Background Paper **BP-356E**

PAPER RECYCLING IN CANADA: A NEW REALITY

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November 1993

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PAPER RECYCLING IN CANADA: A NEW REALITY

INTRODUCTION

Canada is a leader in the world forest products market, particularly as a pulp and paper producer. It is the world's largest newsprint producer, with 31% of the market and the second largest pulp producer, with 16% of world production. Canada is also the greatest exporter of forest products, its exports representing more than 20% of the world's forest products exports.(1) In 1992, the value of Canadian forest products exports reached $22 billion, 14% of the total value of exports.(2) By product, Canada ranks first in newsprint, softwood and pulpwood, with respectively 59, 40 and 36% of world exports. The United States remains the largest consumer of Canadian forest products, purchasing 66% of our exports, followed by the European community (15%) and Japan (9%). In the newsprint sector alone, Canada exports nearly 80% of its production to the United States and approximately 11% to Western Europe.(3)

As impressive as the overall performance of the Canadian forestry sector is, the forest industry, particularly pulp and paper, were hit hard by the recession. The Canadian Pulp and Paper Association (CPPA) estimates the Canadian forest industry's losses as a whole at $1.6 billion in 1992 and $2.1 billion in 1991. Since 1989, 33 old paper mills have ceased production and in 1991 four pulp plants closed.(4) Furthermore, the Canadian pulp and paper industry is undergoing major restructuring and rationalization, is required to comply with new environmental regulations and faces new consumer needs. Among the many changes in the industry, there has been a growing tendency for a number of companies to turn to paper recycling.

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(1) Forestry Canada, *The State of Forestry in Canada*, 1990 Report to Parliament, Ottawa, April 1991, 80 p.

(2) Statistics Canada, *Summary of Canadian International Trade*, Catalogue 65-001 (monthly), December 1992.

(3) Forestry Canada, *The State of Canada's Forests 1992*, Third Report to Parliament, Ottawa, 1993, 112 p.

(4) Claude Turcotte, "La vague de licenciements se poursuivra cette année dans l'industrie foretière. La rentabilité sera de retour vers la fin de l'année," *Le Devoir*, 26 January 1993, p. A5.

In this paper, we outline the current recycling situation in the Canadian pulp and paper sector. Among other things, we examine investments made by the industry in this rapidly growing field, the role of the United States as the main importer of Canadian paper and the environmental and economic consequences of the change of direction that the Canadian pulp and paper industry appears resolved to make.

PAPER RECYCLING: AN INEVITABLE TREND

Paper and cardboard recycling is not a new phenomenon; some Canadian pulp and paper plants have used old paper and cardboard for more than 60 years.(5) In 1990, 52 of Canada's 110 plants used wastepaper to meet their fibre requirements, either in whole or in part. In the past, however, the industry essentially used "pre-consumption" wastepaper; that is, by-products of paper and cardboard manufacturing processes.(6)

The industry is now turning more to "post-consumption" wastepaper: newsprint, fine paper and magazines collected through municipal and institutional recycling programs. In fact, paper recycling is becoming an integral part of Canadian pulp and paper production, particularly in the newsprint sector. The accelerated introduction of recycling infrastructures has not been without structural effects on the industry. As a result, as a world leader in the pulp and paper sector that exports about 75% of its total paper production, Canada must promptly adjust to the demand if it wants to retain its top spot in an increasingly competitive world market. At a time when it must modernize its infrastructures and production processes, particularly in eastern Canada, and improve treatment of its effluents to reduce the pollution of waterways, the industry is resolutely converting to recycling.

Prior to 1990, only one Canadian plant produced newsprint containing recycled fibres from old newsprint; today almost 20 do so. Most of the projects recently announced or implemented have consisted of installing costly de-inking infrastructures which make it possible to recycle very large volumes of wastepaper. Nevertheless a few plants with little or no de-inking equipment are still able to integrate up to 15% wastepaper in their pulp or paper production

(5) Environment Canada, *The State of Canada's Environment - 1991*, Canada's Green Plan, Ottawa, Government of Canada, c. 10, p. 22.

