

An overview of the Alberta forest sector

J. P. De Franceschi
Natural Resources Canada, Canadian Forest Service
Northern Forestry Centre
Edmonton, Alberta

1 Introduction

Alberta is often viewed as one of the three Canadian prairie provinces. This perspective however does not recognize that over one half of the province's land area of 64.4 million ha is forested. In general terms, the forested portion is along the western third and northern half of the province with the majority classified as Boreal Forest (Figure 1).

Flat open grasslands in the southeast give way to gently rolling hills and the foothills toward the west, culminating with the eastern slopes of the Rocky Mountain Range. Moving toward the north the cover changes from flat open grasslands to hardwood forests and then to mixedwoods on gently undulating topography. The forested parts of the province are characterized by pure coniferous stands of lodgepole pine (*Pinus contorta*) or white spruce (*Picea glauca*) along the foothills, and both pure or mixed stands of conifers and deciduous species, mainly white spruce and trembling aspen (*Populus tremuloides*) in the northerly parts.

Alberta's forest resources contribute significantly to both the social and economic well-being of its citizens. Many companies operating in Alberta depend on the forest resource for their raw materials, and they create considerable economic activity. In addition, Aboriginal people look to the forest for both their livelihood and for continuance of their traditional cultural activities. In concern with industrial development, the forests provide Albertans with a wide range of amenities.

This paper will provide an overview of the forest resource base in Alberta along with descriptions of the forest economy, some comments on other uses of the land, a brief discussion of current issues facing the forest sector in this province, and some descriptive statistics on the Aboriginal population. The paper will conclude with a brief discussion on the potential for biomass utilization for energy production in the context of the forest resource base.

