
Potential Economic Implications of Possible Kyoto Scenarios on the BC Forest Industry

Prepared For: BC Ministry of Land Air and Water Protection

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
MEASURES TAKEN BY THE BC FOREST INDUSTRY TO REDUCE GHGS SINCE 1990.....	2
COST IMPLICATIONS	4
Flow Through Cost Impacts	6
DET Cost Impacts	9
COMPETITIVENESS ISSUES.....	12
INDUSTRY REACTION TO IMPOSITION OF A FIFTEEN PER CENT GHG CLAW BACK.....	13
INDUSTRY ISSUES.....	15
Credit for Early Action.....	15
Biomass Neutrality	16
Implications of Alternative Reporting Deadlines.....	17
APPENDIX 1	18
APPENDIX 2.....	18
APPENDIX 3.....	19
APPENDIX 4.....	19

Executive Summary

The BC forest industry has been slowly increasing its energy self sufficiency for several decades by the substitution of its own wood residues for fossil fuels as well as the generation of electricity to displace purchased electricity from Provincial utilities. This increase in energy self-sufficiency has dramatically reduced both direct greenhouse gas (GHG) emissions from reduced fossil fuel consumption as well as indirect emissions from purchased electricity. By 1999 the BC forest industry had reduced its GHG emissions by more than 1 Mt or 24% below 1990 emission levels.

Most of the large integrated forest product companies in BC have been tracking their GHG emission reductions for a number of years through the Federal Voluntary Challenge Program. The industry expected that it would receive credit for these “early actions” to reduce GHG emissions as a result of numerous promises of encouragement made by Federal bureaucrats since the signing of the Kyoto Protocol agreement. However, the release of the Federal Government’s GHG Discussion Paper in July 2002 and the subsequent release of their intended policy in November 2002 indicate that these early action initiatives will not be recognized and that the Federal government will require the industry to reduce its emissions by a further 15 % before the 2008-2010 reporting deadline. Potential pulp sector earnings of \$7.8 million from the sale of early action GHG credits have now become a future liability of \$4.2 million. Receiving “credit for early action” remains a fundamental demand of the forest industry in any credit trading scheme that will ultimately be devised. The Federal Government’s proposed Domestic Emission Trading (DET) system is viewed as expropriation without compensation.

Estimates of the cost of reducing GHG emissions in keeping with the Federal Government’s program DET vary by forest industry sector, the required reduction percentage, the cost per tonne of GHG as well as further internal reduction opportunities. The kraft pulp sector will experience only slight operating cost increases ranging from a low estimate of 0.17% increase with a 15% “claw back” and credit costs at \$10 per tonne to 1.3% increase with a 30% credit claw back and GHG cost of \$50 per tonne. It is likely that these cost increases will be mitigated by further increases in use of wood residue fuel and the concomitant reduction use of natural gas.

The newsprint industry is a significant consumer of purchased electricity and therefore is more exposed to the flow through costs of electricity price increases that will result from costs impacts on the electricity utilities. Newsprint operating costs will increase by 0.36% to 1.15% dependent on the costs incurred by the utilities as a result of the need to reduce their own GHG emissions. The direct impact of emission credit claw backs on newsprint will be negligible as the industry consumes very little fossil fuel. BC Hydro has been working with both the pulp and paper industry to identify efficiency savings. This program combined with increasing industry self-generation of electricity will likely mean that future purchased electricity will decrease offsetting some or potentially all of the cost increases resulting from GHG impacts.

The Federal government's GHG reduction policy does not include the solid wood industry in its proposed DET program. However, if the industry were included it would experience only minor impacts from GHG claw backs as, unlike pulp and paper mills, they individually consume relatively minor quantities of energy per unit of production. Having said this, the solid wood industry has a significant opportunity to further reduce its use of natural gas by substituting its own wood residues. Approximately one third of BC sawmills now use their own wood residues for drying lumber, the remainder still use natural gas or propane. Many of those that use natural gas are still operating waste incinerators causing local pollution problems.

In early December 2002, the Prime Minister indicated that the Federal Government will limit the cost impact on large emitters captured by the DET to a maximum of \$15 per tonne.

Measures Taken by the BC Forest Industry to Reduce GHGs since 1990

The BC Forest Industry has taken significant measures since 1990 to reduce its energy costs that have had the effect of reducing GHG emissions within the industry. These reductions have been achieved by a number of measures including:

- Fuel switching including the substitution of CO₂ neutral wood residue for fossil fuels as well as lower GHG emitting natural gas for fuel oil.
- Closing uncompetitive manufacturing facilities and expanding more efficient facilities.
- Increasing the energy efficiency at existing facilities.

The BC solid wood sector produces more than 6 million BDt of wood residues annually in the form of bark, sawdust and planer mill shavings. Some of the sawdust and shavings are used for product production including sawdust pulp, particle board and MDF manufacture but by far the largest use of wood residues is to produce heat and power in the BC pulp industry. The BC pulp industry currently consumes more than 3 million BDt of wood residues annually to co-generate heat and the production of more than 600 MW of electricity for mill needs¹. There has been a steady increase in the pulp sectors use of wood residues over the decades and a concomitant decrease in the use of fossil fuels including natural gas and heavy fuel oil. This has generated significant reductions in GHGs. Examples of significant fuel switching include:

- Norske's construction of a fluidized bed wood residue boiler at their Powell River paper mill that essentially replaced most of the mill's natural gas consumption.
- Tembec's construction of a new 40 MW wood residue fired cogeneration facility at their Crestbrook pulp mill.
- Howe Sound Pulp and Paper's mill modernization project that included the installation of an 80 MW cogeneration facility.

¹ Power is also generated from the incineration of kraft pulp mill black liquor in recovery boilers that often employ back pressure steam turbines to generate both electricity and low pressure process steam that is used for a number of purposes including pulp drying.

