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À l'attention de **Monsieur Pierre Vézina, ing.
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**Objet : Émission finale
Étude « Potentiel de réduction de la consommation d'énergie
électrique dans l'industrie papetière québécoise »
N/réf. : 093-2F16 (classement 60et)**

Monsieur,

Pour faire suite à votre demande, vous trouverez ci-après le rapport révisé de l'étude portant sur le potentiel d'utilisation de pâte désencrée au Québec, troisième volet de l'étude sur le potentiel de réduction de la consommation d'énergie électrique dans l'industrie papetière québécoise.

Espérant le tout conforme à vos attentes, n'hésitez pas à nous contacter pour de plus amples informations et nous vous prions de recevoir nos salutations les plus distinguées.


Denis Chabot, ing., M.B.A.
DC/jg

p.j.

**POTENTIEL DE RÉDUCTION DE LA
CONSOMMATION D'ÉNERGIE
ÉLECTRIQUE DANS L'INDUSTRIE
PAPETIÈRE QUÉBÉCOISE**

**AUGMENTATION DU
POTENTIEL D'UTILISATION DE
PÂTE DÉSENCRÉE AU QUÉBEC**

Réalisée pour :

**Association des Industries Forestières
du Québec (A.I.F.Q.)**

Préparée par :



Génivel-BPR

Émission finale

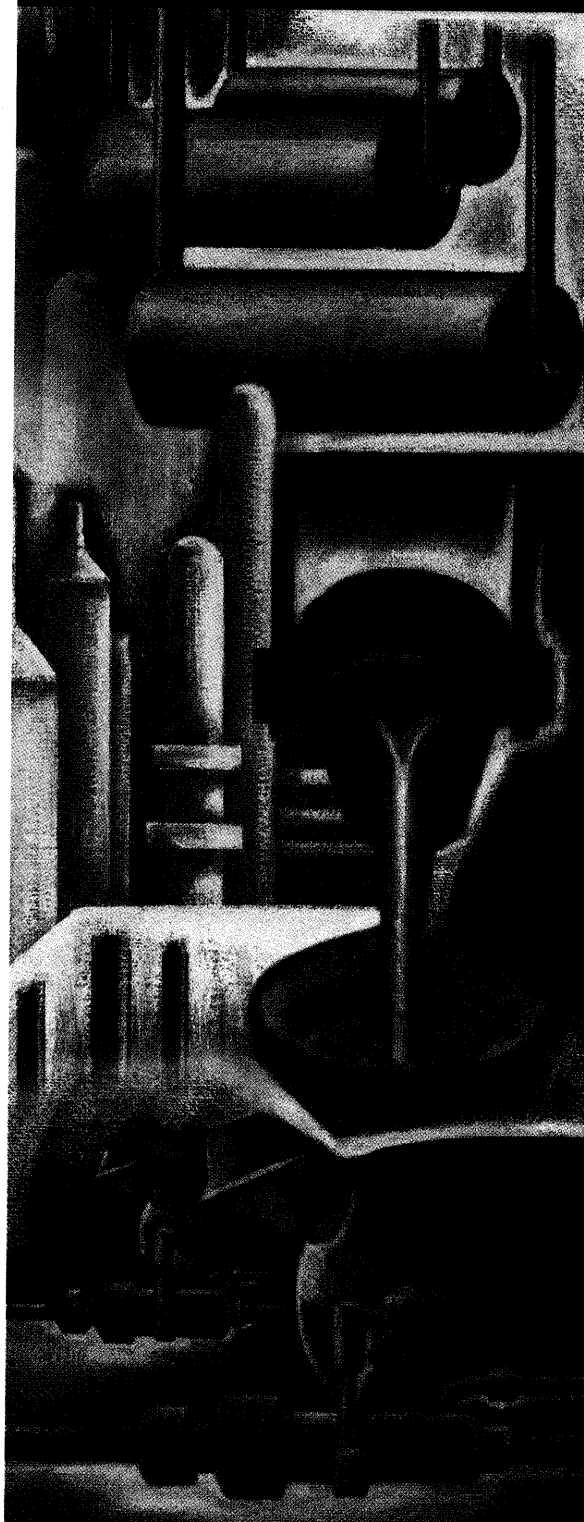
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Génivel-BPR



SOMMAIRE EXÉCUTIF

Le 3 mai dernier, l'Association des Industries Forestières du Québec (A.I.F.Q.) confiait à Génivel-BPR inc. le mandat de réaliser une étude visant à évaluer le potentiel de réduction de la consommation d'énergie électrique dans l'industrie papetière québécoise en augmentant la consommation de pâte désencrée (DIP).

Génivel-BPR a réalisé son mandat en s'appuyant principalement sur ses archives, des données statistiques tirées du registre forestier du Québec publié par le Ministère des Ressources Naturelles du Québec et du bilan 2000 de Recyc-Québec, ainsi que sur plusieurs articles publiés dans des revues spécialisées et disponibles via internet.

Tout d'abord, du point de vue de la consommation d'énergie électrique, en s'appuyant sur des données vérifiées et notre connaissance de l'industrie des pâtes et papiers, nous avons établi une courbe de la consommation d'énergie électrique par tma de DIP en fonction de la capacité de production d'un atelier de désencrage. Ainsi, on a pu déterminer que, dans le cas d'une pâte DIP pour papier journal, remplacer une tma de PTM par une tma de DIP faisait économiser 2,000 kWh.

Ensuite, nous avons comparé les propriétés physiques et optiques du DIP et de la pâte thermomécanique (PTM), ce qui nous a permis de constater qu'il n'y avait pas de différence majeure et que, pour fabriquer du papier journal, une tma de DIP pouvait remplacer une tma de PTM sans affecter la qualité du produit fini. Pour appuyer cette affirmation, mentionnons qu'une usine ontarienne a arrêté récemment sa production de PTM pour passer à la production de papier journal 100% DIP, comme cela se fait dans plusieurs usines américaines.