(6) Forestry Canada (1993), p. 62.

processes.[7] Between 1990 and 1991, Canada's de-inking capacity increased 229% to 790,000 tonnes. In Quebec alone, one de-inking plant began operations in 1991, three others were opened in 1992 and two more were to start up in 1993. In Canada as a whole, the number of de-inking plants will rise from one in 1988 to 16 in 1993, which will increase total recycled newsprint production capacity to four million tonnes per year. As a result, nearly 40% of all Canadian newsprint production will contain recycled fibres, compared to only 3% in 1988.[8] However, the average recycled fibre content of newsprint will be only 12%,[9] a relatively low figure in view of the demands of several American states for a minimum of 40% recycled fibre content in the newsprint used by their publishers.

Major capital investments are required to fit up de-inking plants. According to the CPPA, the 10 projects carried out by the Canadian pulp and paper industry in 1991 and 1992 called for investments in the order of $1 billion.[10] For 1993, the industry expects to spend $2.6 billion, mainly on recycling equipment and infrastructure.[11] Table 1, prepared by the CPPA, shows the major recycling projects carried out or planned for the 1990-1994 period. Of the 17 projects listed, eight concern newsprint production and will result in a demand for 1.2 tonnes of wastepaper; five projects will require approximately 225,000 tonnes of old paper for toilet paper production, and the other four will require 330,000 tonnes of old paper for pulp and fine paper production. In addition, several projects have been announced since these estimates were made; examples are those of Domtar at its Cornwall, Ontario, plant and later at its Windsor, Quebec plant. Domtar intends to introduce an entirely new technology that will enable it to produce fine paper from old corrugated cardboard, a move that will result in a substantial decline in production costs, estimated at some $100 to $125 per tonne of paper produced.[12] Thus, an investment of $76 million at the Cornwall plant will produce an annual saving of $20 million. Once introduced at both plants, the new process

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(7) Canadian Pulp and Paper Association (CPPA), *Ten New De-inking Projects in Place Under Solid Waste Management Program*, Press Release, 6 October 1992, 2 p.

(8) Forestry Canada (1993) and Forestry Canada, *The State of Canada's Forests 1991 - Environmental, Social and Economic Indicators*, Second Report to Parliament, Ottawa, 1992, 85 p.

(9) Forestry Canada (1992), p. 34.

(10) CPPA (1992).

(11) Turcotte (1993).

(12) Maurice Jannard, "Une nouvelle technologie conduirait Domtar à investir 200 millions," *La Presse*, 13 February 1993.

Table 1
Major Recycling Projects in Canada, 1990-1994
Confirmed Projects Only

Company	Location	Product	Start-up date	Estimated demand for old paper (millions of tonnes)	Description
Atlantic Packaging	Whitby, Ontario	Toilet paper	1990	40	New paper machine
Atlantic Newsprint Co.	Whitby, Ontario	Newsprint	February 1990	160	New newsprint plant
Papiers Cascades	Kingsey Falls, Quebec	Toilet paper	Early 1993	30	Increase production
Scott Paper Ltd.	Crabtree, Quebec	Toilet paper	May 1990	75	Installation of additional de-inking equipment
Spruce Falls Inc.	Kapuskasing, Ontario	Newsprint	1991	40	Installation of de-inking equipment
Les Papiers Perkins Ltée	Candian, Quebec	Toilet paper	August 1991	50	Plant expansion
Canadian Pacific Forest Products Ltd.	Thunder Bay, Ontario Gatineau, Quebec	Newsprint	August 1991 December 1991	335	Installation of de-inking equipment
Newstech Recycling Inc.	Coquitlam, B.C.	Commercial pulp	November 1991	40	New de-inking plant
Daishowa Forest Products Ltd.	Quebec City, Quebec	Newsprint and paper for directories	January 1992	150	Installation of de-inking equipment
Kruger Inc.	Bromptonville, Quebec	Newsprint	May 1992	60	Installation of de-inking equipment
Alberta Newsprint Co.	Whitecourt, Alberta	Newsprint	Fall 1992	60	Plant conversion
Papiers Cascades*	Cap-de-la-Madeleine, Quebec	De-inked pulp	October 1992	105	New de-inking plant
Consumers Paper Corp.	Redcliff, Alberta	Commercial pulp and toilet paper	1993	30	New de-inking plant
Quebec and Ontario Paper Ltd.	Thorold, Ontario	Newsprint	1993	310	Plant expansion
Stone-Consolidated Inc.	Shawinigan, Quebec	Newsprint	1993	90	Installation of de-inking equipment
Rolland Inc.	Saint-Jérôme, Quebec	Uncoated fine paper	1994	85	Installation of de-inking equipment