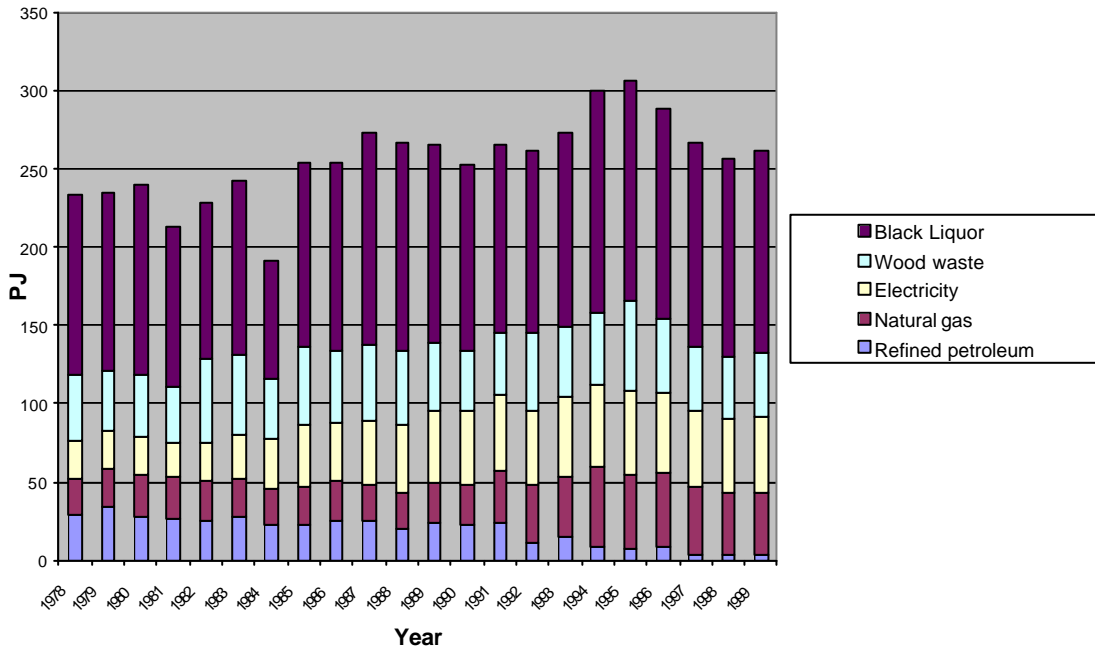
- Pope and Talbot's 20 MW wood residue boiler project at their Mackenzie pulp mill.
- Several sawmill wood energy projects where the mills switched from natural gas to wood residue as the primary fuel for drying lumber.
- Riverside's installation of a 20 MW co-generation facility at their Armstrong plywood mill.
- The construction of the Vancouver Island gas pipeline that permitted South Coast and Vancouver Island pulp mills to convert from fuel oil to lower GHG emitting natural gas.

Significant GHG reductions can also be attributed to plant closures. Within the pulp and paper sector there have been a number of plant closures including:

- Avenor's Gold River pulp mill,
- Norske's pulp mills at Powell River and Alberni
- Skeena Cellulose's pulp mill at Prince Rupert
- Louisiana Pacific's CTMP mill at Chetwynd.

Not all of these closures are necessarily permanent with the exceptions of Gold River, Powell River and Pt. Alberni where the equipment to produce pulp has been sold and removed. In the case of Skeena and Chetwynd there is an equal chance that both mills might reopen and thereby increase the GHG emissions within the sector. Despite these closures, BC pulp and paper production has increased since 1990 due to expansions of existing pulp and paper facilities and the reconstruction of new mills at Howe Sound and Castlegar.

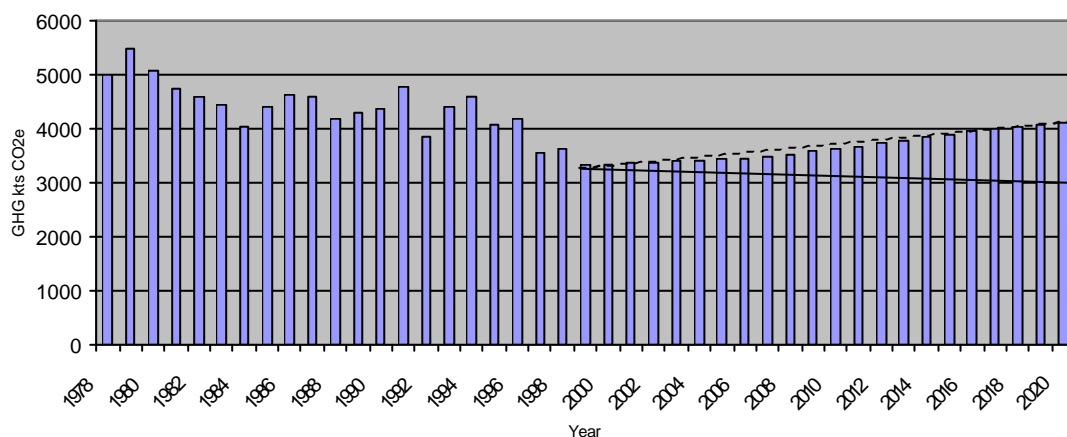
Figure 1: BC P&P Energy Consumption PJ/y



As can be seen from Figure 1, there has been an increasing use of electricity energy within the pulp and paper sector. This is in part due to the added paper making capacity that is electrical energy intensive. Much of this electricity is internally generated but the industry is still a significant buyer of purchased electricity, primarily from BC Hydro. In fact, Norske Canada and Canfor are BC Hydro's two largest customers. In recent years, BC Hydro has been working with its large industrial customers as part of its Power Smart Program to identify internal power saving opportunities within the pulp and paper industry. This program has resulted in a net saving of 650,000 MWh annually or the equivalent of 82MW of avoided capacity. More than 70% of these savings can be attributed to the pulp and paper industry. This program has effectively forestalled the need for BC Hydro to build additional electricity capacity in the Province that in all likelihood would be from combined cycle natural gas fired facilities that would generate significant absolute increases in BC's GHG inventory. Significant direct reductions have also resulted from mill modernization programs at Crofton, Howe Sound and Castlegar despite production increases and the absolute increase in energy demand associated with the modernization programs. Most pulp and paper mills employ pinch analyses techniques that have identified both electrical and thermal energy saving opportunities that in many instances have reduced both power and natural gas purchases.