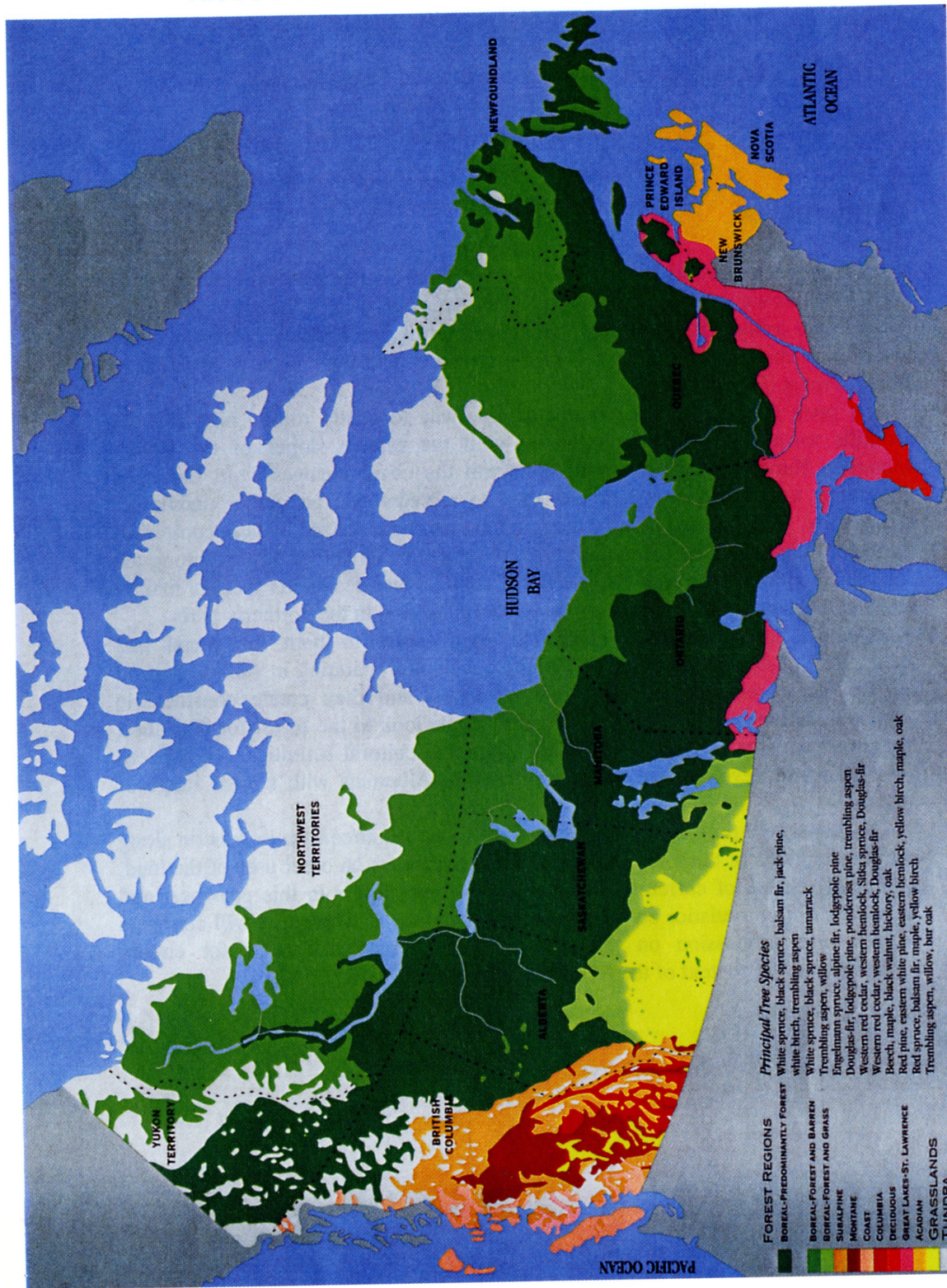


Figure 1. Forest regions of Canada (Source: Minister of Supply and Services Canada 1992).

2 The forest resource base

Alberta's total area of 66.1 million ha (land and water) is divided into two broad classifications based on land use. These areas are known as the Green Area and the White Area (Figure 2). The Green Area totals about 38 million ha (53% of the province) and is primarily the unsettled portion of the province. It is defined as forest lands not available for agricultural development, other than grazing. The Green Area designation provides a secure land base for long-term forest management planning. The remaining White Area is dedicated to agricultural production, settlements, and other human activities.

The majority of forest land in Alberta is owned by the provincial government and is known as provincial crown land. Eighty-seven percent of forested land in Alberta is provincial crown land. Nine percent is owned by the federal government (federal crown land), and includes Aboriginal lands, while the remaining 4 % is privately owned. The significant provincial crown ownership means the provincial government plays an important role in the management and allocation of the province's wood supply to industry.

The land base of the Green Area contains 2.2 billion m³ of standing timber of which two-thirds is coniferous and one-third is deciduous. Of the productive area, almost one-half is pure coniferous trees, one third is pure deciduous trees and the remaining 20 % is mixedwoods. White spruce and lodgepole pine are the dominant coniferous species (56 % and 40 %, respectively), while trembling aspen and balsam poplar (*Populus balsamifera*) comprise the majority of the deciduous volumes (97 %).

The provincial government has developed guidelines to determine the Annual Allowable Cut (AAC) to account for the many uses of the land and its suitability for commercial harvest. After areas such as wildlife reserves, parks, inoperable stands, recreation areas, and others are removed from the AAC calculation, only about two hectares in five are actually available for harvest, and of these, only about 1 % can be harvested annually. This leaves a net AAC of 12.8 million m³ of coniferous volumes and 9.2 million m³ of deciduous volumes available to the forest industry. As of January 1995, only about 6 % of the coniferous AAC and 27 % of the deciduous AAC remained unallocated; however, recent forest industry developments (some of which are in the final stages of negotiation) have resulted in the allocation of virtually all the remaining unallocated volumes.

2.1 Forest management

The Green Area land base is managed by the provincial government either directly or through various types of tenure arrangements with industry. These arrangements or tenures provide industry with a long-term perspective for their timber harvest practices. There are three types of dispositions in Alberta's land tenure system, the Forest Management Agreement (FMA), the timber quota, and the timber permit. Each of these systems have a number of requirements related to land management and public involvement to ensure compliance with public policy on natural resource development.



Figure 2. The green area of Alberta (Source: Alberta Environmental Protection, Land and Forest Service).