* Project conducted in association with Donohue Inc. & James MacLaren Industries

Source: CPPA.

will virtually eliminate the 700,000 tonnes of wood they use annually.(13) The new technology on trial will also make it possible to reduce residual sludge from 25% under the usual old paper de-inking processes to 6%, an appreciable environmental and economic benefit.(14)

THE DE-INKING PROCESS

Most de-inking plants recently fitted up or being fitted up employ relatively similar processes. Some companies, however, have chosen to build their new facilities in a new building adjacent to their pulp and paper production buildings, whereas others have preferred to fit up their de-inking workshop within existing production facilities, as in the case, for example, of the Belgo division plant of Stone Consolidated in Shawinigan, Quebec. That plant, opened in early 1993, should produce some 200 tonnes of pulp per day composed of old newsprint and magazines (about 85%) mixed with virgin fibres (15%), part of which will be forwarded to the company's other two Quebec plants. It should be noted that the old paper will be supplied entirely from the United States.(15)

Generally speaking, de-inking is done in three major stages (see Figure 1).(16) Stage one, pulping, consists of mixing old newspapers and magazines with water so that the paper decomposes and the fibres swell. Caustic soda is usually added at this stage, to transform the oil from the inks into foam, along with hydrogen peroxide, to bleach the pulp obtained from the old paper. The mixture is then filtered, and sometimes centrifuged, to remove undesirable objects such as staples and paper clips.

The pulp is then transferred from the pulper to flotation cells, where the fibres are extracted from the liquid mixture. In this second stage, foaming agents are added and air injected to form bubbles to which the ink adheres. The floating and contaminated foam can then be aspirated by sweepers. The bubbles can then be burst in order to recover the ink, which, once thickened in

(13) François Shalom, "The Fine-Paper Chase: Domtar Pins Hopes on Cardboard-Recycling Plan," *The Gazette*, 13 February 1993, p. C-3.

(14) Canadian Press, "Domtar investit 76 millions à Cornwall," *Le Devoir*, 11-12 September 1993.

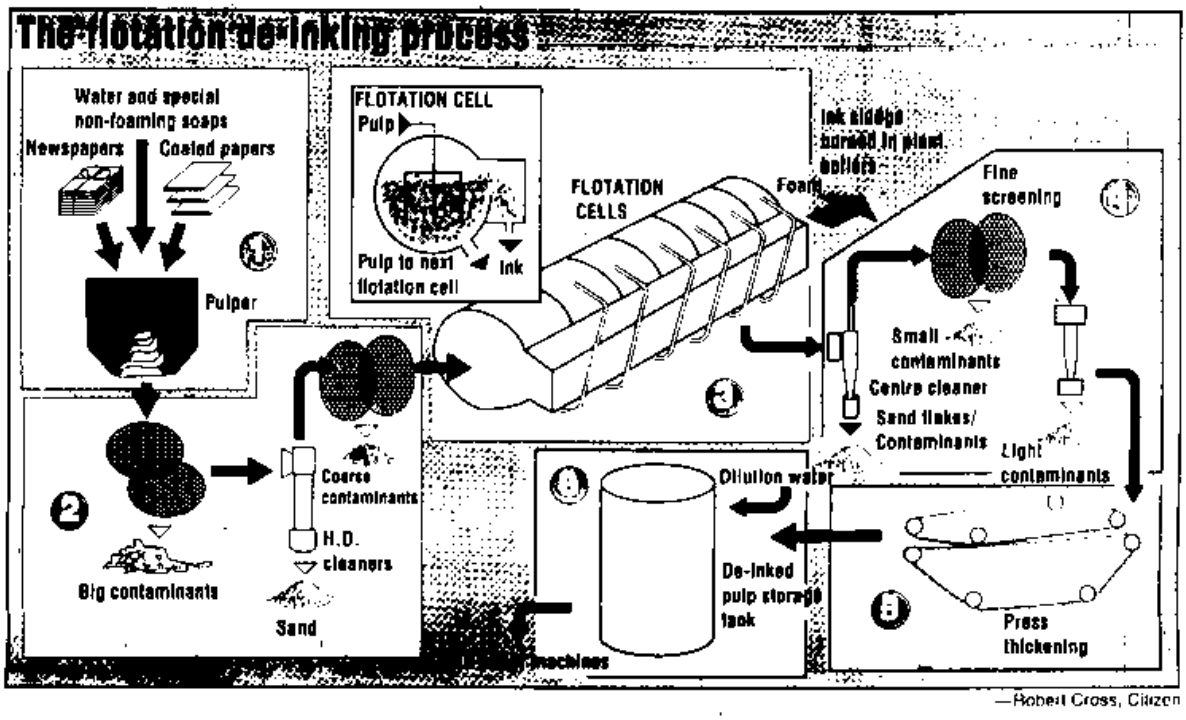
(15) Yves Lavertu, "L'usine Belgo de Stone-Consolidated se lance à son tour dans la pâte désencrée," *Les papetières du Québec*, Vol. 4, No. 2, Summer 1993, p. 10-15.