Figure 2 indicates the GHG emission profile for the combined BC pulp and paper and solid wood sectors for the period 1978-99. The forecast emissions (dotted line) are based on the Federal government's Analysis and Modeling Group's Business as Usual Forecast. The solid line is a more realistic industry forecast of emissions reflecting the industry's pattern of substitution of wood residue for fossil fuels and energy conservation.

Figure 2: BC Forest Industry GHG Emissions kts CO2e



Cost Implications

The Federal Government's GHG Discussion Paper in July 2002 and the subsequent release of their intended policy in November 2002 suggest that all large GHG emitters will be required to reduce their emissions by 15% of projected 2010 emissions. The pulp

and paper industry is listed as an industrial sector within the large GHG emitter category. The sawmilling industry, while collectively a large emitter, was not listed in the Federal Plan. However, the final determination has not been made regarding which industries will be captured. Nor has a final determination been made on the quantity of “free permit” allocations and therefore the terms of reference call for modeling cost impacts on both industries at 85% and 70% (15% and 30% claw back) free permit allocation. Finally, cost impacts at \$10 and \$50 per tonne were modeled to give a range of potential cost impact on both industry sectors².

The cost impact on both the solid wood industry and pulp and paper sectors will manifest itself in two ways. First, both industries may be required to purchase GHG credits equivalent to 15% or 30 % of the 2010 Business as Usual sector allocation if they do not have any cost-effective in-house abatement alternatives. Secondly, the industries may see increases in their input energy costs that are passed along by the natural gas and electricity utilities.

The Pulp and Paper Research Institute of Canada (Paprican) has forecast an increase in product production of \$4.56 for kraft pulp and \$9.46 per ADt for a stand alone newsprint mill. However, the Paprican study was national in scope and completed before the Federal Government’s DET program was fully developed. It also took into consideration that mills in Eastern Canada and the Prairie Provinces purchase electricity from utilities that rely much more on fossil fuel generation than in BC where the vast majority of electricity supply is hydro generated. Similarly, there is a greater reliance on the use fossil fuels in Eastern Canadian mills for heat and power production than in those in Western Canada. Finally, BC mills are generally newer and tend to be more efficient users of energy than those in Eastern Canada as evidenced by the Forest Products Association of Canada (FPAC) 2000 Energy Survey that indicates that the Canadian average GHG emissions are 0.349 tCO₂e per Air Dry tonne (ADt) of product versus 0.325 per ADt for BC mills.

In a separate analysis, the Federal Government Analysis and Modeling Group recently suggested an average cost increase of \$0.59/ADt for combined pulp and paper production. However, it is unclear whether the Federal study assumed any flow through costs from utilities to pulp and paper producers. Table 1 provides Analysis and Modeling Group estimates of projected DET cost increases on various pulp and paper products.

² The Prime Minister indicated during the parliamentary vote on ratification of the Kyoto Accord that the Federal Government would limit financial impact of emission trading to \$15 per tonne.

Table 1: Analysis and Modeling Group Forecast of DET Impact on the Canadian Pulp and Paper Products

	\$/ADt	Recent Prices	Cost Price %
Pulp and Paper	0.59		
Pulp and Paper - Pulp Industry	0.55	\$908.99 per tonne of Northern Bleached Softwood Kraft	0.06
		\$797.88 per tonne of Northern Bleached Hardwood Kraft	0.07
Pulp and Paper - Newsprint Industry	0.41	\$960.32 per tonne of West Coast	0.04
		\$960.32 per tonne of West Coast Newsprint	0.04
Pulp and Paper - Paperboard Industry	0.61	\$786.78 per tonne Unbleached Kraft Linerboard	0.08
		\$728.75 per tonne Corrugating Medium	0.08
Pulp and Paper - Building Board Industry	0.04		
Pulp and Paper - Other Paper Industry	1.01		

Flow Through Cost Impacts

One of the cost impacts of the Federal Governments proposed emission trading scheme is the flow through costs from regulated utilities to the BC forest industry. Estimates of these costs are available from studies done by BC utilities including BC Hydro and BC Gas. BC Gas believes that regulated distribution and transmission companies should be able to pass along all of their cost increases associated with DET to end users. There is some speculation that BC utilities would also attempt to pass along costs imposed on their exported energy to BC customers. BC consumers would obviously balk at such an imposition. Approximately 50% of gas flowing through the BC gas pipeline system is for export to the US. Therefore if the Utilities Commission sides with the utilities then the flow through costs of gas imposed credits could double.

While it is clear that regulated gas distribution and transmission utilities will attempt to pass their costs of compliance with the Kyoto Protocol onto their customers through rate hearings, it is unclear how successful gas producers will be in passing on their costs of compliance that are much more significant than the transmission and distribution costs. BC Gas estimate upstream producer costs at \$0.023/GJ assuming \$50/t credit costs. The Canadian Association of Petroleum Producers argues that natural gas is a commodity whose price is set by supply and demand in relatively free markets. In other words they are price takers and would have little if any ability to pass along these costs to consumers.

Canadian gas producers compete with US and Mexican gas producers in North American markets. Therefore in the longer term, Canadian gas supply may start to dwindle as described in the Scarfe report. *“Petroleum and natural gas producers tend to locate their exploration and development activities where the combination of geological potential, access considerations, and business climate is most favourable to economic returns. Jurisdictions in which economic returns are lowered as a result of emissions costs will experience a leakage of investment activity to jurisdictions in which there are no emissions costs”*. Any restriction in gas exploration and ultimately supply could trigger a run-up in the hub price of gas in BC similar to that experienced two winters ago.

The Analysis and Modeling Group forecasts for electricity prices in BC indicates that prices will decrease over time as “targeted measures” imposed by the Federal Government cause customers to increase efficiency measures lowering the demand for electricity. However, any increase in BC Hydro’s cost structure due to the Kyoto Agreement ratification will likely be passed onto consumers following BC Utility Commission Rate Hearings process. BC Hydro’s own forecast of price increases due to Kyoto ratification and the effects of emission trading ranges from 0.25% to 4% increase for \$10 and \$50 per tonne CO₂ prices. Since the BC Hydro rate freeze went into effect, pulp and paper mills have paid slightly more than \$0.035/kWh for their purchased electricity. Sawmills pay a slightly higher rate as many are in the commercial rate category. The average rate for sawmills is approximately \$0.047/kWh.

