provincial assistance) per farm operation for the duration of the program. There is therefore no maximum limit on an annual basis, as is often the case for other assistance programs.

The assistance allocated to these components of the Prime-Vert Program since April 1, 2001 is deducted from the aforementioned maximum. The Department determines eligibility of expenses. Pursuant to the MAPAQ recommendation, financial assistance applies to the following work and practices:

1. management of riparian zones, including withdrawal of livestock from waterways;
2. actions to combat erosion by the construction of soil conservation structures;
3. establishment of windbreak hedges;
4. well management;
5. improvement of pest control methods; and,
6. winter cover crops.

The agricultural producer is bound by certain conditions and must:

1. provide all of the information required by the MDDEP or obtain proper permits from MDDEP pursuant to the Environment Quality Act and its regulations (particularly in the case of riparian buffer strips);
2. have an agri-environmental fertilization plan and submit an annual phosphorus production report and up-to-date agri-environmental monitoring plan, as required;
3. obtain municipal permits and a notice from the MRNF for work involving a watercourse (bed and banks);
4. commit, as required, to the introduction of agricultural practices that prevent soil erosion and maintain soil quality;
5. comply with all MAPAQ administrative standards, technical rules, and conditions.

For windbreak hedges and riparian buffer strips, the applicant's agri-environmental monitoring plan must include a specific recommendation for one of these complementary plantations.

In 2005, the Prime-Vert Program was relaxed for activities involving the withdrawal of livestock from watercourses pursuant to the Agricultural Operations Regulation. An individual agri-environmental monitoring plan is no longer required in this instance. A MAPAQ-Agriculture and Agri-Food Canada agreement calls for a new equivalent collective agri-environmental plan (to replace the individual agri-environmental monitoring plan) to be completed by the staff of the two departments.

Note that component 10 of the Prime-Vert Program, as opposed to the Greencover Canada program, is for individuals and does not require two or more farmers to submit a joint application for funding.

To submit a project, an applicant must be registered with MAPAQ as a certified agricultural producer, submit his agri-environmental plan, as required, and state his intentions. A local advisor then visits the site, after which the farmer prepares his project, indicating the nature and cost of the work, and signs a commitment. Then, MAPAQ makes an offer to the farmer, specifying the amount of assistance. If the offer is accepted, the farmer begins the work. Once the work is finished, a designated professional (from the public or private sector) inspects the work in situ. A declaration from the producer to the effect that he has implemented all of the required mitigation measures during the project must also accompany the inspection report. MAPAQ may withhold any amount deemed necessary to ensure compliance.

The MAPAQ regional offices administer the program. During the process, a farmer can rely on various sources of technical support, such as MAPAQ representatives, agri-environmental clubs and advisors, forest syndicates, OGCs and watershed area councils (particularly where river basins have been targeted for remedial action, such as buffer strips). Agronomists, engineers, forest engineers, and technicians (farm and forest) are stakeholders who, for the most part, have received technical training on windbreak hedges and riparian buffer strips, primarily from the Institut de technologie agroalimentaire (ITA) de La Pocatière.

Windbreak hedges

Future tree harvesting, providing the trees are replaced, does not limit eligibility for the program. With technical support from his advisor, the agricultural producer determines the layout and distance between the rows of trees as well as selection of species. The producer is

responsible for pruning. Lastly, we checked with MAPAQ, who indicated that the program may eventually subsidize an intercropping pilot project, if it helps to reduce wind erosion.

Eligible expenses, such as soil preparation and other costs, are funded and calculations are based on \$200 per linear metre, excluding the cost of the trees. Eligible expense for trees is \$7 per tree for field-based hedges, and \$20 per tree for hedges planted around farm buildings. MAPAQ, in cooperation with MRNF, provides trees free of charge. However, it is possible that the practice differs from region to region in this regard. Neither herbaceous plants nor hedge maintenance is subsidized.

MAPAQ indicated that interest in windbreak hedges is increasing slightly, but steadily. MAPAQ expects it to reach a plateau, potentially compensated for by a growing interest in riparian buffer strips. None of the administrative regions appears to have a systematic inventory of the surface area or kilometre measurement of the hedges planted over the years.

Riparian buffer strips

Among eligible expenses are the purchase of trees and shrubs, seeds for forage plants, soil preparation, mulch placement, planting, and any other justified expenses incurred to create the riparian buffer strip. Expenses related to buffer strip maintenance are not eligible. Selective harvesting in the buffer strips is not incompatible with the program objectives, but the producer is responsible for any costs that are incurred. The agricultural producer, in consultation with his advisor, selects the commercial species for planting (and future harvesting).

The Corporation for Development and Protection of the Ste. Anne River (CAPSA) is currently conducting a comparative evaluation of the various formulas used to extend riparian buffer strips (in agricultural zones) to beyond the regulated minimum 3-metre width.

An initial formula consists in applying the Prime-Vert Program, which covers 70% of eligible expenses to extend the buffer strip on the tillable waterfront surface, to a maximum \$30,000 per farm for the duration of the program. The buffer strip must complement either the withdrawal of livestock from a watercourse or stabilization of eroded areas to become eligible for subsidy. Furthermore, CAPSA offers to cover costs beyond the 70% of eligible expenses. The CAPSA complementary share is based on the width of the strip that is created. Thus, the additional amount may be 10% for a 5-metre wide strip (measured from the watercourse), 20% for a 7.5-metre wide strip, and 30% for a strip 10 metres or more in width.