(16) Louise Desautels, "Un procédé qui fait couler beaucoup d'encre," *Forêt Conservation*, June 1992, p. 10-12.

paste form, can then be skimmed off or otherwise removed. The flotation stage also ends with a filtering and purification mixture designed to eliminate glue, plastic, varnish, ink and sand particles.

The third stage, pulp washing, which is sometimes combined with or completely replaces flotation, is most often done separately. This is essentially a filtration operation during which the mixture, which is still very liquid, is passed through a screen which retains the useful fibres, but allows the finer, undesirable particles to flow through. It is important to mention that the de-inking process as a whole, from the initial weighing of the old paper to the pressing of the pulp obtained, is entirely automated and therefore requires very few personnel.

Figure 1



SOME CONSEQUENCES OF PAPER RECYCLING

The factors that have led the Canadian pulp and paper industry to make a total commitment to paper recycling are many and varied; however, the main factor concerns domestic waste management. Paper recycling is not, however, without major environmental and economic impact on society as a whole.

A. Paper Recycling and Waste Management

The pressure placed on the Canadian pulp and paper industry to recycle paper comes mainly from Congress and U.S. consumers, who have demanded that publishers buy paper that has at least the minimum recycled fibre content. Since the United States is the largest market for Canadian paper products, the Canadian industry had no choice but to adjust quickly to the growing demand for papers containing recycled fibres. As Table 2 illustrates, 13 American states, as well as the District of Columbia, have passed laws requiring minimum recycled fibre content in newsprint used by publishers. According to most of those statutes, the newsprint sold in the state concerned must contain 40 to 50% recycled fibres by 1998 to 2000. Furthermore, between 1989 and 1992, 16 other states signed voluntary participation agreements with newspaper editors on the use of paper containing recycled fibres. These agreements were intended to achieve objectives similar to those entrenched by the other states in legislation. According to Forestry Canada, more than 77% of total U.S. newsprint consumption is concentrated in 27 states.(17) Organizations such as the National Environmental Law Centre and the U.S. Public Interest Research Group even recommend passing federal legislation similar to that passed by certain states to ensure that newsprint is more "ecological" and that the paper recovery markets are stimulated and stabilized. More precisely, they suggest that such a statute should require 50% post-consumption recycled fibre content by the year 2000 and set standards based on the ratio of recycled fibre used to total quantity of paper used.(18)

(17) Forestry Canada (1993), p. 61.

(18) Lauri Aunan and Susan Birmingham, *Recycling the News: A Study of Recycled Newsprint Content of the Nation's Largest Newspapers*, National Environmental Law Centre and U.S. Public Interest Research Group, Portland and Washington D.C., November 1992, 19 p. and 2 appendices.