While BC Pulp and Paper producers self-generate a significant amount of power estimated at 700 MW or 5,500 GWh annually, the industry still purchases approximately two-thirds of its electricity or more than 9,000 GWh annually from utilities. Consumption at individual mills varies dependent on the product line. Kraft pulp mills consume comparatively little purchased electricity as many self-generate at least a portion of their needs. CTMP mills consume significant quantities of electricity and self produce little if any of their own electricity consumption³. With a few notable exceptions such as Norske’s Powell River mill, stand-alone paper mills also consume significant amounts of electricity and self-generate only a small amount of their total consumption. Table 2 provides a relative indication of electricity consumption per tonne of product production.

Table2: Relative Electricity Consumption by Mill Type

Mill Type	MWh/ADt
CTMP	2.15
Kraft	0 – 1.0
News Print	2.7
Light Weight Coated	3.0

³ Some CTMP mills are (were) integrated with kraft pulp mills and do self generate some of their power consumption.

Table 2 also indicates that any cost increases due to increasing electricity rates will primarily burden CTMP and paper mills. However, on a KWh basis the impact of emission trading would be relatively minor even if the full impact of the rate increase predicted by BC Hydro was passed through to the forest industry as indicated by Table 3. Assuming a worst case scenario (@\$50t credit costs and 30% DET claw back) the combined cost of electricity and gas that would flow through to the pulp sector would be \$1.44/ADt or 0.40% of the total production costs.

Table 3: Unit Cost Impacts of Flow through Producer Energy Costs to the Kraft Pulp Sector

		Total Direct Unit Cost \$/ADt	Electricity Unit Cost	Electricity Unit Cost Change as % Total Unit Cost	Natural Gas Unit Cost \$/ADt	Gas Unit Cost Change as % Total Unit Cost	Total Energy Unit Cost	Total Energy % Flow Through Cost Increase
Base Case	Pulp \$/ADt	\$ 360.00	\$ 8.30		\$ 19.46		\$ 27.76	
15 % Claw back	@\$10/t	\$ 360.00	\$ 8.32	0.006%	\$ 19.50	0.011%	\$ 27.82	0.017%
	@\$50/t	\$ 360.00	\$ 8.63	0.092%	\$ 19.85	0.108%	\$ 28.48	0.200%
30% Clawback	@\$10/t	\$ 360.00	\$ 8.34	0.012%	\$ 19.54	0.022%	\$ 27.88	0.033%
	@\$50/t	\$ 360.00	\$ 8.96	0.184%	\$ 20.24	0.216%	\$ 29.20	0.401%

Table 4 indicates the impact of flow through energy cost increases on a newsprint producer. Modern newsprint producers consume very little fossil fuel but significant electrical energy as indicated in Table 2. Production cost increases due to the flow through cost of purchased electricity increases range from 0.36% to 1.15% in the worst case scenario. However, as virtually all newsprint operators are integrated pulp producers, the flow through cost per tonne of newsprint will be somewhere in between the cost of a stand alone newsprint producer and a market pulp producer.

Table 4: Unit Cost Impacts of Flow through Producer Energy Costs to the Newsprint Sector

		Total Direct Unit Cost \$/ADt	Electricity Unit Cost	Electricity Unit Cost Change as % Total Unit Cost
Base Case	Newsprint \$/ADt	\$460.00	\$66.00	
15 % Claw back	@\$10/t	\$460.00	\$67.65	0.36%
	@\$50/t	\$460.00	\$68.64	0.57%
30% Claw back	@\$10/t	\$460.00	\$69.30	0.72%
	@\$50/t	\$460.00	\$71.28	1.15%

Similarly the cost impact on the sawmilling sector of flow through cost increases is relatively minor as indicated by Table 5. The impact on individual mills will vary significantly as some mills consume virtually no natural gas as they utilize their own wood residue to heat their lumber dry kilns, whereas the remaining mills use natural gas to operate their kilns.

Table 5: Unit Cost Impacts of Flow through Producer Energy Costs to the Sawmill Sector

		Total Direct Unit Cost \$/Mfbm	Electricity Unit Cost	Electricity Unit Cost Change as % Total Cost	Natural Gas Cost	Gas Unit Cost Change as % Total Cost	Total Energy Unit Cost	Total Energy % Flow Through Cost Increase
Base Case	Solid Wood	\$ 342.00	\$ 6.25		\$ 8.75		\$ 15.00	
15 % Claw back	@\$10/t	\$ 342.00	\$ 6.27	0.005%	\$ 8.76	0.005%	\$ 15.03	0.010%
	@\$50/t	\$ 342.00	\$ 6.50	0.073%	\$ 8.92	0.051%	\$ 15.43	0.124%
30% Claw back	@\$10/t	\$ 342.00	\$ 6.28	0.009%	\$ 8.78	0.010%	\$ 15.07	0.019%
	@\$50/t	\$ 342.00	\$ 6.75	0.146%	\$ 9.10	0.102%	\$ 15.85	0.249%

If there is a significant impact on the cost of natural gas and/or electricity, the industry will likely further increase its substitution of wood residue fuel for natural gas and attempt to self-generate more power to offset purchased electricity⁴.

DET Cost Impacts

In addition to the flow through cost increases from electricity and natural gas producers, the BC forest industry may well be forced to enter the market place and buy emission credits. The Federal Government in its Climate Change Plan for Canada has confirmed its preference for Option 4 in its earlier Discussion Paper as the methodology for reducing emissions from large industrial GHG emitters. Option 4 provides firms in the participating industrial sectors with a total of 279 MT worth of emission permits/credits each year. These permits/credits would be provided free of charge but only equal 85% (or possibly 70% if Canada does not get recognition of Clean Energy Exports to the US) of the expected 2010 emissions from the large emitting industrial sectors. It is assumed that each industrial sector and/or sub-sector would receive 85% of their business as usual (BAU) credits and that allocation of credits within a sector would reflect the emission intensity of the firm relative to the sector average. The remaining percentage of a company's allocation would be attained by in-house reduction measures or GHG trading as provided for in the Domestic Emission Trading scheme devised by the Federal Government.