Afin de quantifier l'impact de l'utilisation de pâte DIP sur le coût de fabrication du papier, nous avons réalisé une simulation. Cela nous a permis de constater que, au coût actuel des copeaux, soit 125.\$ CAN/tma, tant que le coût des vieux papiers livrés à l'usine ne dépasse pas 140.\$ CAN/tm cet impact est positif. Cependant, il faut considérer ce résultat comme relatif étant donné la volatilité des prix de la fibre vierge et des vieux papiers.

La grande question étant toujours la disponibilité des fibres, nous avons découvert que celle des fibres vierges aurait tendance à diminuer au Québec au cours des prochaines années. Déjà, entre 2000 et 2001, 2,000,000 m³ ont été retranchés et ce n'est pas terminé avec l'annonce faite par le gouvernement du Québec de l'établissement de zones protégées. Très bientôt, les usines papetières devront se pencher vers des solutions de remplacement, dont celle qui consistera à utiliser plus de DIP.

Recyc-Québec nous prédit une augmentation de 240,000 tm/année de la quantité de vieux papiers/cartons récupérés d'ici 2005, principalement en provenance des édifices à bureaux. Du côté de nos voisins du sud, les Etats-Unis, il semble d'après les documents consultés qu'il n'y aura aucune difficulté à acquérir annuellement 160,000 tm supplémentaires de vieux papiers.

Par conséquent, en 2005, le Québec devrait pouvoir trouver sur le marché 400,000 tm de plus de vieux papiers. Si la pâte DIP est destinée à la fabrication du papier journal, ce 400,000 tm comprendra 75% de ONP (Old Newsprint Paper) et 25% de MOW (Mixed Office Waste). Si on la destine aux papiers à plus grande valeur ajoutée, le taux de MOW pourra être largement augmenté. Avec 400,000 tm de vieux papiers, à un rendement moyen de 80%, on peut produire environ 875 tma/jour de DIP.



Pour ce qui est de l'an 2008, 385,000 tm devraient être disponibles et on peut également supposer que l'on pourrait trouver 320,000 tm de vieux papiers du côté américain.

Bien que le marché demeurera très volatil, ce n'est pas cette demande supplémentaire en provenance du Québec qui devrait influencer le cours des vieux papiers.

L'Asie, avec en tête la Chine, et l'Inde se chargeront d'orchestrer la valse des prix compte tenu de toutes les nouvelles machines qui y sont annoncées. Une fois qu'elles produiront, ces pays pourront commencer à récupérer, ce qui devrait faire baisser la pression sur les prix. D'autre part, il ne faut pas oublier que les prix de la fibre vierge seront aussi probablement soumis à des pressions à la hausse à cause de la réduction de la disponibilité.

Le coût d'implantation d'un nouvel atelier a été estimé à 72 000 000.\$ CAN pour une capacité de production de 300 tma/jour de DIP pour papier journal, incluant un bâtiment neuf avec un entrepôt de vieux papiers, le tout annexé à l'usine existante afin de partager les services de vapeur, d'eau, etc. En se basant sur ses archives et sur des données publiques relatives à la réalisation de ce type de projets, et après avoir ajusté les coûts en dollars d'aujourd'hui, Génivel-BPR a établi une courbe des coûts moyens d'implantation en fonction des tonnes métriques désencrées par année et la valeur de 72,000,000.\$ CAN est conforme à la courbe que nous avons établie. Pour une pâte DIP de qualité supérieure pouvant être utilisée dans la fabrication de papiers à valeur ajoutée, il faut ajouter 30% à la facture. Chaque usine étant un cas particulier, la présente estimation est précise à $\pm 25\%$.

Après avoir passé en revue l'ensemble des usines québécoises, nous avons établi, selon les critères d'implantation que nous avons fixés, que quatre (4) endroits au Québec seraient des sites intéressants pour implanter des ateliers de capacité supérieure à 300 tma/jour.

Bien que cela réserve parfois de coûteuses surprises, l'agrandissement d'ateliers existants pourrait être envisagé. On pourrait tout aussi bien pousser l'audace jusqu'à complètement remplacer la production de PTM dans une usine.

Selon l'horizon 2005, dans l'éventualité où les usines québécoises consommeraient 315,000 tma/an (875 tma/jour) supplémentaires de DIP, la consommation d'énergie électrique serait réduite de 630 GWh/an (1,750 MWh/jour), soit l'équivalent en puissance de 72.9 MW.

Selon l'horizon 2008, cela passerait à 560,000 tma/an (1,555 tma/jour), pour une réduction annuelle possible de 1,119.6 GWh/an (3,110 MWh/jour), soit l'équivalent en puissance de 129.5 MW.

TABLE DES MATIÈRES

LETTRE DE PRÉSENTATION

SOMMAIRE EXÉCUTIF

1.	OBJECTIF DE L'ÉTUDE	1
2.	DESCRIPTION DU MANDAT	2
3.	POTENTIEL D'UTILISATION DE PÂTE DÉSENCRÉE AU QUÉBEC	3
3.1	TRANSFERT DE PROCÉDÉ DE FABRICATION	3
3.2	APPROVISIONNEMENT EN FIBRES	6
3.3	EFFET DE L'OFFRE / DEMANDE SUR LE PRIX DE LA FIBRE RECYCLABLE	10
3.4	COÛT D'IMPLANTATION D'UN ATELIER DE DÉSENCRAGE	12
3.5	SITES POTENTIELS D'IMPLANTATION ET RÉDUCTION ESCOMPTÉE	13
4.	CONCLUSION	16

ANNEXES

Annexe A	Tableau « Consommations d'énergie électrique par tma pour différents types de pâte »
Annexe B	Graphiques
Annexe C	Tableau « Comparaison des propriétés physiques et optiques pour différents types de pâte »
Annexe D	Simulation coût de fabrication avec et sans DIP
Annexe E	Tableau des indices des prix
Annexe F	Ressources et industries forestières (Portrait statistique, décembre 2001)
Annexe G	Extraits de « Bilan 2000 de la gestion des matières résiduelles au Québec » - Recyc-Québec
Annexe H	Répertoire des usines québécoises
Annexe I	Articles de référence
Annexe J	Définition des termes
Annexe K	RISI North American Graphic Paper Forecast



1. OBJECTIF DE L'ÉTUDE

L'objectif de la présente étude est d'évaluer le potentiel de réduction de la consommation d'énergie électrique réalisable en augmentant l'utilisation de la pâte désencrée (DIP) dans les usines papetières québécoises.