The second formula is designed to promote widening of the strip by converting a portion of cropland into wildland. CAPSA compensates for the loss of cropland with three annual payments of \$355 per hectare of cropland converted to wildland.

For CAPSA, the third option pays \$1,000 per hectare for an additional buffer strip area converted to wildland. Agricultural producers who plant wood species in this area receive \$1,500 per hectare.

B.2 Program for the Development of Biodiversity in Water Courses of Agricultural Regions

In January 2005, the Quebec Wildlife Foundation (FFQ), in cooperation with the UPA, announced the establishment of the Program for the Development of Biodiversity in Water Courses of Agricultural Regions.

This 5-year program, with funding in the order of 8 million, involves 10 pilot projects in ten targeted watershed areas (Sainte-Anne, Richelieu, Boyer, Fouquette, du Nord, Batiscan, L'Assomption, Yamaska, Ticouapé and Marguerite). The program covers a total area of 55,626 hectares and involves 522 agricultural producers. The projects are managed either by a UPA federation or by an agri-environmental advisory club. As a partner, the Agency for Agricultural Funding in Quebec annually contributes to projects an amount of \$600 per hectare of developed riparian buffer strip to a yearly maximum of \$2,000 per agricultural enterprise.

Project objectives are designed to improve agricultural practices, enhance the quality of waterfront areas, and develop wildlife habitat in watershed areas. Projects primarily involve the creation of riparian buffer strips, wildlife corridors and windbreak hedges.

In December 2005, MAPAQ announced an additional \$200,000 of new money for this program, which involves numerous private sector partners, among them Mouvement Desjardins, regional partners, and various provincial and federal departments. Each of the 10 projects will be subject to a final review that will be used to prepare an operational development guide aimed at all agricultural producers.

C. Summary of programs and incentives of the Quebec government

The following table shows a summary of Government of Quebec programs currently available for each of the technologies under review.

Table 5. Available Quebec programs: impact on implementation of technologies

Technologies	Programs	Impact
Block plantations of hybrid poplar, short-rotation intensive culture of willow	Assistance Program for the Development of Private Forests (for certified forest producers)	For block plantations of hybrid poplar, technical assistance and 80% of eligible expenses covered by <u>some</u> agencies (+) For short-rotation intensive culture, willingness of <u>some</u> agencies to support pilot projects (+)
	Forest Resources Development Program – Component II	90% of eligible expenses if work satisfies regional interests and priorities (+)
	Real Estate Tax Refund Program	85% of property taxes reimbursed (+)
	Forest Management Funding Program	Loans available (+)

Technologies	Programs	Impact
Windbreak hedges and riparian buffer strips	Prime-Vert Program (for farmers)	Subsidizes 70% of eligible expenses. For buffer strips, mainly in designated watershed areas for complementary action involving the withdrawal of livestock from waterways and erosion stabilization projects (+)
	Program for the Development of Private Forests (for certified forest producers)	Technical support and 80% of eligible expenses covered by <u>some</u> agencies (+)
	Program for the Development of Biodiversity in Water Courses of Agricultural Regions (for farmers) ⁹	Ten pilot projects corresponding to watershed areas (+); Objective to publish an operational guide (+)

Note: Characterization of impact

+: positive impact

=: neutral

-: negative impact

3.3 Municipalities

3.3.1 Bylaws and Policies

A. Block plantation of hybrid poplar

Like the other technologies under review, block plantation of hybrid poplar must comply with the key MRC master plan guidelines and zoning bylaws.

In general, MRC bylaws for private forests mirror municipal regulations. The latter are mainly designed to limit the forest harvesting area, for example, to a maximum 4-hectare unit in an established timeframe. Although this does not represent a direct limitation on afforestation activities, it could pose a constraint when, following a 15- or 20-year cycle, one expects to fell trees on areas greater than 4 hectares. Therefore, this situation could cause uncertainty for forest producers.

B. Short-rotation intensive culture of willow

We did not identify any municipal bylaws affecting this technology. In theory, regulations limiting the area of forest harvesting should not have any significant impact on 3-5-year rotations with root system maintenance (coppicing). Note that the purpose of these regulations respecting harvest areas is to protect the visual landscape.

C. Agroforestry systems

Municipal and MRC waterfront protection bylaws are subject to the minimum provisions of the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains. The

⁹ The Government of Quebec is one of the program partners.

Government of Quebec delegates responsibility for enforcement of this policy to the municipalities.

Local municipalities may adopt standards that exceed Policy provisions in their urban planning, through their MRC master plan.

It is possible that the larger cities have policies regarding the creation of windbreak hedges and riparian buffer strips in an effort to conserve the environment or scenic landscapes.

D. Summary of bylaws and policies of municipalities

Table 6 summarizes the municipal policies and bylaws affecting implementation of the technologies under review.