⁴ The cost increase in electricity resulting from the two tiered pricing recommendation in BC's Energy Policy report (Nov. 2002) will likely cause some mills to reexamine previously mothballed projects.

While it is clear that the pulp and paper sector will be captured by the proposed Domestic Emission Trading (DET) scheme, it is not clear whether the solid wood sector will be captured. In its initial analysis, the solid wood sector was excluded even though collectively it is a large user of energy. To determine what industrial sectors would be captured, the Government applied the 80:20 rule i.e. 80% of the emissions coming from 20% of the industry participating firms. The solid wood sector includes more than 9,000 individual companies which would make tracking difficult. In recent weeks there has been some indication that the Federal Government might opt to include only those mills that were over a certain size in keeping with the 80:20 rule. Such an option could be part of the Covenant negotiations that are now taking place with national industry associations.

The Canadian pulp and paper industry has an excellent track record of reducing GHG emissions. According to the Forest Products Association of Canada (FPAC), the Canadian pulp and paper industry reduced GHG emissions by 19% on an absolute emissions basis and by 36% on a unit of production basis from 1990 to 2000. The comparable figures for BC are a 29% on an absolute basis and a remarkable 41 % reduction on a unit of production basis. It is unclear how many more cost-effective projects are available within the sector. It is uncertain how BC mill's GHG emission intensity will compare to the industry average as in part the reductions of the BC industry since 1990 are in part due to the permanent and semi-permanent closure of several pulp mills. Therefore for the purposes of this analysis it is assumed that the industry would have to purchase all of its necessary credits on the DET market and that BC mills emission intensity factor would be the Canadian industry average.

The Federal Government has not provided the BAU targets for large industrial emitters. However, FPAC estimates that the pulp and paper sector 2010 BAU forecast will be 12.7 Mt. Assuming a 15% claw back, the sector will be allocated 11.0 Mt leaving a gap of 1.7 Mt that would be made up either by doing more in-house abatement measures or purchasing emission credits. The emission credits can come from either Canada's DET system, or from overseas Cooperative Development Mechanism or Joint Implementation projects as provided for in the Kyoto Protocol.

Table 6 provides a summary of the impact of the cost of acquiring emission credits under a 15% and 30% claw back scenarios as well as comparable scenarios at \$10 and \$50 offset costs. The Table also shows the combined effect of flow through energy costs and the costs of acquiring GHG offsets. The costs of offsets range from \$0.54/ADt for the 15% claw back and \$10/t scenario to \$5.39/ADt for the 30% claw back and \$50/t scenario. Combining the cost of offsets with the cost of flow through energy costs increases the cost impact range from \$0.60 to \$6.83 per ADt.

Table 6: Unit Cost Impact of Combined Emission Trading Offsets and Flow through Energy Costs on the BC Kraft Pulp Industry.

	Total Direct Unit Cost \$/ADt	Offset Cost \$/ADt	Offset Unit Cost Change as % Total Unit Cost	Flow Through Energy Costs \$/ADt	Flow Through Energy Costs as % Total Unit Cost	Total Cost of Offsets and Flow Through Costs \$/ADt	Total Offset and Energy Costs as % of Total Cost
Pulp \$/ADt	\$360.00						
@\$10/t	\$360.00	\$ 0.54	0.15%	\$0.06	0.02%	0.60	0.17%
@\$50/t	\$360.00	\$ 1.08	0.30%	\$0.72	0.20%	1.80	0.50%
@\$10/t	\$360.00	\$ 2.69	0.75%	\$0.12	0.03%	2.81	0.78%
@\$50/t	\$360.00	\$ 5.39	1.50%	\$1.44	0.40%	6.83	1.90%

Option 4 proposes to allocate individual company GHG emission quotas on the basis of the individual company GHG emission intensity relative to the sectoral average. The analysis in Table 3 assumes that the BC pulp and paper industry emissions are the average of the Canadian pulp and paper sector. However the FPAC Energy Survey data indicate that the BC industry is more efficient than the Canadian industry average. In 2000 for example, the BC GHG emissions were 0.325 tCO₂e/ADt compared to the industry average of 0.348 tCO₂e or 7.67% below the industry average. The cost impacts on the BC industry should therefore be somewhat less than that indicated by Table 6. However, the BC industry emission intensity is influenced significantly by the closure of mills as previously indicated. The degree to which this is a factor in other regions of Canada will ultimately determine the individual company impacts.

The potential DET impact on the BC solid wood industry is difficult to estimate as the Federal Government has not provided any indication of BAU emissions for this sector. However, using GHG emission data from a series of BC forest companies participating in the Voluntary Challenge Registry it is estimated that 2001 GHG emissions will be 1.7 Mt. Assuming that this is the BAU forecast means that the sawmilling sector would have to reduce its GHG emissions by 0.255 Mt based on a 15% claw back. Table 7 provides an estimate of the cost impact of flow through energy costs and DET credit costs on the BC sawmilling industry.

Table 7: Unit Cost Impact of Combined Emission Trading Offsets and Flow through Energy Costs on the BC Sawmilling Industry.