2. DESCRIPTION DU MANDAT

Le mandat qui a été confié à Génivel-BPR inc. par l'Association des Industries Forestières du Québec (A.I.F.Q.), relativement à l'évaluation du potentiel de réduction de la consommation d'énergie électrique réalisable en augmentant l'utilisation de la pâte désencrée (DIP) dans les usines papetières québécoises, consiste en :

- L'analyse sommaire du transfert de procédé de fabrication (PTM vers DIP).
- La vérification de la disponibilité de la fibre recyclable sur le marché.
- L'estimation de l'effet de la demande versus l'offre sur les prix de la fibre recyclable.
- L'estimation sommaire des coûts d'implantation d'un atelier de désencrage.
- L'identification de sites potentiels d'implantation.

3. POTENTIEL D'UTILISATION DE PÂTE DÉSENCRÉE AU QUÉBEC

3.1 TRANSFERT DE PROCÉDÉ DE FABRICATION

Là où le produit final, c'est-à-dire le type de papier, le permet et que dans le procédé de fabrication on utilise de la pâte PTM (thermomécanique), il est possible de substituer des tonnes de pâte désencrée (DIP) aux tonnes de pâte thermomécanique (PTM). Il y a deux façons de la faire :

- .1 En achetant de la pâte désencrée qui est livrée à l'usine sous forme de ballots que l'on remet en pâte avec un tritrateur avant de l'utiliser sur la machine à papier (même processus que pour la pâte Kraft que l'on se procure sur le marché).
- .2 En installant sur le site de l'usine un atelier de désencrage, ce qui nécessite un investissement important et l'obligation de s'organiser pour acheter des ballots de vieux papiers chez les recycleurs.

Les opérateurs d'usines papetières étant peu enclin à se procurer de la pâte DIP toute prête sur le marché pour plusieurs raisons, dont celles entre autres ayant trait au contrôle de la qualité, à la volatilité du prix et à la fiabilité de l'approvisionnement, nous allons traiter de la deuxième façon, c'est-à-dire l'installation de leur propre atelier de désencrage.

L'installation d'un atelier de désencrage comporte aussi des désavantages. C'est plus compliqué à opérer qu'un atelier de PTM ; il y a plus de produits chimiques à manipuler et le procédé génère beaucoup plus de boues qu'il faut soit brûler, soit enfouir, soit épandre. Il faut aussi se rappeler que dans l'esprit d'un opérateur, le coût de fabrication d'une tma de DIP est égal au coût de fabrication d'une tma de PTM (qualité papier journal), ce qui rend l'acceptation d'un atelier de désencrage plus difficile. De plus, si vous conservez votre atelier de PTM, vous avez deux départements à gérer.

3.1.1 Impact énergétique

Selon le « Tableau des consommations d'énergie électrique par tma pour différents types de pâte », que l'on retrouve à l'annexe A, il y a en moyenne 2,000 kWh/tma de différence entre fabriquer une tonne de PTM pour du papier journal (2,500 kWh/tma) et une tonne de DIP pour le même type de papier (500 kWh/tma).

Si la pâte DIP est partiellement utilisée dans la fabrication d'un papier à valeur ajoutée, c'est-à-dire un type de papier pour lequel on applique plus d'énergie à la pâte PTM, alors l'économie d'électricité résultant de la substitution de pâte DIP est encore plus importante.

À l'annexe B, on trouve un graphique qui nous indique la consommation moyenne d'énergie électrique (kWh/tma) pour différentes productions quotidiennes de pâte DIP (tma/jour). On peut noter que plus l'atelier est important, plus basse est la consommation par tonne métrique anhydre (tma).

3.1.2 Impact qualité

À l'annexe C, on trouve un tableau qui présente les propriétés physiques et optiques pour différents types de pâtes utilisées dans la fabrication de papier journal.

On peut voir pourquoi le SGW (pâte mécanique de meules) force l'utilisation de Kraft (pâte chimique); l'allongement, l'éclatement et la déchirure sont nettement inférieurs à ceux des autres pâtes.

Le Kraft étant très dispendieux, les usines qui ont pu le faire, ont laissé tomber le SGW pour le PTM (pâte thermomécanique) qui ne requiert pas l'utilisation de Kraft étant donné ses excellentes propriétés physiques.

Si l'on compare les propriétés du PTM avec celles du DIP (pâte désencrée), on s'aperçoit qu'elles sont très proches, sauf pour l'indice de déchirure. Celui du DIP est environ 1.5 points plus bas que celui du PTM. La plupart des machines alimentées par un mélange de DIP et de PTM n'utilisent pas de Kraft et la qualité du papier produit sur ces machines est aussi bonne que celle du papier produit sur des machines alimentées uniquement avec du PTM. L'utilisation de DIP peut même avoir un impact positif sur la brillance du papier. Comme pour toute autre pâte utilisée dans le mélange d'alimentation de la machine à papier, la qualité de la DIP pourra grandement influencer la stabilité de la machine et la qualité de la feuille.

En ce qui a trait à l'utilisation de DIP dans la fabrication de papiers spéciaux, il est possible que si vous remplacez du PTM, vous soyez forcé d'ajouter du Kraft pour maintenir les propriétés physiques du papier. De plus, le procédé de désencrage sera plus complexe étant donné qu'on exigera une plus grande propreté et une plus haute brillance du DIP.

3.1.3 Impact coût de fabrication

Afin de montrer l'impact de l'utilisation de pâte DIP sur les coûts de fabrication du papier journal, nous avons simulé l'opération d'une usine avec, dans un premier temps, un atelier de PTM et une machine à papier et, dans un deuxième temps, un atelier de PTM, un atelier de DIP et la même machine à papier.

	<u>Scénario 1</u>	<u>Scénario 2</u>
➤ % TMP	100	75
➤ % DIP		25
➤ Coût de fabrication \$ CAN/tm	498.09	490.35

On peut retrouver les tableaux à l'annexe D.

Nous avons utilisé un coût moyen de 135.\$/tm pour les vieux journaux et de 120.\$/tm pour les vieux magazines.