Table 6. Quebec municipal policies and bylaws: impact on implementation of technologies

Technologies	Bylaws and Policies	Impact
Block plantation of hybrid poplar	MRC master plans	Compliance with key orientations and zoning (+,=,-)
	Regulations respecting forest harvest areas	Uncertainty regarding harvesting potential (-)
Short-rotation intensive culture of willow	MRC master plans	Compliance with key orientations and zoning (+,=,-)
Agroforestry systems	MRC master plans	Compliance with key orientations and zoning (+,=,-) Some standards regarding buffer strips may exceed those of the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (+)

Note: Characterization of impact

+: positive impact

=: neutral

-: negative impact

3.3.2 Programs and incentives

To date, our research has not dealt with MRC and municipal programs and incentives.

It is important to note the creation in 2005 by the City of Boisbriand of the Centre for Testing and Research on Plants for the Environment and Urban Development (CERVEAU). The City amended its municipal zoning, converting residential lots into lots for plantations of fast-growing trees such as willow. In 2005, some \$650,000 was allocated, over a 3-year period, to purchasing 38 hectares for the short-rotation intensive culture of willow and other species. The willow stems produced are expected to be used for the creation of sound breaks, for soil decontamination, and for erosion control.

4. SUMMARY AND ISSUES

4.1 Regulatory framework and programs of the federal government

Canada's adherence to the Kyoto Protocol is the overall framework for the development of the afforestation and agroforestry technologies under review.

Canada's first climate change plan was announced in 2002, and followed in 2005 by a new plan. Both documents propose guidelines that address, for example, carbon sequestration as a means to meet Canada's commitment under the Protocol. However, the Conservative government elected in 2006 plans to amend the federal climate change guidelines. The new plan of action on climate change is expected during the fall of 2006.

Afforestation technologies

In Quebec, Canada's 2002 Action Plan on Climate Change permitted completion of a semi-operational afforestation initiative. The Forest 2020 Plantation Demonstration Assessment Program enabled the establishment of 100 hectares of unit plantations of hybrid poplar.

Agroforestry Technologies

The Agricultural Policy Framework (APF) is the main federal policy affecting the adoption of the two agroforestry technologies under review. In Quebec, this policy governs two incentive programs, MAPAQ's Prime-Vert Program and the Greencover Canada program, both exclusively for agricultural producers. An interesting feature of Greencover Canada is its requirement that a project be submitted by two or more farmers, promoting the coordination of environmental actions (windbreak hedges and riparian buffer strips) between neighbours, and thereby decreasing fragmentation of available funds among a multitude of small isolated projects.

Partial harvesting in riparian buffer strips and windbreak hedges, particularly through coppicing, is not counter to either the Greencover Canada or Prime-Vert program.

4.2 Regulatory framework and programs of the Quebec government

Several laws involving a multitude of stakeholders (municipalities, MRCs, forest producers, OGCs, forest industry, farmers, and various government departments) create structures and maintain a certain balance among the rights and interests of each one.

Afforestation technologies

The Forest Act has the greatest impact on owners wishing to afforest unused farmlands. More specifically, it identifies and guides the role of the private forest development agencies and their partners. The Forest Act also defines certified forest producer status; a relatively important distinction that opens the door to technical and financial assistance.

The private forest development agency programs provide the backbone for assistance to private forest producers. The Assistance Program for the Development of Private Woodlots contributes on average 80% of afforestation expenses. However, only part of the agencies fund afforestation projects involving block plantations of hybrid poplar. Further, the program does not

subsidize short-rotation intensive culture of willow, particularly because of the novelty of this type of crop and financial constraints.

The agencies do not at this time cover the biomass sector, preferring rather to meet the demand for wood fibre for lumber production. However, we note an interest in the short-rotation intensive culture of willow on the part of several agencies. Better understanding of this type of crop, particularly in terms of yield and profitability, could permit its inclusion in future private forest protection and development plans.

Other Quebec government legislation and policies influence the implementation of the technologies under review:

- Pursuant to the Land Use Planning and Development Act, the protection and development plans of the private forest development agencies must comply with MRC master plan guidelines and zoning.
- Pursuant to a MAPAQ-MRNF interdepartmental agreement, authorization must be obtained from MAPAQ before the agencies may subsidize afforestation of agricultural zones, particularly of unused farmland. The authorization criteria and process vary from one region to another, and some applications are denied.
- Since implementation of the Forest Protection Strategy, MRNF no longer subsidizes the use of chemical pesticides. In general, this limitation increases the cost of plantation development.
- Instituted under the Act respecting farm-loan insurance and forestry-loan insurance, the Forest Management Funding Program provides financial support for private forest enterprises wishing to expand and consolidate.

Further, the Quebec Energy Strategy notes the government's intention to promote biofuels. Besides corn-based ethanol, the Strategy also proposes the use of forestry residues. It is important to note that the Strategy declares the government's interest in short-rotation intensive culture as a source of biomass for ethanol production.

It is also important to note that, in theory, short-rotation intensive culture could obtain agricultural practice status if the willow stems were certified as an agricultural product. In this instance, MAPAQ could grant financial support for pilot projects on agriculturally zoned land. In theory, such a decision would also permit private forest development agencies to subsidize short-rotation intensive culture in agricultural zones.

Agroforestry technologies

Like afforestation, agroforestry activities are also subject to the key guidelines and zoning regulations stipulated in the MRC master plans, pursuant to the Land Use Planning and Development Act. The development of windbreak hedges along lot lines is also governed by the Civil Code of Quebec.