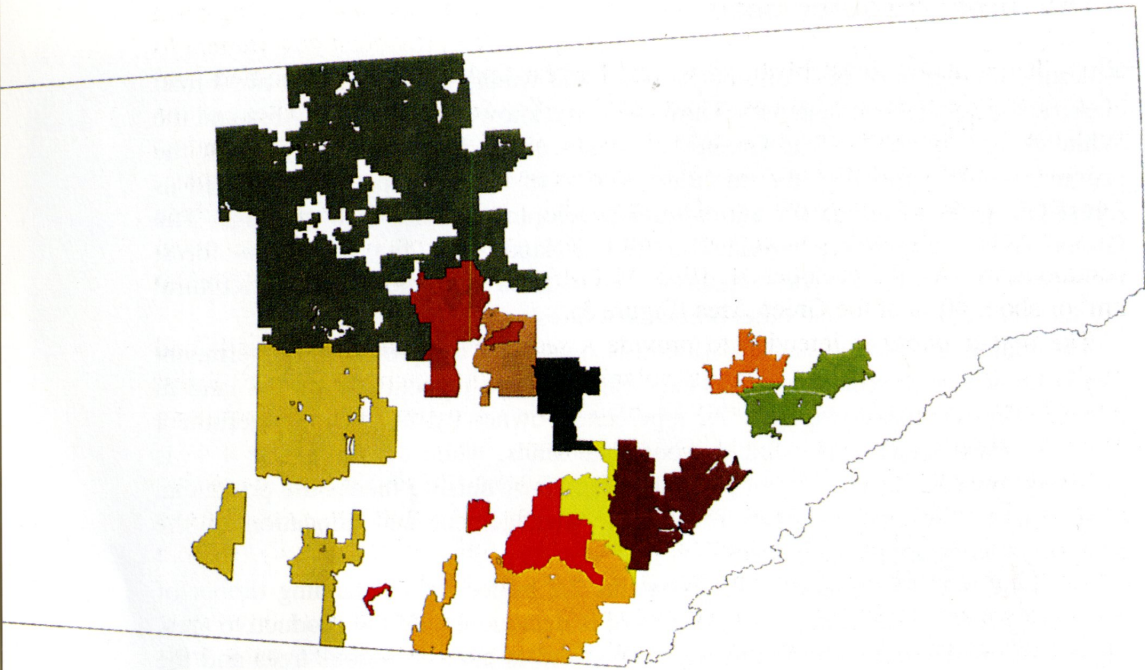


Figure 3. Forest management agreements (Source: See Fig. 2).

The FMA is designated for the larger industrial developments and is a long-term (usually 20 years) agreement between a company and the provincial government to allow the company to establish, grow, and harvest timber within a specified land area. The agreement is land based and AAC is allocated within the context of the land base. The company must have a major wood processing facility and is required to carry out its business in accordance with a forest management plan. The plan must be approved by the provincial government and must include consultation with and participation from the general public and the local communities. As of December 31, 1995, 11 FMAs were in place covering 136,120 km² or about 40 % of the Green Area (Figure 3).

The timber quota is intended to provide a secure wood supply to small- and medium-sized operators. This is a volume based agreement; therefore, forest management planning responsibility is assumed by the provincial government. There are about 50 registered quota holders in the province.

Local community needs and small operator requirements are satisfied by *timber permits*. This category allows access to small volumes of timber for individuals or groups such as Aboriginal communities. The permit holder usually pays a reforestation levy or can assume reforestation costs directly.

Reforestation activity is conducted by both industry and government depending on the tenure arrangement in place. In all cases, regenerated stands must meet legislated standards. Since 1991, Free-To-Grow standards have been implemented in Alberta to ensure new forests will meet or exceed the productive yield of the original stand. Currently, 20 % of harvested areas are left to regenerate naturally, 20 % are direct seeded, and 60 % are planted. In the near future, planting is expected to increase to 65 % with areas left to natural regeneration reduced to 15 %. In 1995, the forest industry and the Alberta government planted 75 million trees.

Regardless of the type of disposition in place, long-range forest management plans, annual operating plans, and harvest practices are considered in the context of the integrated resource management plans. This approach facilitates the coordination of activities of multiple users on the same land base and ensures all forest users' needs are addressed.