N'oublions pas que les prix peuvent varier dans le temps selon les pressions que subit le marché et que, de ce fait, les résultats présentés dans les tableaux de l'annexe D sont relatifs.

Il y a donc intérêt à utiliser la DIP, composé de 75% de ONP (Old Newsprint Paper) et de 25% de MOW (Mixed Office Waste), tant que les coûts d'achat des vieux papiers ne dépassent pas une certaine limite, pour diminuer la consommation d'énergie électrique et du même coup, les coûts de fabrication.

3.2 APPROVISIONNEMENT EN FIBRES

De tout temps, l'approvisionnement en fibres, qu'elles soient vierges ou recyclables, a toujours été un facteur déterminant en ce qui concerne les investissements des papetières. Au Québec, la fibre vierge de bois résineux a toujours été accessible. Si certaines usines ont investi dans l'installation d'un atelier de désencrage, c'est que les clients du marché américain exigeaient un contenu de fibres recyclées dans le papier journal qu'ils se procuraient.

Bien que l'on sache que l'utilisation du DIP réduit de façon substantielle la consommation d'énergie électrique dans une usine où l'on utilise normalement du PTM, ce n'est pas évident de convaincre la direction de ces usines d'investir dans la DIP. Les usines estiment qu'elles ont un moins bon contrôle sur l'approvisionnement en fibres recyclables. En effet, la qualité, la disponibilité et le prix varient beaucoup dans le temps comparativement à la fibre vierge, ce qui, pour les usines qui utilisent du DIP entraîne une certaine fluctuation du coût de fabrication.

Toutefois, si l'on se fie aux données du dernier registre forestier émis par le Ministère des ressources naturelles, Direction du développement de l'industrie des produits forestiers (Ressources et industries forestières, Portrait statistique, décembre 2001), la situation est appelée à changer d'ici peu.

On retrouve des parties de ce document à l'annexe F. La section 5, article 5.0, nous apprend qu'entre 2000 et 2001, la possibilité des forêts publiques et les prélèvements admissibles dans les forêts privées ont diminués.

	2000	2001
➤ Forêt publique	43,728,900 m ³ /an	41,858,061 m ³ /an
➤ Forêt privée	13,304,400 m ³ /an	12,859,300 m ³ /an

De plus, les volumes de bois attribués dans les forêts publiques québécoises ont aussi été révisés à la baisse (environ 2,000,000 m³/an, soit assez de fibres pour 687,800 tma/an ou 1,900 tma/jour de PTM) :

	2000	2001
➤ CAAF	37,258,900 m ³ /an	35,022,400 m ³ /an
➤ CVAF	481,100 m ³ /an	442,600 m ³ /an

Dans la section sommaire, toujours dans le même document, on peut lire qu'il s'est récolté environ 44,000,000 m³/an au cours de la même période.

À la section 5, article 5.2, on peut voir que cette récolte a eu tendance à augmenter légèrement depuis 1996.

À la lumière de ces statistiques, on peut conclure que la disponibilité est à la baisse et que la récolte, a quant à elle, tendance à augmenter légèrement; la différence étant probablement comblée par la forêt privée, dont la récolte n'a pas atteint le maximum des prélèvements permis, et l'importation, le tout tel que montrée à la section 10, article 10.2 du document du Ministère. Les ressources forestières résineuses du Québec sont donc pleinement utilisées et, selon le bilan net présenté dans le document du ministère, l'importation de fibres vierges est aussi confirmée.

Si la tendance se maintient, pour continuer à produire au même rythme les mêmes types de papiers sans que le prix de la fibre ne s'envole et pour protéger la marge concurrentielle des usines, l'industrie devra s'orienter vers des solutions de remplacement telles que :

A- Utiliser d'autres essences de bois comme les feuillus.

B- Changer de type de papier et augmenter le contenu en pigments.

C- Augmenter l'utilisation de DIP.

La mise en application des ces solutions de remplacement visant à réduire la consommation de fibres vierges devra prendre en considération l'état et la localisation géographique des usines ainsi que les conditions du marché.

Comme la présente étude porte sur la réduction de la consommation de l'énergie électrique, nous nous attarderons à la solution de remplacement « C » qui est celle qui offre le meilleur potentiel, tel que mentionné précédemment.

Si la disponibilité de fibres vierges diminue, qu'en est-il de celle des fibres recyclables?

Selon le registre forestier québécois, en 2000 (section 10, article 10.1), il s'est consommé au Québec 822,400 tma de vieux papiers pour le désencrage et 317,900 tma de vieux papiers sans désencrage pour un total de 1,140,300 tma de vieux papiers.

D'après Recyc-Québec (voir extraits du bilan 2000, annexe G), le secteur municipal (unique source de récupération des vieux journaux) a généré 258,000 tma en 2000, ce qui signifie que 882,300 tma ont été importées, principalement de chez nos voisins du sud. Toujours selon le document de Recyc-Québec, le taux de récupération de vieux papiers/cartons était de 35% en 2000 et l'objectif, selon leur courbe, est de 65% en 2008, ce qui représenterait une augmentation annuelle moyenne de 3.75% et nous amènerait à 55% en 2005.

Selon l'article de Graham Moore (Making the most of the Urban Forest, annexe I), c'est les taux que visent les Européens, mais ils sont déjà à 49.8%. Aux Etats-Unis, on est beaucoup mieux organisés et la récupération de vieux cartons atteignait déjà 70% en 1995 (selon l'article « PaperHelp Online, 9.2.1 World Trade in Waste Paper » annexe I).

Tableau 1

EN 1999	Selon registre forestier	Selon Recyc-Québec (estimation)
Total papier produit au Québec	8,492,000 tm	
Total papier exporté	6,473,000 tm	
Total papier consommé au Canada	2,019,000 tm	
Total papier récupéré au Québec		781,875 tm (tableau II ci-après)

Le tableau 1 indique qu'en 1999, le Québec a récupéré 39% du papier/carton produit au Québec et consommé au Canada, ce qui semble coller à la courbe de Recyc-Québec (annexe G).