The regulatory framework for the creation of riparian buffer strips is more complex. This is mainly subject to the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains, which sets minimum standards to protect the environment, particularly

watercourses. Further, the Agricultural Operations Regulation, pursuant to the Environment Quality Act, prohibits livestock access to waterways and buffer strips.

Like the Greencover Canada program, MAPAQ's Prime-Vert Program subsidizes farmers who plant windbreak hedges and riparian buffer strips. The latter is subsidized as a complementary measure to withdraw livestock from watercourses or stabilize eroded riparian sites. Both programs help to achieve similar environmental objectives. However, Greencover Canada focuses explicitly on the carbon sequestration potential of the plantation, an objective that may also be achieved through the Prime-Vert Program, but without explicit promotion by the latter program.

Since neither of these programs is available to landowners other than farmers, it is interesting to note the willingness of some private forest development agencies to provide technical and financial assistance for the establishment of windbreak hedges and riparian buffer strips, provided these plantations produce a significant volume of wood fibre.

Note also the Program for the Development of Biodiversity in Water Courses of Agricultural Regions, which supports pilot projects in the 10 targeted watershed areas. Among other items, this program supports the creation of riparian buffer strips.

4.3 Regulatory framework and programs of municipalities

The municipal regulatory framework is largely determined by the Land Use Planning and Development Act and the Municipal Powers Act. Private forest protection and development plans must comply with MRC master plan guidelines and zoning bylaws pursuant to the Land Use Planning and Development Act. The master plans may identify riparian zones targeted for conservation and limit the size of tree harvesting areas.

The study did not include a comprehensive and systematic inventory of MRC and municipal programs and incentives. Of interest, however, is the creation in 2005 by the City of Boisbriand of the Centre for Testing and Research on Plants for the Environment and Urban Development (CERVEAU). That city amended its municipal zoning, converting residential lots into lots specifically designated in part for the short-rotation intensive culture of willow for environmental purposes.

Certain municipalities and at least one MRC hold certified forest producer status. A more detailed study would permit a more accurate assessment of the potential municipal contribution to the implementation of the technologies under review.

4.4 Issues

Numerous issues arose in the review of the regulatory framework and incentive programs associated with implementation of the technologies under review. Table 7 presents a summary of these issues.

Table 7. Issues associated with implementation of technologies

Technologies and Issues	Regulatory Framework or Incentive Program
<p>1. Issues involving all of the technologies under review</p> <p>Specifications and impact of the new guidelines of Canada's Action Plan on Climate Change</p> <p>Contiguous nature of the technologies, located between forestry and agriculture</p> <p>Impact of the Commission on the Future of Agriculture and Agri-food in Quebec</p> <p>Potential impact of the Government of Quebec's objectives regarding biofuels on demand for biomass from these technologies</p>	<p>Action Plan expected in Fall 2006</p> <p>Forest Act; Act respecting the preservation of agricultural land and agricultural activities; body of normative programs</p> <p>To be determined following tabling of the Commission report by January 2008</p> <p>Quebec Energy Strategy (2006-2015); Quebec Action Plan on Climate Change (2006-2012)</p>
<p>2. Block plantation of hybrid poplar and short-rotation intensive culture of willow</p> <p>Minimum 4-hectare area of forest land to obtain technical and financial support from private forest development agencies</p> <p>Forest vocation for agriculturally zoned land, especially criteria and decision-making process that varies among the regions</p> <p>Application of chemical pesticides not funded by private forest development agencies</p> <p>No fertilization subsidized by private forest development agencies: possible hamper to plantation yield</p> <p>Place for hybrid poplar (markets, profitability, etc.) to be specified among wood producers' syndicates and private forest development agencies</p> <p>Short-rotation intensive culture still not well known; however, some agencies are willing to include it among eligible activities in future, if more information is made available</p>	<p>Forest Act</p> <p>MRNF-MAPAQ inter-departmental agreement pursuant to the Act Respecting the Preservation of Agricultural Land and Agricultural Activities</p> <p>Forest Protection Strategy</p> <p>Assistance Program for the Development of Private Forests</p> <p>Assistance Program for the Development of Private Forests</p> <p>Assistance Program for the Development of Private Forests</p>

Technologies and Issues	Regulatory Framework or Incentive Program
<p>Eventual MAPAQ recognition for certain forms of afforestation as agricultural crops</p> <p>Impact of a future forest investment strategy (orientations, priorities, silvicultural activities funded, etc.)</p> <p>For block plantations of hybrid poplar, uncertainty regarding municipal regulations restricting the size of forest harvest areas</p>	<p>Act Respecting the Preservation of Agricultural Land and Agricultural Activities, Farm Producers Act, Act Respecting the Marketing of Agricultural, Food and Fish Products</p> <p>Forest Investment Strategy expected in 2006</p> <p>Municipal bylaws</p>
<p>3. Windbreak hedges and riparian buffer strips</p> <p>Minimum 3-metre width of banks in agricultural zones may be insufficient</p> <p>Three incentive programs for farmers only</p> <p>Nonuniversal program: priority given to designated watershed areas</p> <p>Tree maintenance and pruning are not subsidized; the agricultural producer is responsible for these expenses¹⁰</p> <p>For windbreak hedges, flexibility/adaptation of incentive programs to the specificities of intercropping, particularly greater density of hedges per hectare</p> <p>The Greencover Canada program is recent and still relatively unknown among agricultural producers</p>	<p>Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains</p> <p>Prime-Vert Program, Greencover Canada program, and Program for the Development of Biodiversity in Water Courses of Agricultural Regions</p> <p>Prime-Vert Program and Program for the Development of Biodiversity in Water Courses of Agricultural Regions</p> <p>Prime-Vert Program and Greencover Canada</p> <p>Prime-Vert Program and Greencover Canada</p> <p>Greencover Canada program</p>

¹⁰ This work, usually required to ensure profitable wood sales, may compensate for the loss of land surface and income incurred through the creation of windbreak hedges and riparian buffer strips.