3 The forest economy

The forest industry is an important component of Alberta's economy and ranks third in the province after the energy and agriculture sectors. In 1995, shipments from the industry totaled \$4.3 billion, an increase from \$2.5 billion in 1992 and \$900 million in 1985. The growth is attributed to higher commodity prices, a doubling of panel production, and growth in the secondary sector. In 1995, 26 000 people were directly employed in the sector while another 39 000 jobs were created supplying and servicing the industry and its workers. The industry has experienced substantial growth in the 1990s and has outperformed the industry elsewhere in the country. For example, annual sales have more than doubled from \$1.6 billion in 1990 to \$3.6 billion in 1996. Employment for the same period increased by 50 %.

Industry expansion began in 1983 when the provincial government implemented a strategy to diversify the provincial economy to include the forest sector. As a result, \$5 billion of investment occurred during the 10-year period 1986—1996. This expansion led to the establishment of pulp mills and panel plants. Much of the expansion was encouraged by the abundant timber supplies and new hardwood processing technology and markets, which utilized the untapped aspen resource. An additional \$1.3 billion investment is planned over the next four years in northwestern Alberta.

In 1995, the forest industry in Alberta harvested 19.8 million m³ of both hardwoods and softwoods, an increase from the 15 million m³ harvested in 1992. This harvest level ranks Alberta fourth in the country after British Columbia, Quebec and Ontario. Lower prices during 1996—97, however, are expected to reduce the harvest to 1992 levels.

Alberta's primary forest sector consists of a variety of mill types. The sector includes numerous sawmills ranging in size from small portable one-man operations producing a few thousand board feet of rough lumber to large state-of-the-art sawmills producing many millions of board feet of planed and kiln-dried lumber. It also includes eight panel plants, six pulp mills, one newsprint mill, and two paperboard and felt producers.

In 1995, Alberta's sawmills produced 2.1 billion board feet of lumber (8 % of total Canadian production). The panel mills produced about one quarter million square meters (10 mm basis) of panel products with OSB (oriented strand board) comprising the major share of production at 78 % of output. The pulp mills produced 1.5 million tonnes of bleached kraft pulp (4 mills) and 365 00 tonnes of chemi-thermo-mechanical pulp (2 mills). The one newsprint plant produced 230 000 tonnes and output from the two paperboard and felt mills totaled 70 000 tonnes.

Secondary manufacturing of forest products has also seen substantial growth. Since 1992, this sector has grown about 1.5 times in terms of employment and payroll. The sector now comprises almost 700 companies from the previous 600 and produces a variety of products centering on the re-manufacture of lumber, production of engineered building components, and cabinet and furniture materials.

Total employment in the forest industry is estimated at 65 000 people with 13 500 in logging and primary manufacturing, and 12 500 in the secondary sector with a further 39 000 indirect and induced jobs. These jobs created personal earnings of \$2.5 billion in 1995. Employment in the logging and primary sectors averaged 1.31 person-years per thousand m³ harvested, similar to the Canadian average.

Government revenues from the forest industry result from personal and corporate taxes generated from income derived in the sector, and on stumpage charges paid by the industry. Personal earnings in 1995 generated \$600 million in taxes to the federal and provincial governments while stumpage payments totaled \$45.5 million. In addition, industry has absorbed the cost of many forest management activities previously assumed by the government.

4 Current issues

Some of the issues currently facing the forest sector in Alberta are:

- (1) wood supplies,
- (2) certification,
- (3) other uses of the land, and
- (4) Aboriginal participation in the forest sector.

These issues are not in listed in any priority and are not all encompassing, but are intended to highlight a few areas of concern or opportunity for the forest sector in Alberta.

- (1) *Wood supplies* - Although Alberta is endowed with a vast forest resource, forest lands suitable for forest industry development have virtually all been allocated; therefore, the future growth potential may appear limited. Add to this the continuing pressures to reallocate lands from timber production to other uses such as recreation or conservation purposes, or losses to fire, and the issue of wood supply gains importance. The industry can prepare for the possibility of future shortfalls and enhance its existing wood supply. Mean annual increment across the province averages 1.98 m³ per ha. More intensive management such as juvenile spacing and commercial thinning could increase merchantable yields and thus mitigate the negative effects of a reduced wood supply. Many mature aspen stands currently scheduled for harvest contain a substantial softwood understory. Careful harvesting to protect those understories can provide substantial volumes when the stand is re-entered for the second harvest.