Tableau 2

Quantité de fibres cellulosiques récupérées au Québec (tma/année)						
	1992 Données Recyc-Qc	1999 (Estimée)	2000 Recyc-Qc	Aug. annuelle	2005 (Estimée)	2008 (Estimée)
Secteur municipal (vieux journaux)	101,000	238,375	258,000	19,624	356,125	415,000
Secteur industriel, Commercial et institutionnel (cartons, papiers de bureau)	344,000	543,500	572,000	28,500	714,500	800,000
TOTAL	445,000	781,875	830,000		1,070,625	1,215,000

Note : données calculées à partir du contenu du bilan 2000 de la gestion des matières résiduelles au Québec, annexe G.

L'objectif de Recyc-Québec d'atteindre un taux de récupération de 55% en 2005 est plausible. Il semble que cette tendance soit mondiale.

Donc au Québec en 2005, on récupérera probablement 240,000 tm de vieux papiers/cartons de plus et cela devra principalement provenir des édifices à bureaux du Québec. D'autres part, on pourra certainement trouver aux Etats-Unis un autre 160,000 tm de vieux papiers, ce qui rendrait disponible pour le désencrage 400,000 tm de vieux papiers. Si l'on destine la DIP a la fabrication du papier journal, ces 400,000 tm de vieux papiers seront composés de 75% de ONP (Old Newsprint Paper) et de 25% de MOW (Mixed Office Waste). Par contre, si la DIP est destinée à la fabrication de papiers à valeur ajoutée, alors le pourcentage de MOW pourra être largement augmenté.

Avec 400,000 tm de vieux papiers, a un taux de rendement moyen de 80%, on pourra produire environ 875 tma/jour de DIP.

Si l'on regarde plus loin, jusqu'en 2008, il est prévu que 385,000 tm de vieux papiers/cartons de plus qu'en 2000 seront récupérées, toujours en posant comme hypothèse que le système de récupération dans les édifices à bureaux du Québec aura été optimisé. Si l'on suppose qu'à ce moment il sera possible d'acquérir annuellement sur le marché américain 320,000 tm additionnelles de vieux papiers, il sera alors envisageable, avec 700,000 tm, de penser produire 560,000 tma/an (1,555 tma/jour) de DIP.



3.3 EFFET DE L'OFFRE / DEMANDE SUR LE PRIX DE LA FIBRE RECYCLABLE

À l'annexe I, plusieurs articles nous indiquent qu'il y a actuellement une forte demande pour les vieux cartons OCC (Old Corrugated Container), que les prix pour cette matière sont à la hausse et que cela devrait se maintenir pour un certain temps. L'Asie, avec en tête la Chine, et l'Inde sont à l'origine de cette flambée. Plusieurs machines y sont en construction et pour l'instant, cela met de la pression sur les prix et augmente la volatilité du marché. Dès qu'elles auront commencé à produire, ces pays pourront commencer à récupérer et la pression sur les prix diminuera. La demande pour les vieux journaux (ONP) suivra, ainsi que le prix, mais moins rapidement.

Dans son article « Making the Most of the Urban Forest », Graham Moore, en mai 2002, estime qu'il faudra 4,000,000 de tonnes métriques supplémentaires d'ici l'année 2005 pour satisfaire les besoins croissants de ces nouveaux marchés. On pense pouvoir répondre à cette demande en améliorant l'efficacité des collectes, mais il y aura certainement des hausses sporadiques de prix dues aux délais de réaction du marché qui continuera à fluctuer.

Le Québec sera lui aussi affecté par les cours du marché et c'est pourquoi, si nous pensons augmenter notre consommation de DIP, il faudrait peut-être penser à utiliser plus de vieux papiers (MOW) à fort contenu en papier provenant des édifices à bureaux du Québec. Ceux-ci semblent moins recherchés et encore offerts à un prix abordable. On pourrait en introduire dans la fabrication de nos papiers à valeur ajoutée (SC, couché, etc.) Presque toutes nos usines fabricant de tels papiers ont une bonne pâte (PTM) et pourraient se permettre un certain pourcentage de DIP (probablement entre 10 et 15%) sans affecter la qualité de leur produit. Les systèmes de désencrage seront plus dispendieux à installer et à opérer, mais la marge bénéficiaire de ces papiers le permet.

Toute chose étant relative, ce serait une façon de maintenir les coûts d'approvisionnement entre 125 et 150.\$ CAN par tonne métrique livrée à l'usine. De plus, si on est pour récupérer davantage de ce type de vieux papiers au Québec, peut-être pourrait-on les garder chez nous.

Malgré tout, il sera toujours possible d'augmenter la consommation de DIP dans les usines de papier journal. Il faudra avoir à l'œil la rentabilité des opérations, coût de la fibre vierge versus coût des fibres recyclables et coût de fabrication du produit fini.



RISI en 2001 (voir annexe K) prévoyait pour le marché des Etats-Unis, qu'en 2005 le prix du ONP serait de 92.\$ US/tonne courtes (152.\$ CAN/tma) et celui du MOW de 32.\$ US/tonne courte (53.\$CAN/tma), ce qui tend à démontrer que le coût du MOW est moins élevé compte tenu qu'il est moins prisé des utilisateurs, et ce, parce qu'il demande un atelier de désencrage plus complexe et ne donne pas nécessairement un type de pâte souhaitable pour la fabrication de papier journal.

3.4 COÛT D'IMPLANTATION D'UN ATELIER DE DÉSENCRAGE

Nous avons établi cette estimation en nous référant à nos archives, c'est-à-dire sur des projets ou des études que Génivel-BPR ont réalisés au cours des 10 dernières années. Nous avons aussi placé quelques appels téléphoniques pour nous enquérir des coûts de réalisation de certains projets et des quantités de pâte qu'on y produisait. La valeur de chaque dollar a été ajustée à la valeur d'aujourd'hui (2002) en utilisant le tableau des indices de prix à l'annexe E.

Le tableau qui suit présente une estimation un peu plus détaillée d'un projet d'atelier de désencrage de 300 tma/jour pour du papier journal. Pour 72 000 000.\$ CAN, on a un bâtiment neuf, adjacent à l'usine existante et profitant de tous les services communs ainsi que tout l'équipement nécessaire pour produire une pâte de qualité. Comme chaque usine est un cas particulier, cette estimation est précise à $\pm 25\%$.