5. SOURCES

Laws, regulations, and policies

Act Respecting Farm-Loan Insurance and Forestry-Loan Insurance
(Loi sur l'assurance-prêts agricoles et forestiers)

Act Respecting Municipal Taxation
(Loi sur la fiscalité municipale)

Act Respecting the Conservation and Development of Wildlife
(Loi sur la conservation et la mise en valeur de la faune)

Act Respecting the Marketing of Agricultural, Food and Fish Products
(Loi sur la mise en marché des produits agricoles, alimentaires et de la pêche)

Act Respecting the Preservation of Agricultural Land and Agricultural Activities
(Loi sur la protection du territoire et des activités agricoles)

Agricultural Operations Regulation
(Règlement sur les exploitations agricoles)

Agricultural Policy Framework
(Cadre stratégique agricole canadien)

Canada's Action Plan on Climate Change
(Plan du Canada sur les changements climatiques)

Canadian Environmental Assessment Act
(Loi canadienne sur l'évaluation environnementale)

Civil Code of Quebec
(Code civil du Québec)

Environment Quality Act
(Loi sur la qualité de l'environnement)

Farm Producers Act
(Loi sur les producteurs agricoles)

Fish Habitat Management Policy of Fisheries and Oceans Canada
(Politique de gestion de l'habitat du poisson du ministère des Pêches et des Océans)

Fisheries Act
(Loi sur les pêches)

Forest Act
(Loi sur les forêts)

Forest Protection Strategy
(Stratégie de protection des forêts)

Land Use Planning and Development Act
(Loi sur l'aménagement et l'urbanisme)

Municipal Powers Act
(Loi sur les compétences municipales)

Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains
(Politique de protection des rives, du littoral et des plaines inondables)

Quebec Action Plan on Climate Change
(Plan d'action du Québec sur les changements climatiques)

Quebec Energy Strategy
(Stratégie énergétique du Québec)

Regulation Respecting Environmental Impact Assessment and Review
(Règlement sur l'évaluation et l'examen des impacts sur l'environnement)

Regulation Respecting Real Estate Tax Refunds for Certified Forest Producers
(Règlement sur le remboursement des taxes foncières des producteurs forestiers reconnus)

Regulation Respecting the Registration of Agricultural Operations and the Reimbursement of Real Estate Taxes and Compensations
(Règlement sur l'enregistrement des exploitations agricoles et sur le remboursement des taxes foncières et des compensations)

Web sites

Agence de mise en valeur de la forêt privée de l'Estrie
<http://www.agenceestrie.qc.ca>

Agence de mise en valeur des forêts privées de la Chaudière
<http://www.arfpc.ca>

Agence de mise en valeur des forêts privées des Appalaches
<http://www.amvap.ca>

Agence des forêts privées de Québec 03
<http://www.afpq03.ca>

Agence forestière de la Montérégie
<http://www.afm.qc.ca>

Agence régionale de mise en valeur des forêts privées du Bas-Saint-Laurent
<http://www.agence-bsl.qc.ca>

Agriculture and Agri-Food Canada
<http://agr.gc.ca>

Canadian Biomass Innovation Network (CBIN)
<http://www.rcib.qc.ca>

Canadian Environmental Assessment Agency
<http://www.ceea-acee.qc.ca/>

Conseil de l'industrie forestière du Québec
<http://www.cifq.qc.ca>

Conseil pour le développement de l'agriculture du Québec
<http://www.cdaq.qc.ca>

Corporation d'aménagement et de protection de la Ste-Anne
<http://www.capsa-org.com>

Fondation de la Faune du Québec
<http://www.fondationdelafaune.qc.ca>

Forest 2020
http://www.ccmf.org/forest2020/index_e.html

Ministère de l'Agriculture, des Pêcheries et de l'Alimentation
<http://www.mapaq.gouv.qc.ca>

Ministère des Affaires municipales et des Régions
<http://www.mamr.gouv.qc.ca>

Ministère des Ressources naturelles et de la Faune
<http://www.mrnf.gouv.qc.ca/inc/forets/>

Natural Resources Canada, Feasibility Assessment of Afforestation for Carbon Sequestration (FAACS)
http://nrcan.gc.ca/cfs-scf/national/what-quoi/afforestation/index_e.html

6. TRANSLATION OF TERMS SPECIFIC TO THE QUEBEC CONTEXT

(See also Section 5 for the translation of laws, regulations and policies)

Agency for Agricultural Funding in Quebec
(Financière agricole du Québec)

Agro-environmental Plan
(PAA : Plan d'accompagnement agroenvironnemental)