Table 2

Recycled Fibre Content for Newsprint:
U.S. Requirements

State (year adopted)	Type of program[1]	Deadline	Recycled fibre content[2]
Arizona (1990)	Mandatory	2000	20% (50%)
California (1989)	Mandatory	2000	20% (50%)
North Carolina (1991)	Mandatory	1998	40%
Connecticut (1990)	Mandatory	1999	50%
Columbia District	Mandatory	1994	8% (20%)
Florida (1993)	Mandatory	1996	30%
Illinois (1990)	Mandatory	1993	28%
Maryland (1990)	Mandatory	1998	40%
Missouri (1990)	Mandatory	2000	50%
Oregon (1991)	Mandatory	1995	25%
Rhode Island (1991)	Mandatory	2000	40%
Texas (1991)	Mandatory	2000	30%
West Virginia (1991)	Mandatory	Not available	Highest possible post-consumption fibre content
Wisconsin (1990)	Mandatory	2000	45%
Colorado	Voluntary	2000	30%
South Dakota (1991)	Voluntary	Not available	Highest possible content
Hawaii	Voluntary	Not available	Not available
Indiana (1992)	Voluntary	2000	40%
Iowa (1990)	Voluntary	2000	40%
Kentucky	Voluntary	2000	40%
Louisiana (1990)	Voluntary	2000	40%
Maine (1990)	Voluntary	1995	16% (40%)
Massachussets (1990)	Voluntary	2000	40%
Michigan (1990)	Voluntary	1995	24%
New York (1990)	Voluntary	2000	40%
New Hampshire (1991)	Voluntary	2000	40%
Ohio (1992)	Voluntary	2000	40%
Pennsylvania (1989)	Voluntary	1995	50%
Vermont (1990)	Voluntary	2000	40%
Virginia (1991)	Voluntary	1995	30%

1 By Type of Program, we mean the statutes passed by the various states which set mandatory recycled fibre content levels or we designate the state that signed voluntary participation agreements with publishers.

2 Percentages indicated in parentheses refer not to recycled fibre content but to the percentage of newsprint containing such fibres relative to total newsprint purchases in the state concerned.

Source: Based on unpublished data provided by the Canadian Forestry Service, Department of Natural Resources, 13 September 1993.

The Canadian pulp and paper industry is opposed to the U.S. approach to regulating the recycled fibre content of printing paper; even more it fears the passage of a federal statute applicable to all states; this would force Canadian paper producers to import more than three million tonnes of old paper from the United States.(19) Instead, the industry believes that better solid waste management, particularly through paper recycling and the increased use of wood fibre residues, can do much to reduce the pressure on landfill sites, preserve natural resources and lower dependence on non-renewable fossil fuels.(20) In fact, the paper industry sees these minimum recycled fibre content standards as true protectionist measures, non-tariff barriers(21) constituting a major constraint on free trade. It also fears that by increasing the demand for old paper, these standards will lead to the introduction of a limited recycling market. Furthermore, statutes, regulations and supply policies containing discriminatory provisions against pulp, newsprint or other papers and cardboard produced in whole or in part using virgin fibre do not further Canadian solid waste management objectives. Such measures force the industry to increase its old paper imports and appear harmful to the social and economic viability of isolated communities for which the use of old papers is economically unrealistic.(22)

The question of waste management is also central to the debate on paper recycling. The U.S. interest in paper recycling essentially stems from the problem of rapidly filling landfill sites. For the new U.S. government, however, paper recycling goes beyond the initial objectives of reducing the pressure on landfill sites and is now part of the climate change action plan. In these circumstances, the purpose of recycling is to reduce the demand for wood fibre so as to enable the forest to increase its capacity to absorb atmospheric carbon.(23) It is estimated, however, that the sites in more than half of the U.S. states will be full in less than 10 years.(24) Since wastepaper represents 35 to 45% of total waste volume,(25) paper recycling appeared to be the ideal solution to

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(19) Hélène Boyer, "Le Québec devra-t-il recycler son papier journal," *Le Devoir*, 29-30 May 1993.

(20) CPPA, *Solid Waste Management: A Statement by the Pulp and Paper Industry*, Montreal (not dated), 3 p.