À l'annexe B, on trouve un graphique qui présente le coût moyen d'implantation en (000)\$ CAN en fonction de la production annuelle de DIP en (000)' tma/année. Comme l'estimation du coût d'implantation d'une usine de 300 tma/jour colle à la courbe, ainsi on peut déduire que l'implantation d'une usine de 150,000 tma/année (environ 410 tma/jour), pour du papier journal, coûterait autour de 80 000 000.\$ CAN.

Si l'on désire introduire de la DIP dans la fabrication de papiers à plus grande valeur ajoutée, il faut alors améliorer la qualité de notre pâte. Ainsi, la brillance devra être supérieure à 80 ISO, le décompte des saletés devra être inférieur à 5 ppm et la quantité résiduelle de cendres devra être inférieur à 3%.

La façon d'améliorer la qualité, c'est d'ajouter une boucle au procédé, ce qui augmente le coût moyen d'implantation d'environ 30% ainsi que les coûts d'opération suite à la plus grande consommation de produits chimiques.

Le tableau qui suit présente une estimation un peu plus détaillée pour un atelier de ce type pouvant produire la même quantité de pâte, soit 300 tma/jour. Le coût d'un tel projet est de 94 000 000.\$ CAN et l'estimation a été établie à partir des mêmes critères. Une usine de 400 tma/jour pour cette pâte DIP de qualité supérieure serait de 104 000 000.\$ CAN.

3.5 SITES POTENTIELS D'IMPLANTATION ET RÉDUCTION ESCOMPTÉE

Tel qu'établi précédemment, il serait possible d'ici l'année 2005 d'augmenter la consommation de pâte désencrée (DIP) par les usines papetières québécoises de 800 tma/jour (environ 290,000 tma/année) sans créer trop de vagues dans le marché.

Si un ou des nouveaux ateliers de désencrage devaient s'implanter au Québec, les critères suivants devraient être considérés :

- Localisation près des zones d'approvisionnements ou des grands centres afin de minimiser les coûts de transport.
- Production supérieure à 300 tma/jour afin de maintenir le coût d'implantation par tma aussi bas que possible.
- Propriétaire unique : les compagnies préfèrent contrôler leurs opérations.
- Consommation plus importante de MOW (voir définition à l'annexe J) afin d'en introduire dans la fabrication de papiers à valeur ajoutée et que ce type de vieux papier est peut être plus disponible et moins sujet aux fluctuations du marché.

Plusieurs usines pourraient éventuellement utiliser du DIP dans leur procédé de fabrication. Présentement ces usines utilisent du PTM fabriqué sur plusieurs lignes. Selon notre répertoire des usines québécoises (annexe H), ces usines sont :

- Abitibi-Consolidated, division Amos – papier journal – 4 lignes pour 625 tma/jour.
- Abitibi-Consolidated, division Beupré – papier impression couché et non couché – 3 lignes pour 600 tma/jour.
- Abitibi-Consolidated, division Clermont – papier journal – 2 lignes pour 1100 tma/jour.
- Abitibi-Consolidated, division Grand-Mère – papier impression – projet de TMP à venir.
- Abitibi-Consolidated, division Kénogami – papier impression – 2 lignes de 3 stages pour 450 tma/jour.

- Abitibi-Consolidated, division La Baie – papier journal – 3 lignes pour 400 tma/jour.
- Bowater, division Dolbeau – papier impression – 2 lignes pour 600 tma/jour.
- Bowater, division Donnacona – papier impression - nombre de lignes non disponibles pour 506 tma/jour.
- F.F. Soucy, Rivière-du-Loup – papier journal – 4 lignes pour 625 tma/jour.
- Kruger, division Wayagamak – projet de papier couché de 500 tm/jour, pas de PTM.

Selon les critères énumérés plus tôt, certaines de ces usines sont situées trop loin des grands centres. D'autres, à cause des spécifications de leur produit (pas plus de 10 à 15% de DIP), ne consommeraient pas assez pour justifier leur propre atelier. De plus, bâtir un seul atelier pour plusieurs usines et transporter la pâte serait trop onéreux.

Le premier site retenu (site #1) pourrait construire un atelier de désencrage de 550 tma/jour (DIP pour papier journal) et arrêter une ligne de PTM. Cette usine est proche d'un grand centre et les facilités de transport (train, rail et route) sont bien implantées.

Le deuxième site (site #2) est sensiblement dans le même cas que le site #1. On pourrait y construire un atelier de 350 tma/jour et arrêter 2 lignes de PTM.

Le troisième site (site #3) présente des facilités similaires quant aux infrastructures de transports. On pourrait y construire un atelier de 400 tma/jour et arrêter complètement la production de PTM. On pourrait même aller plus loin en arrêtant tous les ateliers existants de fabrication de pâte et installer un atelier de DIP de 800-900 tma/jour et fabriquer du papier journal avec 100% de fibres recyclées.

Enfin, au Québec, il y a un seul site (site #4) susceptible de recevoir un atelier de DIP pour alimenter des usines fabricant des papiers à valeur ajoutée. L'atelier pourrait avoir une capacité de 200-250 tma/jour.

La réduction escomptée, selon l'horizon 2005, pour 315,000 tma/an (875 tma/jour) est de 630 GWh/an (1,600,000 kWh/jour), ce qui est très appréciable.



La réduction escomptée, selon l'horizon 2008 l'est davantage avec ses 1,229.6 GWh/an. Cependant, il est difficile de prévoir ce qui sera le portrait de l'industrie au Québec à ce moment et également de savoir qui sera en mesure d'utiliser ce type de pâte. Il serait préférable de faire le point en 2004.

Certaines compagnies, non citées dans le cadre de cet exercice, pourraient se montrer ouvertes à l'utilisation de DIP si leur stratégie à long terme, qui n'est pas connue, allait dans ce sens.

4. CONCLUSION

Les statistiques démontrent que le potentiel des forêts québécoises en ce qui a trait à la production de fibres résineuses est utilisé à 100% et que le gouvernement a déjà commencé à réduire les quantités disponibles afin de protéger notre patrimoine.