Appalaches Private Forest Development Agency
(Agence de mise en valeur des forêts privées des Appalaches)

Assistance Program for the Development of Private Forests
(Programme d'aide à la mise en valeur des forêts privées)

Centre for the Testing and Research on Plants for the Environment and Urban Development
(CERVEAU : Centre d'expérimentation et de recherche sur les végétaux pour l'environnement et l'aménagement urbain)

Commission for the Protection of Agricultural Land in Quebec
(Commission de protection du territoire agricole du Québec)

Commission on the Future of Agriculture and Agri-food in Quebec
(Commission sur l'avenir de l'agriculture et de l'agroalimentaire québécois)

Controlled Wildlife Harvesting Zones
(ZEC : Zones d'exploitation contrôlées)

Corporation for Development and Protection of the Ste. Anne River
(CAPSA : Corporation d'aménagement et de protection de la Sainte-Anne)

Council for the Development of Agriculture in Quebec
(CDAQ : Conseil pour le développement de l'agriculture du Québec)

Environmental Public Hearings Office
(BAPE : Bureau d'audiences publiques en environnement)

Farm Producers Union
(UPA : Union des producteurs agricoles)

Forest Development Plan
(PAF : Plan d'aménagement forestier)

Forest Management Funding Program
(Programme de financement forestier)

Forest Resources Development Program
(Programme de mise en valeur des ressources du milieu forestier)

Joint Management Groups
(OGC : Organismes de gestion en commun)

Lower St. Lawrence Private Forest Development Agency
(Agence de mise en valeur des forêts privées du Bas-Saint-Laurent)

Montérégie Private Forest Development Agency
(Agence forestière de la Montérégie)

Prime-Vert Program
(Programme Prime-Vert)

Program for the Development of Biodiversity in Water Courses of Agricultural Regions
(Programme de mise en valeur de la biodiversité des cours d'eau en milieu agricole)

Protection and Development Plan
(PPMV : Plan de protection et de mise en valeur)

Quebec 03 Regional Private Forest Development Agency
(Agence des forêts privées de Québec 03)

Quebec Agriculture and Agri-food Market Board
(Régie des marchés agricoles et alimentaires du Québec)

Quebec Department of Agriculture, Fisheries, and Food
(MAPAQ : Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec)

Quebec Department of Natural Resources and Wildlife
(MRNF : Ministère des Ressources naturelles et de la Faune)

Quebec Department of Recreation, Hunting and Fishing
(MLCP: Ministère du Loisir, de la Chasse et de la Pêche)

Quebec Department of Sustainable Development, Environment, and Parks
(MDDEP : Ministère du Développement durable, de l'Environnement et des Parcs du Québec)

Quebec Forest Industry Council
(CIFQ : Conseil de l'industrie forestière du Québec)

Quebec Wildlife Foundation
(FFQ : Fondation de la faune du Québec)

Real Estate Tax Refund Program
(Programme de remboursement des taxes foncières)

Regional Councils of Elected Officials
(CRÉ : Conférences régionales des élus)

Regional County Municipalities
(MRC : Municipalités régionales de comté)

Regional Private Forest Development Agencies
(Agences régionales de mise en valeur des forêts privées)

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ACKNOWLEDGEMENTS

We thank the following individuals and organizations for their generous cooperation in this study:

Agence des forêts privées de Québec 03
André Gélinas

Agence de mise en valeur de la forêt privée de l'Estrie
Lise Beauséjour

Agence de mise en valeur des forêts privées des Appalaches
Martin Loiselle

Agence forestière de la Montérégie
Luc Dumouchel and Claudine Lajeunesse

Agence régionale de mise en valeur des forêts privées de la Chaudière
Yves Beaudoin

Agence régionale de mise en valeur des forêts privées du Bas-Saint-Laurent
Marc-André LeChasseur and Florent Morin

Agriculture and Agri-Food Canada
Stéphane Gariépy and Stéphanie Larouche-Boutin

Canadian Forest Service
Gilles Chantal, Laurentian Forestry Centre
Gaston Joncas, Laurentian Forestry Centre
Thomas White, Pacific Forestry Centre

Conseil pour le développement de l'agriculture du Québec
Raphaël Chevalier and Stephen Côté

Corporation d'aménagement et de protection de la Ste-Anne
Chantal Leblanc

Fédération des producteurs de bois du Québec
Jean-Pierre Dansereau

Fondation de la faune du Québec
Marcel Quirion and Claude Grondin

Institut de recherche en biologie végétale de Montréal
Michel Labrecque

Institut de technologie agroalimentaire de La Pocatière
André Vézina

Ministère de l'Agriculture, des Pêcheries et de l'Alimentation
Direction du développement durable et de l'environnement
Yvon Brochu and Richard Laroche

Ministère de l'Agriculture, des Pêcheries et de l'Alimentation
Région de la Capitale-Nationale
Suzanne Pilote and Yvan Montambeault

Ministère de l'Agriculture, des Pêcheries et de l'Alimentation
Région des Appalaches
Donald Lemelin

Ministère des Ressources naturelles et de la Faune
Pierre Périnet, Direction de la recherche forestière
Gil Lambany, Direction de l'aménagement des forêts publiques et privées

Réseau Ligniculture Québec
Brigitte Bigué

Union des producteurs agricoles du Québec
Marc-André Côté

Université Laval, Département de phytologie
Alain Olivier and David Rivest

APPENDICES

Appendix 1. Quebec 03 Regional Private Forest Development Agency – Financial Assistance Schedule – 2006-2007.