(21) Groupe d'action sur l'avenir de l'industrie des produits forestiers, *Rapport*, Charlesbourg, Québec, 5 February 1992, 62 p.

(22) CPPA, *Statement on Solid Waste Management*.

(23) United States Embassy (Ottawa), "Overview and Key Elements of Climate Change Action Plan," BP 93-40, 20 October 1993, 3 p.

(24) Forestry Canada (1993), p. 61.

(25) Hatch & Associates Inc., *Étude sur le recyclage du papier de rebut (jusqu'à la fin de 1990)*, Final report prepared for Forestry Canada and Environment Canada, 1990, 81 p. and appendices, p. 5.

reduce pressure on landfill sites. However, this route is perhaps not as straightforward as is generally suggested, at least for Canada. According to the information in Forestry Canada's third report to Parliament, newsprint represents approximately 7% of waste in Canada; thus, if all this newsprint was recycled, including residual sludge, the net decrease in landfill volume would be equivalent to 7%.(26)

Furthermore, since Canada exports more than 70% of its paper and cardboard production, there would not be a sufficient domestic supply of old paper to meet the demand of de-inking plants for this new source of raw material, even if there were a highly efficient and comprehensive collection system. In 1991, imports represented 25% of total wastepaper supply. The CPPA estimates that these imports from the United States should have reached 30% in 1992 and that they should represent about 50% in 1995.(27) Forestry Canada estimates that Canadian demand for wastepaper in 1993 will reach 1.3 million tonnes, but that only 400,000 tonnes of old newspapers can be collected and used by the industry. The latter will therefore likely have to import 900,000 tonnes of wastepaper to supply its recycled newsprint plants,(28) even though nearly two-thirds of Canadian households living in single-family housing have access to a paper recycling service.(29)

For example, the Gatineau de-inking facilities of Canadian Pacific Forest Products Ltd. (CPFC), which opened in June 1992, require a daily supply of 600 tonnes of old newspapers and magazines, 80% of which comes from the United States. In total, CPFP's de-inking plants in Gatineau and Thunder Bay will process 500,000 tonnes of old papers every year; that is, approximately twice the total quantity of wastepaper collected each year in all of Canada. According to the company, the massive importing of old paper from the United States should not reduce its competitiveness in the North American markets since the trucks and trains that deliver paper south of the border now return to Canada loaded with wastepaper.(30)

By importing such large quantities of wastepaper from the United States, Canada is in a way actively helping solve the problem of landfill sites for its major importer of newspaper.

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(26) Forestry Canada (1993), p. 65.

(27) CPPA (1992), p. 2.

(28) Forestry Canada (1993), p. 63.

(29) Leslie Geran, "Environmental Practices of Canadian Households," *Canadian Social Trends*, No. 28. Spring 1993, p. 17-20.

(30) Jules Richer, "Désencrage: PFCP inaugure son usine," *Le Droit*, 3 June 1992, p. 4.

Large-scale recycling may also have the effect of shifting the problem and creating a new environmental issue in Canada. The de-inking plants produce large quantities of liquid and solid waste, mainly de-inking sludge, which must be disposed of. According to two Canadian researchers, the impact of U.S. laws on recycling would make it possible to save at best 2% of landfill space in Canada. If Washington were to pass a national statute, however, 0.5% more waste would have to be disposed of in Canadian sites. The main consequence of the de-inking of old papers could therefore be a geographical shift in waste disposal sites.(31) As a result, some wonder whether Canada, and particularly Quebec, would not become the wastepaper basket of the United States.(32)

It is estimated that the de-inking of each tonne of old papers would generate an average of 0.3 tonne of wet sludge.(33) If the industry recycles 1.3 tonnes of wastepaper in 1993, as Forestry Canada predicts, it will then have to dispose of nearly 400,000 tonnes of residual sludge. For example, the new CPFP plant in Gatineau produces 17 tonnes of residue per 100 tonnes of de-inked paper,(34) approximately half of the ratio stated above. Solid residues are incinerated in the new boilers in order to produce the energy or steam necessary to the production process.(35) The residual sludge may contain dangerous or toxic compounds formed mainly from printing inks and chemicals used to bleach virgin pulp and in the de-inking process. The dioxins and furans contained in the papers to be de-inked, which are originally bleached using chlorine, are particularly dangerous. The effluents resulting from de-inking are deemed to be toxic for fish and must be treated before being disposed of in waterways.(36)