Another source of wood supply is from private land. Current harvests from private land totals about 2.7 million m³. This harvest is not included in the provincial AAC determination and may not be sustainable. Industry has an opportunity to work with land owners to encourage sustainable management of private forest lands to ensure future wood supplies.

- (2) *Certification* - The global environmental movement has resulted in development activities world wide to come under closer scrutiny. The forest industry is no exception and the sustainability of the forest resource has come into question. Forest products have been the target of consumer resistance. In response to the criticism, the issue of certification has emerged as a means of assuring consumers that certified products originate from firms that are sensitive to the environment and practice sustainable forest management. Development of a certification system is underway in Canada (for example, the Canadian government through the Canadian Council of Forest Ministers, has developed a series of criteria and indicators for sustainable forest management). In Alberta, the Alberta Forest Products Association, whose members represent the major forest industries in the province, responded with the development and implementation of the "Forest Care" code of practice.

This code is intended to certify Alberta forest companies that abide by a number of principles and practices that set standards for performance in the care of the forest, the environment, and the community. The Alberta forest products industry is export oriented and therefore must be sensitive to global attitudes.

- (3) *Other uses of the land* - The value of forest land exceeds the value of the timber on it. Wildlife habitat and recreation are only two of the non-timber values associated with forest land. In recognition of the multiple benefits and the multiple uses of forest land, the government of Alberta developed the Alberta Forest Conservation Strategy. This strategy, developed over a number of years, provided numerous forums to collect public input and gather opinions from a wide range of interest groups, organizations and individuals in all parts of the province. The strategy, which is now in place, will "....guide the policies and actions of all those who live, work and play in the forests of Alberta..."

5 Aboriginal people in Alberta

Almost 5 % of Canada's 27 million people are of Aboriginal origin. This proportion is even higher in Alberta where almost 210 000 or 8.2 % of the total provincial population of 2.5 million residents are of Aboriginal descent. The greatest proportion of Aboriginal people live in rural areas either in First Nation communities on Indian reserves if they are "status Indians", or on Metis settlements, or other rural non-aboriginal towns. In total, 43 First Nation communities are located in Alberta.

Many of the concerns of Aboriginal people pertain to their lack of opportunities to participate in the forest sector even though forest developments are occurring on their traditional lands. In response, provincial governments are increasing Aboriginal people's participation in decisions regarding forest resource development, and partnerships are evolving among Aboriginal communities, industry, and government to give Aboriginal people a bigger role in the decision-making process. In addition, forest companies are including Aboriginal people's traditional use of the land in the company's forest management and operational planning process. This facilitates dialogue between the industry and local Aboriginal communities and ensures traditional Aboriginal values are given full consideration in forest resource development, planning, and operations.

A major barrier to participation in the forest sector by Aboriginal people is their lack of training. A variety of training programs are underway to improve the ability of Aboriginal people to participate in the forest industry. For example, the "First Nation Forestry Program" of the Canadian Forest Service is designed specifically to improve the capacity of First Nation people to participate in the forest sector both as employees and as business men and women. Some forest companies, and other government agencies also have specific programs to increase Aboriginal participation in all facets of their operations.

The forest industry is by its very nature a rural based industry. Aboriginal people's tradition and culture is also rural based. Both the logging and manufacturing components of the forest industry are often located in and among aboriginal communities. Interaction between the forest industry and Aboriginal communities therefore is inevitable and these communities can and do contribute to the development of the forest industry in Alberta.