		Total Direct Unit Cost \$/Mfbm	Offset Cost \$/Mfbm	Offset Unit Cost Change as % Total Unit Cost	Flow Through Energy Costs \$/Mfbm	Flow Through Energy Costs as % Total Unit Cost	Total Cost of Offsets and Flow Through Costs \$/Mfbm	Total Offset and Energy Costs as % of Total Cost
Base Case	Sawmill	\$342.00						
15 % Claw back	@\$10/t	\$342.00	\$ 0.20	0.06%	\$0.03	0.01%	\$0.23	0.07%
	@\$50/t	\$342.00	\$ 0.98	0.29%	\$0.43	0.13%	\$1.41	0.41%
30% Claw back	@\$10/t	\$342.00	\$ 0.39	0.11%	\$0.07	0.02%	\$0.46	0.14%
	@\$50/t	\$342.00	\$1.96	0.57%	\$0.85	0.25%	\$2.81	0.82%

Competitiveness Issues

The BC Forest Industry operates in truly competitive markets with many buyers and sellers both in the pulp and paper industries and solid wood industries. Therefore the ability to pass along cost increases resulting from flow through energy costs or offset GHG trading costs are minimal. Assuming a worst case scenario for the BC pulp industry:

- That the Federal claw back is 30% and
- The cost per tonne of GHG offsets is \$50/tonne CO₂e and
- That industry has no other choice other than buying credits.
- The pulp industry's direct costs will increase within a range of 0.17% to 1.90%.

While low range cost increase appears minimal, the BC industry is already un-profitable and un-competitive relative to the cost structure of kraft pulp producers in competing countries as indicated in Table 8. The B.C. cost structure is generally higher than other competing regions because B.C. pulp mills are, for the most part, older, smaller and operate less efficiently than those in most competing jurisdictions, impacting all areas of cost other than fibre.

Moreover, BC market pulp producers have incurred losses in virtually every year over the past decade. Capital investment has been less than depreciation for the past several years. These are clear signals that the industry simply can not afford any further cost increases no matter how minor.

Table 8: Regional Comparison of 1997 Market Pulp Delivered Costs⁵

	Sweden	Alberta	Finland	Rest of Canada	U.S. South	U.S. West	B.C.
Fibre	\$307	\$196	\$381	\$254	\$243	\$192	\$214
Conversion cost							
Labour	70	111	53	111	107	89	116
Chemicals	63	57	65	64	75	96	73
Energy	17	14	-1	41	37	55	43
Other Mill	58	132	71	109	81	87	130
Corporate & Selling	11	19	13	11	17	37	26
	\$ 526	\$ 529	\$ 582	\$ 590	\$ 560	\$ 556	\$ 602
Delivery	58	93	61	62	100	113	84
Total 1997	\$584	\$622	\$643	\$652	\$660	\$669	\$686
(Dec31/98 exchange rates)							
Advantage over B.C.	15%	9%	6%	5%	4%	2%	

NLK⁶ Consultants has bench marked more than 75 northern bleached kraft pulp mills world wide (See Appendix 1). The results of this analysis indicate that BC mills are in the top fifty percentile of the industry cost curve except during poor pulp market conditions when BC mills enjoy lower pulp chip fibre costs that are typically tied to the selling price of pulp unlike other jurisdictions where fibre costs are relatively constant. The results also confirm that while BC mills enjoy relatively low energy costs, Finnish mills have become net electrical energy sellers in the European grid.

NLK's analysis of the competitiveness of BC newsprint producers indicates that BC mills are much more competitive than BC kraft pulp producers (see Appendix 3) primarily because of the relatively low purchased electricity costs enjoyed by BC producers (see appendix 4).

Industry Reaction to Imposition of a Fifteen Per Cent GHG Claw Back

Given that the pulp industry cannot absorb any further cost increases, a logical reaction to the imposition of GHG reduction obligations is for the industry to examine further internal GHG reduction opportunities. While the industry has made significant GHG reductions since 1990, there are still further reduction opportunities within the industry.

⁵ Source: Pricewaterhouse Coopers

⁶ Source : NLK Consultants Inc

Perhaps the greatest opportunity is through additional fuel switching i.e. the substitution of wood mill residues for fossil fuels. According to the FPAC annual Energy Survey of member mills, the BC pulp and paper industry is already 69% energy self-sufficient. Kraft pulp mills and integrated pulp and paper mills produce the majority of their process steam requirements from their recovery and power boilers. Most also produce a certain percentage of their power requirements utilizing a combination of condensing and non-condensing steam turbines dependent on the steam requirements of the mill. However, competing Scandinavian mills are virtually 100% energy self-sufficient driven by the relatively high cost of purchased energy in these Nordic countries. BC mills will have to move towards this goal to remain world competitive.

The industry will also examine further opportunities to improve energy efficiency. NLK recently completed a report indicates that 120 MW could be saved by internal efficiency projects within the BC pulp and paper sector. A recent Stothert Engineering report for BC Hydro indicated there is also the potential to produce a further 200 MW of power from the more than 2 million Bdt of wood residue that are still being incinerated as waste in bee-hive burners associated with the sawmilling industry. There are undoubtedly further but so far unquantified savings in natural gas efficiency projects in the industry that would directly reduce natural gas consumption and concomitantly reduce GHG.

The newsprint industry has historically been more profitable than the pulp industry. It is also a more competitive industry than the BC pulp industry. However, newsprint producers consume much more electricity than kraft pulp producers and therefore the flow through costs of electricity price increases passed on by BC utilities are much more significant as indicated by Table 4. Appendix C indicates that BC newsprint producers are very competitive internationally within their sector and that the flow through costs of DET from BC Hydro, while significant at \$50/t and a 30% claw back, will not seriously erode the competitiveness of BC newsprint mills.

The BC solid wood industry has historically been more profitable than the pulp and paper industry. BC sawmills are world class from an operating cost perspective. Most are larger than those in competing jurisdictions and were it not for the current counter-vailing duty on US lumber, the BC industry would be enjoying relatively robust earnings.

The solid wood industry is less energy self-sufficient than the pulp and paper industry although it is a significantly less energy intensive industry compared to the pulp and paper sector. The sawmilling industry uses a relatively small amount of electricity for motors, fans etc. The primary use of energy within the sector is for lumber drying. While approximately one-third of BC sawmills have converted from fossil fuels to wood residue, the majority still use natural gas to dry their lumber. While there is an obvious business case for kiln conversion from natural gas to the mills own wood residues many of these projects are stalled as they do not provide the same return on investment as alternative mill investment opportunities.