Research efforts in this area have been stepped up in order to find ways of converting de-inking sludge into a valuable resource.(37) The sludge can already be used as organic enrichment for vineyards and orchards and to produce asphalt, cement, bricks, tiles and moulded pulp products such as egg cartons. However, a number of companies choose to incinerate these

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(31) Michel Corbeil, “Forcer le recyclage du papier ne viderait pas les dépotoirs,” *Le Soleil*, 3 October 1992.

(32) Pierre Dubois, “Le Québec, poubelle des États-Unis?,” *Forêt Conservation*, May 1991, p. 14-17.

(33) Forestry Canada (1993), p. 64.

(34) Richer (1992).

(35) Bert Hill, “Harvesting the Blue Box Forest,” *Ottawa Citizen*, 18 February 1992, p. B1-B2.

(36) Environment Canada (1991), c. 10, p. 22.

(37) CPPA, *Statement on Solid Waste Management*.

sludges or bury them at municipal or private sites.(38) The most promising avenue could well be the composting and development of sludges for agricultural, horticultural and forestry purposes, provided that the sludges and resulting compost did not contain unacceptable levels of toxic compounds. Recent research also suggests that de-inking sludges are not highly toxic, perhaps even less than conventional manures. Nevertheless, the potential markets and demand for such compost must still be assessed, since several municipalities are already known to be composting leaves and grass clippings and are considering doing the same for sewage sludge from water treatment plants. Furthermore, since the manufacture of newsprint from recycled fibre requires the addition of 20 to 30% old magazines, residual solids contain as much as 50% kaolin, a very fine sand imported from the United States which is used in the production of glossy paper. Some are therefore considering building a plant to extract kaolin from the sludge produced by all de-inking units in Quebec. Ideally, the ink oils and pigments could also be extracted and recycled in the industry.(39)

B. Environmental and Economic Impacts of Paper Recycling

Paper recycling also offers major environmental and economic benefits. The substitution of entirely recycled fibres for virgin fibres in paper manufacturing could result in reductions of 58% in water consumption, 35% in water pollution, 74% in air pollution and 23% in energy demand.(40) According to Forestry Canada, paper recycling requires 43% less energy than is needed to produce new paper from wood fibre.(41) Furthermore, the recycling of one tonne of old papers produces the fibre equivalent of 11 to 24 trees depending on size and species.(42) In the specific case of CPFP's Gatineau plant, the annual use of 215,000 tonnes of old newsprint and magazines will replace three million trees in the paper manufacturing process. From another perspective, the Ontario Recycling Council estimates that 25 million trees could be saved each year if the weight of newsprint produced in Canada were reduced by 10% to the European standard.(43)

But not all forestry analysts are convinced that the massive use of paper recycling will lead to a significant reduction in wood-cutting. As Forestry Canada states, wood chips

(38) Forestry Canada (1993), p. 64-65.

(39) Desautels (1992).

(40) Aunan and Birmingham (1992), p. 8.

(41) Forestry Canada (1991), p. 53.

(42) Forestry Canada (1993), p. 66.

(43) Hill (1992).

represent approximately 45% of wood used by Canadian newsprint plants,[44] and 60% of that in the Quebec paper industry in 1992.[45] This situation can therefore considerably limit the impact that the use of recycled fibres would have on tree cutting. Furthermore, it is believed that the volume of wood unused by the pulp and paper industry will be simply transferred to the lumber industry. If old paper partly replaced wood chips, the revenues of sawmills, which derive approximately one-quarter of their business turnover from the sale of wood chips to paper plants, could be greatly affected. If, on the other hand, they replace the saw-logs used in manufacturing newsprint, it is estimated that recycling 1.3 million tonnes of old papers would result in a saving of approximately 3.4 million cubic metres of wood; that is, 14% of the pulpwood currently used or 2% of the total harvest of softwood in Canada.[46]