6 Potential biomass supplies for energy production

The potential supply of biomass for energy production is substantial in Alberta even if only logging wastes are considered. Some broad estimates of the amount of waste biomass produced from logging operations can be based on the harvest level. A previous study in Saskatchewan, Canada reported that at pre-harvest volumes of 150 to 250 m³ per ha, 19 % to 32 % of the pre-harvest volume is left on the forest floor after commercial logging (De Franceschi 1991). If this rate is applied to the Alberta 1996—97 harvest level of 15 million m³, between 3.5 and 7.1 million m³ of wood is left unutilized after logging. If the entire provincial AAC of 22.1 million m³ is harvested, the total biomass left unutilized could be as high as 10.5 million m³ annually exclusive of milling wastes.

In Alberta, only two commercial scale plants that utilize waste biomass to produce electricity are currently in operation. There could be a number of reasons why biomass use is so limited. Some of these reasons are:

- 1) Cost of collecting and transporting wood waste;
- 2) Institutional constraints (i.e., resistance by power companies to biomass technology); and
- 3) Low cost and convenience of other forms of energy make biomass applications unnecessary.

Natural gas is the most common source of heating in Alberta. Ninety percent of the electricity produced in this province is generated from coal with the remaining 10 % produced from natural gas and hydro-electric projects. Energy costs for an average home (103 m², family of 4 persons) in central Alberta total less than \$1.200 annually with \$500 for electricity and \$700 for natural gas. These costs are based on annual consumption of 6 600 kWh of electricity and 150 GJ of natural gas (4 250 m³). Recently, wind generated electricity was introduced into the provincial grid system. Even though costs were higher, consumers purchased this electricity and demonstrated their acceptance for the more environmentally sensitive energy. Therefore even with the relatively low costs of conventional fuels, alternative forms of energy are beginning to be considered. The large amount of waste biomass produced by the forest industry is a potential source of fuel for energy production. The low cost of conventional fuels, however, hinder the development of this biomass resource.

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IEA Bioenergy

WOOD FUELS FROM CONVENTIONAL FORESTRY

Proceedings of the third annual workshop
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The publication is the Proceedings of the third annual workshop of Activity 1.2 (Harvesting)/Task XII/IEA Bioenergy in Jasper Alberta in October 18, 1997. It is composed of eleven papers dealing with various aspects of the production of wood fuels from conventional forestry. An overview is given of the Alberta forest sector, potential applications of bioenergy in Canada's remote communities, and timber procurement systems of the southeastern United States. Several articles discuss new techniques and the state of the art of wood fuel harvesting, and characteristics and standards of wood chips. An evaluation report of the Activity is also presented. The evaluation report describes the history of harvesting related cooperation within IEA Bioenergy and the main developments during past ten years, and discusses wood fuel harvesting issues and the advantages and disadvantages of IEA Bioenergy cooperation.

Key words: IEA, bioenergy, fuelwood, harvesting, conventional forestry

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Correspondence: Pentti Hakkila: The Finnish Forest Research Institute, Vantaa Research Centre, P.O. Box 18, FIN-01301 Vantaa, Finland. Tel: +358 9 857 051, Fax: +358 9 8570 5361

Distribution: The Finnish Forest Research Institute, Unioninkatu 40 A, FIN-00170 Helsinki, Finland. Phone: +358 9 857 051, Fax: +358 9 625 308

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Table of contents

	Page
Preface	5
An overview of the Alberta forest sector <i>J. P. De Franceschi</i>	7
Potential applications of bioenergy in Canada's remote communities <i>Bruce McCallum</i>	17
Potential utilization of woodfuels in Finland <i>Ismo K. Nousiainen and Tero J. Vesisenaho</i>	23
State of the art in energywood development in Holland with special attention to the marketing concept of 'green energy' <i>Adri de Gelder</i>	33
Timber procurement systems of the southeastern United States <i>Richard W. Brinker</i>	41
Harvesting systems for multiple products. An update for the United States <i>Bryce J. Stokes</i>	49
New techniques and methods in an expanding wood-fuel market <i>Bengt Brunberg</i>	57
UK industry - baling and storage of forest residues <i>Barrie Hudson</i>	69
Fuelwood characteristics and nutrient release from Norway spruce logging residue during storage at the forest landing <i>Juha Nurmi</i>	83
Standards for wood fuels, or the lack there-of <i>Pieter D. Kofman</i>	91
Wood fuel harvesting - the role of IEA Bioenergy <i>Olli Eeronheimo</i>	97