Si l'industrie papetière québécoise veut continuer à produire les mêmes quantités de papier/carton, elle doit se tourner vers des solutions de remplacement car l'importation de fibres et la forêt privée ne pourront pas toujours suffire à combler le déficit.

L'augmentation de la consommation de DIP (pâte désencrée), dont la fabrication consomme environ 80% moins d'énergie, peut s'avérer une solution de remplacement intéressante, tant du point de vue coût de fabrication que de celui de la qualité du produit fini.

Selon Recyc-Québec, d'ici l'année 2005, la récupération de vieux papiers/cartons augmentera de 240,000 tm par année au Québec et tout porte à croire que ce seront les édifices à bureaux qui seront mis à profit pour combler la majeure partie de cette hausse. RISI, dans son « North American Forecast » de juillet 2001 (voir extrait à l'annexe K), prévoit que la demande annuelle canadienne pour les vieux papiers/cartons devrait augmenter de 633,000 tm entre 2002 et 2005. De ce nombre, 86,000 tm seraient des vieux journaux et 150,000 tm du MOW (Mixed Office Waste), dont environ 40-45 % serait importées.

C'est pourquoi, dans un premier temps, nous pensons que l'implantation d'ateliers de désencrage pouvant produire au total 316,000 tma/an (875 tma/jour) de DIP serait une bonne façon de réduire la consommation d'énergie électrique de 6,306 GWh/an (1,600 MWh/jour) et de compenser pour une partie de la réduction de la quantité disponible de fibres résineuses.

Cela pourrait se faire sans altérer la qualité des produits, ni faire grimper les coûts de fabrication. Pour ce qui est de l'utilisation de DIP de très bonne qualité dans la fabrication de papiers à valeur ajoutée, il faudra probablement convaincre les usagers en réalisant une série de tests sur de l'équipement pilote, ce qui aidera au développement de notre main-d'œuvre.

En ce qui a trait au potentiel 2008, 1,119.6 GWh/an (3,110 MWh/jour), il serait bon de le réévaluer en 2004 en tenant compte des changements survenus dans les usines québécoises et des conditions du marché.

Annexe A

Tableau

« Consommations d'énergie électrique par tma pour différents types de pâte »

KWh requis par tma de pâte		
	<u>Type de pâte</u>	<u>KWh/tma</u> (auxiliaires exclus)
Pâte de meules	SGW (papier journal)	1600 – 1800
Pâte de meules pressurisées	PGW	1800 – 2100
Pâte de sulfite à haut rendement	HYS	550 – 750
Pâte thermomécanique	PTM (papier journal)	2400 – 2800
Pâte thermomécanique	PTM (spécialités)	2800 – 3200
Pâte thermomécanique	PTM (papier SC et couché)	> 3200
Pâte désencrée	DIP	300 – 600

A.I.F.Q.

Potentiel de réduction de la consommation d'énergie électrique dans l'industrie
papetière québécoise

Augmentation du potentiel d'utilisation de pâte désencrée au Québec

093-2F16 (60et)



Génivel-BPR

Annexe B

Graphiques

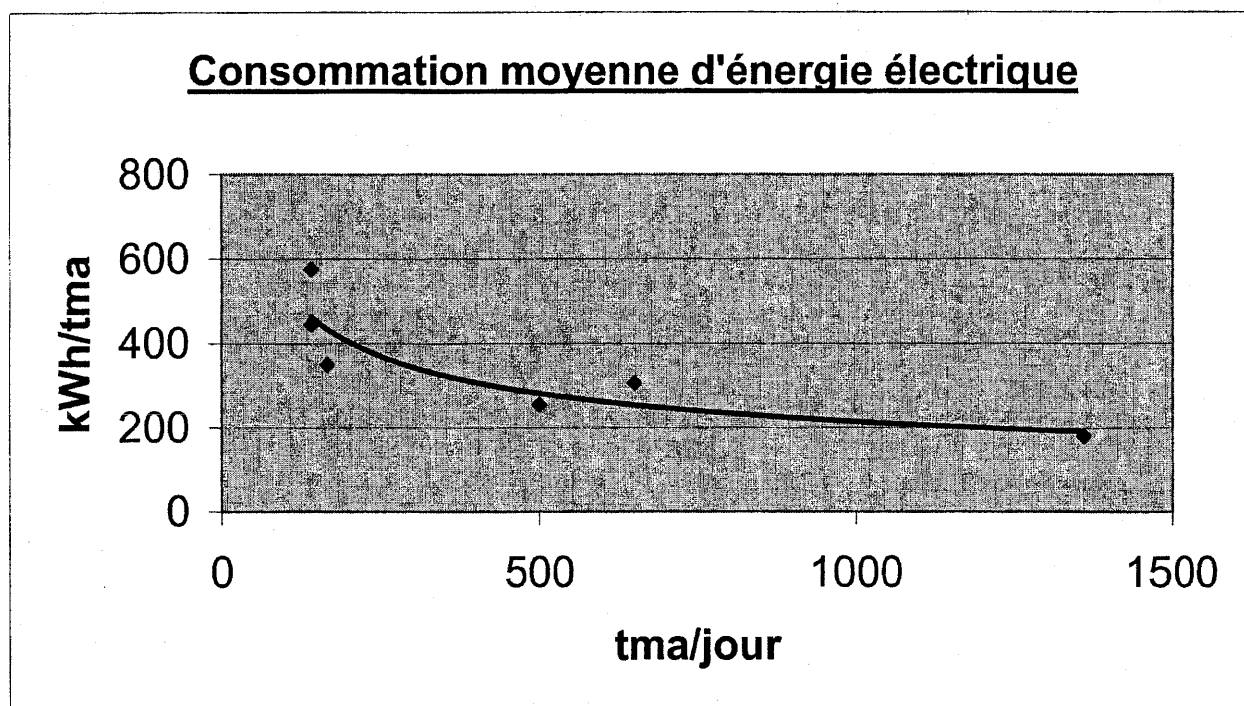
12 septembre 2002

Projet : Étude du potentiel de réduction
de la consommation d'énergie électrique
dans l'industrie papetière québécoise