The example of Daishowa illustrates this trend. This company reduced its long-term wood supplies by 10% following the opening of its de-inking plant in Quebec. This situation has fanned woodlot owners' fears that they may lose a sizable share of their traditional market and see wood prices decline as a result.[47] Private producers' fears appear entirely justified when one considers that Quebec paper manufacturers have reduced their roundwood purchases from those producers by 35% in the past three years.[48] The pressures on public forests also appear to be declining. Since 1990, as a result of paper recycling, the recession and new processes, paper producers have nearly halved the quantity of wood cut in Quebec's public forests; authorized volumes have declined from 8.3 to 4.9 million cubic metres. It is expected that the volume of wood left by the pulp and paper companies will be picked up by the sawmills,[49] a phenomenon that will further exacerbate the difficulties woodlot owners are experiencing in selling their wood to the sawmill industry.

Of course the industry can record appreciable profits by diversifying its supply from the natural forest to the so-called "urban" forest. It is nevertheless true that forestry workers and small communities that are traditionally dependent on the forest sector may well suffer from the growth in paper recycling. It should not be forgotten, however, that paper fibres can be recycled

(44) Forestry Canada (1993), p. 65.

(45) Pierre Dubois, "Forêt privée: virage vers le sciage," *Forêt Conservation*, March 1993, p. 10-13.

(46) Forestry Canada (1993), p. 65.

(47) "La pression sur la forêt québécoise demeurera," *Le Soleil*, 13 November 1991, p. B1.

(48) Dubois (1993).

(49) Canadian Press, "En trois ans, les papeteries ont diminué de moitié leur abattage sur les forêts publiques," *La Presse*, 31 May 1993, p. C-3.

approximately seven times, and each time virgin wood fibres will have to be introduced to ensure strength.

In economic terms, it may be considered that the pulp and paper industry's move toward recycling could make it possible to reduce production costs and thereby improve the Canadian sector's competitive position. According to a report of the Quebec Ministry of Forests, however, the cost to produce a tonne of newsprint in eastern Canada is 21% greater than in the southern United States. Since, according to estimates, the cost of wood fibre is 47% higher here because of the rapid-growth species used in the southern United States,(50) the use of wastepaper should close the gap in this area. Of course, this will depend on the price that has to be paid for old paper, particularly where it is imported from the United States. Prices will remain relatively low as long as plants have not used existing stocks, but increased demand will soon push prices up. Forestry Canada expects that they will increase from $20 per tonne in 1995 to about $180 around 2001, then fluctuate between $120 and $160 per tonne.(51)

CONCLUSION

The Canadian pulp and paper industry has strongly resisted the idea of helping to solve the U.S. problem of burying waste by importing old paper and recycling it through costly infrastructures. It appears, however, that this route is the only way for the Canadian industry to preserve its extensive market while updating its aging, and in some instances even obsolete, production infrastructures. Canadian producers have thus chosen to spend billions of dollars to acquire the technology that will enable them to manufacture newsprint containing a significant percentage of recycled fibres. Canada's de-inking capacity for old paper has increased so rapidly that Canadian newsprint producers must now import an impressive quantity of wastepaper from their major export market.

While this new trend is quite favourably perceived by most environmental organizations, other stakeholders question the true impact of large-scale paper recycling on both the environment and the financial health of the Canadian pulp and paper industry. According to them, while trees will be spared the axe, de-inking infrastructures will produce an enormous quantity of waste that will have to be disposed of in ways that will not damage the environment or human health.

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(50) François Riverin, "Pâtes et papiers: plusieurs fermetures encore à prévoir," *Les Affaires*, 18 September 1993, p. 36.

(51) Forestry Canada (1993), graph on p. 65.

For an industry whose production infrastructure is becoming obsolete, it may also still be tempting to build new facilities near major urban centres (the "urban forest"), from which old paper can be recovered in large quantities. This trend has already been observed in the United States, and could result in increased competition for Canadian pulp and paper producers. It will, however, always be necessary to combine high-quality virgin fibres with fibres from old paper, and in this way Canada may be able to maintain some of the comparative advantages that have made its reputation as the world's number one exporter of forest products.

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