CODES		ELIGIBLE WORK	RATE 2006-2007
WORK	PRODUCTION		
SITE PREPARATION ACTIVITIES (Group 05)			
DMD	0501	Brush-cutting (mechanical or manual) + clearing	\$1,080
DBMAD	0517	Manual brush-cutting and clearing (less than 50% cover) (grassland)	\$960
DBD	0516	Mechanical brush-cutting	\$490
DMEL	0502	Clearing with clipper blade-equipped tractor (brushland)	\$570
DMED	0504	Chipping (brushland)	\$805
RDMD	0507	Salvage + brush-cutting + clearing	\$1,135
PRDSE	0510	Mechanical or manual weed control (grassland)	\$345
SMED	0511	Scarification - light	\$310
SMEBC	0513	Scarification - medium	\$425
SMAT	0514	Manual scarification (\$/1,000 microstations)	\$340
DMEPRH2	0512	Forest harrowing	\$805
PRLH	0520	Agricultural ploughing and harrowing (hardwood plantation) (grassland)	\$405
PRLHF	0521	Forest ploughing and harrowing	\$1,225
DCT	0518	Application of phytocides - by land	---
DCA	0519	Application of phytocides - by air	---
REFORESTATION (\$/1,000 plants) (Group 06)			
PLANTATION			
PMANR	0626	Softwoods - bare-root planting stock	\$290
PMPFD	0628	- bare-root planting stock – large	\$350
PMARR6	0630	- seedling container – 67 cavities (50 to 109 cc)	\$250
PMARR4	0632	- seedling container – 45 cavities (110 to 199 cc)	\$270
PMARR	0639	- seedling container – 200 to 299 cc	\$335
PMARR	0638	- seedling container – 300 cc or more	\$430
PMAF	0636	Hardwoods - bare-root planting stock – less than 50 cm	\$390
PMAF	0666	- bare-root planting stock – 50 to 99 cm	\$430
PMAF	0667	- bare-root planting stock – 100 cm or more	\$610
PMAF	0660	- seedling container – 300 to 999 cc	\$430
PMAF	0661	- seedling container – 1 000 cc or more	\$610
PPHRN	0680	Hybrid poplar - plant	\$610
PPHB	0681	- cutting	\$270
PMERN	0634	Mechanical planting (grassland)	\$190
ENRICHMENT			
1) Mini strip planting			
EMBR	0670	Softwoods - bare-root planting stock	\$290
EMPFD	0671	- bare-root planting stock - large	\$350
EMBR4	0672	- seedling container – 45 cavities (110 to 199 cc)	\$270
EMB	0673	- seedling container – 200 to 299 cc	\$335
EMB	0674	- seedling container – 300 cc or more	\$430
EMBF	0675	Hardwoods - bare-root planting – moins de 50 cm	\$390
EMBF	0678	- bare-root planting stock – 50 to 99 cm	\$430
EMBF	0679	- bare-root planting stock – 100 cm or more	\$610
EMBF	0676	- seedling container – 300 to 999 cc	\$430
EMBF	0677	- seedling container – 1 000 cc or more	\$610
2) Spaced			
ETR	0637	Softwoods - bare-root planting stock	\$375
ETR	0635	- bare-root planting stock – large	\$570
ETR	0633	- seedling container – 200 to 299 cc	\$570
ETR	0631	- seedling container – 300 cc or more	\$645

CODES		ELIGIBLE WORK	RATE 2006-2007
WORK	PRODUCTION		

		FILL PLANTING		
		1) Plantation		
ERPN	0641	Softwood	- bare-root planting stock	\$290
ERPPFD	0643		- bare-root planting stock – large	\$350
ERPRR4	0645		- seedling container – 45 cavities (110 to 199 cc)	\$270
ERP	0642		- seedling container – 200 to 299 cc	\$335
ERP	0644		- seedling container – 300 cc or more	\$430
		Hardwoods		
ERPF	0647		- bare-root planting stock – less than 50 cm	\$390
ERPF	0668		- bare-root planting stock – 50 to 99 cm	\$430
ERPF	0669		- bare-root planting stock – 100 cm et plus	\$610
ERPF	0662		- seedling container – 300 to 999 cc	\$430
ERPF	0663		- seedling container – 1,000 cc or more	\$610
		Hybrid poplar		
ERPHRN	0686		- plant	\$610
ERPHRN	0687		- cutting	\$270
		2) Natural regeneration		
ERNN	0649	Softwoods	- bare-root planting stock	\$315
ERRNPF	0653		- bare-root planting stock – large	\$375
ERRNR4	0651		- seedling container – 45 cavities (110 to 199 cc)	\$300
ERRN	0648		- seedling container – 200 to 299 cc	\$350
ERRN	0650		- seedling container – 300 cc or more	\$455
		Hardwoods		
ERRNF	0652		- bare-root planting stock – less than 50 cm	\$390
ERRNF	0654		- bare-root planting stock – 50 to 99 cm	\$455
ERRNF	0655		- bare-root planting stock – 100 cm or more	\$610
ERRNF	0664		- seedling container – 300 to 999 cc	\$455
ERRNF	0665		- seedling container – 1,000 cc or more	\$610