Given the general poor financial health of the BC forest industry, there has been little opportunity to raise equity capital and therefore mill owners demand a high rate of return

on the small amount of capital they have to invest. Recently some companies have been investigating third party financing for energy projects. A variety of financing models have been proposed but most would see a third party operating a mill energy system utilizing the mills own wood residues and selling energy back to the mill at some fixed price that is less than the cost of natural gas.

Industry Issues

Credit for Early Action

The Canadian forest industry was taken aback by the Federal Government's position to disallow "credit for early action". Option 4 from the Government's Discussion Paper would see each industrial sector receive either 85% or 70% of its BAU emissions at some future point in time. The imposition of such a strategy effectively denies the forest industry credit for actions taken since 1990 to reduce GHG emissions. While it can be argued that the absolute emission reduction is less than it would be if the industry had delayed action, it nonetheless requires the industry to do further projects or buy credits from within the proposed emission trading scheme rather than having excess credits to sell within the proposed DET system.

The forest industry has assumed since the signing of the Kyoto Protocol that industry would be required to reduce its GHG emissions to 6% below 1990 emission levels in keeping with Canada's Kyoto target. There was also a belief that emissions would be measured on an absolute basis using actual fuel consumption and recognized GHG emission factors. Based on these assumptions, that are consistent with the methodology of the Voluntary Challenge Registry established by the Federal government, the combined BC Forest Industry has reduced its GHG emissions by approximately -24% to the end of 1999 relative to 1990 emissions. Most companies thought they would be in a position of potentially selling excess credits into the GHG trading marketplace. Needless to say these same companies were shocked to see that the Federal Government was intending to deny these credits and ask the industry to do even more. Moreover, it appears to be the Federal Government's intent to take these early action credits and use them to reduce the impact on companies and industries whose GHG emissions have increased since 1990. While the Federal Government has made commitments to share the pain of GHG reductions by sector and Province, its Option 4 essentially "robs Peter to pay Paul" in the view of the forest industry. Receiving "credit for early action" remains a fundamental demand of the forest industry in any credit trading scheme that will ultimately be devised. The proposed DET system is essentially expropriation without compensation.

Assuming that a GHG trading system is based on the premise of a target of 6% reduction below 1990 actual emissions, the BC forest industry could generate substantial earnings from the trade of excess GHG credits. In 1999 Natural Resources Canada (NRCan) compiled fuel consumption data by Province and industry using StatsCan SIC codes and updated information from "Canada's Energy Outlook" to support the work of the Analysis and Modeling Group forecasts of GHG emissions. This data set indicates that

the BC forest industry reduced GHG emissions from 4,304 kt in 1990 to 3,306 kt in 1999 or 24 %. Assuming the industry would only be responsible for reductions to 6% below 1990 emission levels leaves the industry with a potential net credit of 777 kt and potential net revenue of \$7.8 million per year @ \$10/t or \$38.8 million @ \$50/t. Therefore rather than GHG reduction being a net cost of approximately \$4.2 million to the pulp sector, there would be an opportunity for significant GHG trading revenue.

The BC pulp and paper sector would own the majority of any potential revenue that might accrue from a trading system based on a target of minus 6% and absolute emission reduction requirements. FPAC energy survey data to 2000 indicates that the BC pulp and paper industry has reduced its GHG emissions by 903 kt beyond the minus 6% Kyoto requirement. The fact that the pulp and paper net credits exceed the forest industry total is in part explained by the inherent differences in the two data sources but also the growth that has taken place in the solid wood sector since 1990 particularly in the Oriented Strand Board and Medium Density Fibreboard sectors.

Biomass Neutrality

Equally important to the forest industry is the maintenance of CO₂ neutrality for biomass incineration. In calculating GHG emissions from wood residues, mills only calculate the methane and nitrous oxide emissions and assume the CO₂ emissions are zero in keeping with International Panel on Climate Change (IPCC) recommended methodology. As previously stated most of the GHG credits earned by the forest industry since 1990 are the result of the substitution of renewable wood residue fuels for non-renewable fossil fuels. The premise of biomass neutrality is based on the fact that GHG emissions would occur in any event even if mill residues were not substituted for fossil fuels. This is in fact the case in BC where excess mill residues are routinely incinerated as wastes.

A secondary argument for the principle of biomass neutrality is the principle that no CO₂ credits are taken from “managed forests” as defined by the IPCC. This assumption is now in question as Canada has successfully argued that it should receive GHG offsets for the potential carbon sink created by Canada’s managed forests. It is arguable whether Canada’s managed forests are a net sink or source but in any event, Canada must decide by 2006 whether it intends to include its forests in its GHG accounts. Should Canada decide to include managed forests it is important that the forests be treated as a closed carbon system. At the present time there is an assumption that all of the CO₂ contained in harvested trees is released to the atmosphere when forests are harvested or otherwise die from fire or insect attack. This simplistic assumption is not the actual case as CO₂ is released in stages from harvesting through manufacturing and ultimately in product landfills once forest products reach the end of their useful product life. To track such emissions would require a complicated life-cycle analysis model that would have to include a variety of assumptions on product life. Furthermore Canadian ownership of product sinks is questionable as Canada exports more than 80% of its forest products. It is expected that importing countries such as Japan will claim ownership of imported forest product sinks if ultimately they are responsible for landfill GHG emissions from these

same products. Such a life-cycle analysis would effectively eliminate most of the credits earned by the BC forest industry since 1990.