REFORESTATION MAINTENANCE (Group 07)			
EDHA	0752	Agricultural harrowing	\$405
ERED	0753	Plant straightening	\$310
EDES	0754	Mechanical or manual weed control (grassland or brushland)	\$925
ECME	0751	Mechanical or manual release (regeneration less than or equal to 1.5 m)	\$1,025
ECME	0755	Mechanical or manual release (regeneration greater than 1.5 m)	\$860
ECCT	0756	Application of phytocides - by land	
ECCA	0757	- by air	
EEL	0760	Pruning	\$1,055
ETF	0761	Pruning for shaping of tolerant hardwoods and hybrid poplar	\$555
CIM	0784	Protection against insects, disease, and animals	\$465
PAI	0790	Degradable mulch (grassland)	\$1,200

NON-COMMERCIAL TREATMENTS (Group 08)			
		RELEASE OF NATURAL REGENERATION	
DEGM	0857	Mechanical or manual release	\$1,025
DEGCT	0859	Application of phytocides - by land	
DEGCA	0860	- by air	
		PRE-COMMERCIAL THINNING	
CPCR	0862	Softwoods	\$1,120
CPCFT	0863	Hardwoods	\$1,095
CPCF1	0864	Trembling aspen hardwoods	\$855

CODES		ELIGIBLE WORK	RATE 2006-2007
WORK	PRODUCTION		

INTERMEDIATE OR MIXED CUTTING (Group 08B)			
INTERMEDIATE THINNING			
CITR	0866	Softwood	\$975

COMMERCIAL TREATMENTS (Group 09)			
CAE	0965	Maple bush improvement cutting (establishing a maple farm)	\$845
		Selection cutting with timber marking	
RJR	0970	- softwoods	\$945
RJF	0971	- tolerant hardwoods	\$965
		Commercial thinning with timber marking	
CERM	0966	- softwoods (natural stand)	\$945
CERMP	0980	- softwoods (plantation)	\$945
CEFTM	0967	- tolerant hardwoods	\$845
CEFIM	0976	- intolerant hardwoods	\$845
		Commercial thinning without timber marking	
CER	0977	- softwoods	\$815
CERP	0978	- softwoods (plantation)	\$815
		Succession cutting	
CS	0968	- intolerant hardwoods	\$760
		Shelterwood cutting with timber marking	
RCPERM	0973	- softwoods	\$945
RCPERM	0974	- tolerant hardwoods	\$595
PBB	0972	Strip cutting	\$410
CRBA	0975	Salvage cutting	\$335

ROADS AND DRAINAGE (Group 10)			
VFC	1082	Forest roads (\$/km)	- construction of individual road (25% of actual cost) Max \$2,595
VFC	1084		- construction of collector road (50% of actual cost) Max. \$5,165
VFA	1083		- road improvement \$880
PRDR	1080	Drainage (\$/km)	- on cleared land \$1,405
NCDR	1081		- on forested land \$1,665

FOREST DEVELOPEMENT PLANS (Group 11)			
PAF	1122	Property size	- 4 to 50 ha \$240
PAF	1123		- 51 to 100 ha \$355
PAF	1124		- 101 to 250 ha \$555
PAF	1125		- 251 to 799 ha \$830

CONTACTS WITH OWNERS (Group 12)			
SCT	1201	Technical advisory services (\$/ha)	\$190
MSCT	1202	Timber marking and technical advisory services (\$/ha)	\$250
SCTPR	1203	Technical advisory services (planting and fill planting) (\$/1,000 plants)	\$70
SCTVF	1204	Technical advisory services (forest road work) (\$/km)	\$250
SCTDR	1205	Technical advisory services (drainage) (\$/km)	\$545
SCTCPRS	1206	Technical advisory services (careful logging around regeneration and seed-tree method → 0,4 ha to 4 ha) (\$/ha)	\$190
SCTCPRS	1207	Technical advisory services (careful logging around regeneration and seed-tree method → additional hectares) (\$/ha)	\$55
VST	1208	Advisory visit	\$160

Appendix 2. Surface areas of hybrid poplar afforestation in Quebec private forests (1990-2002)

Private forest development agency	Surface area on unregenerated sites according to Kyoto (ha)	Surface area on regenerated sites according to Kyoto (ha)	Total surface area (ha)
Estrie	31.2	25.8	57.0
Appalaches	4.2		4.2
Québec 03	12.8		12.8
Montréal	1.4	0.3	1.7
Bois-Francs	5.4		5.4
Côte-Nord	0.3		0.3
Gaspésie – Les Îles	0.3		0.3
Lanaudière	3.3		3.3
Laurentides	1.8		1.8
Bas-Saint-Laurent	62.3		62.3
Lac-St-Jean	142.5	17.8	160.3
Saguenay	1.8	34.3	36.1
Mauricie	0.5	0.5	1.0
Outaouais	80.4		80.4
Abitibi-Témiscamingue	2.3		2.3
TOTAL	350.5	78.7	429.2

Source: CFS information system on afforestation eligible under the Kyoto Protocol. Data obtained from the Quebec regional private forest development agencies.