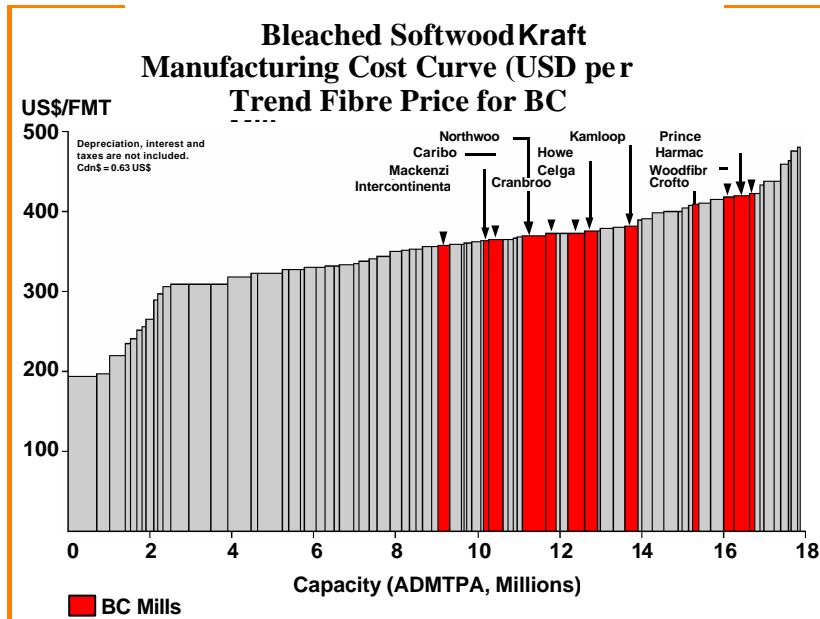
A simple solution to the foregoing dilemma is to treat the forest as a closed loop system based on current assumptions of total CO₂ release at the time of harvest. Essentially the forest would become a system of closed accounts with credits being taken from growing forests offset by debits from harvesting, insect attack and fires. Such assumptions will protect biomass CO₂ neutrality of wood residues used in the manufacturing sector of the industry and prevent the need for a complicated life-cycle GHG tracking system. Product sinks could be treated in a similar manner with sinks being created by product carbon storage offset by CO₂ and methane emissions once the products reach the end of their useful life.

Implications of Alternative Reporting Deadlines

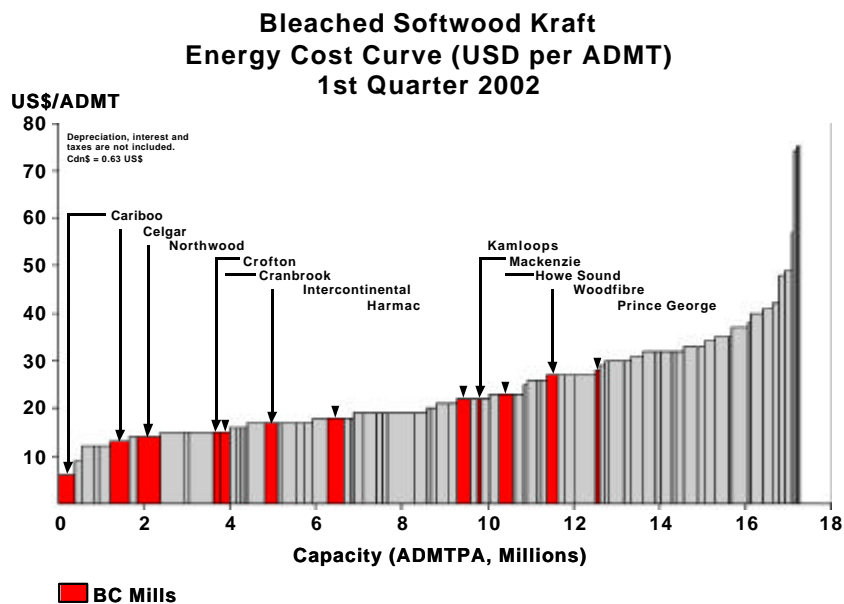
The 2008-2012 reporting period in the Kyoto Protocol agreement is problematic for most industries including the pulp and paper and solid wood sectors. Capital stock normally has a shelf life of 20 years. The imposition of GHG targets that must be achieved by 2010 could artificially speed up the capital stock turnover increasing depreciation costs.

Moreover there are several new technologies being developed that will ultimately allow the industry to become virtually energy self-sufficient. Start-up companies such as BC based EthoPower that has developed wood residue gasification technology and DynaMotive Energy that has developed wood residue BioOil technology will allow mills to cost-effectively produce their power and thermal energy needs from their own wood residues at the sawmill scale level. Lignol Innovations is yet another start-up company that has acquired the REPAP solvent pulping technology rights that they intend to employ in the manufacture of ethanol and lignin from wood residues. Ethanol from mill residues can ultimately be blended with gasoline to further reduce vehicle GHG emissions. These technologies are now being introduced to the industry but it will likely be more than a decade before they are in wide spread use. A target deadline of 2020 makes much more sense from the perspective of capital stock turnover and technology development.

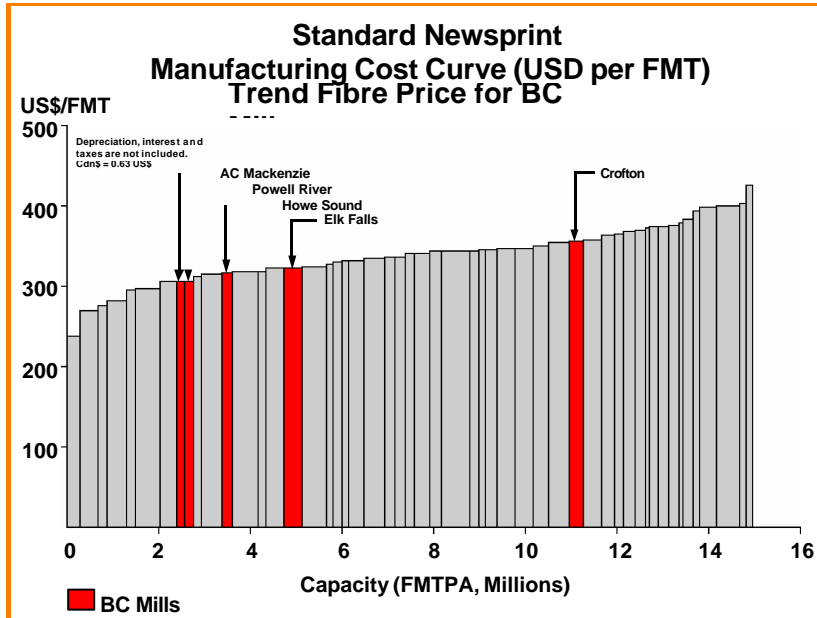
Appendix 1



Appendix 2



Appendix 3



Appendix 4