N/Réf. : # 093-2F16

Objet : Atelier de pâte désencrée
Consommation moyenne d'énergie électrique

Usine	tma/jour	kWh/tma
A	500	255
B	650	306
C	1360	180
D	140	445
E	140	575
F	165	350



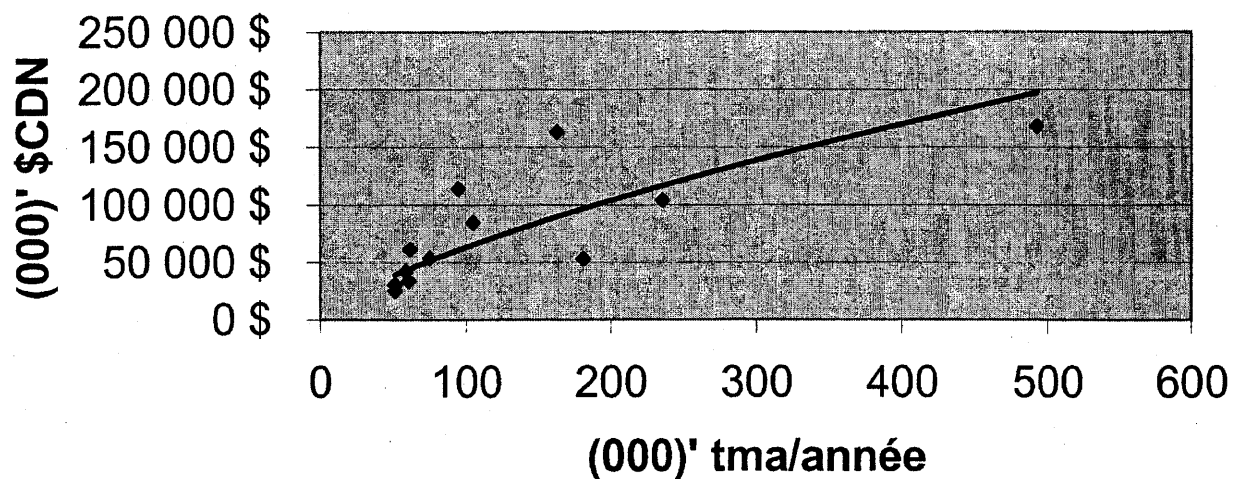
Projet : Étude du potentiel de réduction
de la consommation d'énergie électrique
dans l'industrie papetière québécoise

N/Réf. : # 093-2F16

Objet : Atelier de pâte désencrée
Coût moyen d'implantation typique

Usine	(000)' tma/an	Coût du projet (000)' \$CDN
A	181	53 000 \$
B	235.3	104 000 \$
C	492.3	168 000 \$
D	50.7	25 000 \$
E	50.7	30 600 \$
F	59.7	33 600 \$
G	57.9	41 900 \$
H	74.2	53 600 \$
I	104.3	84 300 \$
J	60.8	61 300 \$
K	162.9	163 000 \$
L	94.1	114 000 \$

Coût moyen d'implantation



Annexe C

Tableau

« Comparaison des propriétés physiques et optiques pour différents types de pâte »

	PÂTE MÉCANIQUE		Désencrée DIP
	de meules SGW	Thermomécanique PTM	
INDICE D'ÉGOUTTEMENT (ML)	80	134	148
Bûchettes Somerville .004 (%)	0.04	0.0728	0.0214
Longueur de rupture (km)	3.0	4.35	4.45
Allongement (%)	1.73	2.38	2.08
Indice d'éclatement (kPa m ² /g)	3.86	9.12	7.80
Indice de déchirure (mNm ² /g)	3.86	9.12	7.80
Brillance ISO (%)	61.1	58.73	59.05
Opacité ISO (%)	Non disponible	94.77	97.12
PH	Non disponible	4.8	5.5

Note : pâte utilisée pour la fabrication de papier journal.

A.I.F.Q.

Potentiel de réduction de la consommation d'énergie électrique dans l'industrie
papetière québécoise

Augmentation du potentiel d'utilisation de pâte désencrée au Québec

093-2F16 (60et)



Génivel-BPR

Annexe D

Simulation coût de fabrication avec et sans DIP

12 septembre 2002

Simulation sans pâte désencrée

Coût de fabrication = 498.⁰⁹ \$CAN/tm de papier

Numéro de produit Nom		Spécifications du produit :						Spécifications de la feuille de base :				Recettes/Base Pâtes (feuille de base)				(Naturelles = 0,62 %)		Recettes/Base Papier				Recettes/Base Papier (produit fini)					
		- poids de base (g/m²) - lustre non-imprimé (% Hunter) - rugosité (PPS) - porosité (PPS) - opacité (TAPPI) - formation (NUI) - brillance (° ISO) - couchage (g/m²/côté)						- humidité feuille de base (%) - poids de base humide (g/m²) - poids de base sec (g/m²) - brillance (° ISO)				TMP (hyd.) % SGW(hyd.) % PGW(hyd.) % HYS(hyd.) % TMP(per.) % SGW(per.) % PGW(per.) % HYS(per.) % Désencré % Kraft % TOTAL %				Cendres % 0,62 %		TMP (hyd.) % SGW(hyd.) % PGW(hyd.) % HYS(hyd.) % TMP(per.) % SGW(per.) % PGW(per.) % HYS(per.) % Désencré % Kraft % Glaise % PCC/GCC % Calcinée % TOTAL %				TMP (hyd.) % SGW(hyd.) % PGW(hyd.) % HYS(hyd.) % TMP(per.) % SGW(per.) % PGW(per.) % HYS(per.) % Sauce % Désencré % Kraft % Glaise % PCC/GCC % Calcinée % Humidité % TOTAL %					
1	Newsprint	 48,0 90 8 58 45,4 45,4 58						 0,0 0				 0,0 0				 0,0 0				 0,0 0				 0,0 0			
2		 0,0 0						 0,0 0				 0,0 0				 0,0 0				 0,0 0				 0,0 0			
3		 0,0 0						 0,0 0				 0,0 0				 0,0 0				 0,0 0				 0,0 0			
4		 0,0 0						 0,0 0				 0,0 0				 0,0 0				 0,0 0				 0,0 0			
5		 0,0 0						 0,0 0				 0,0 0				 0,0 0				 0,0 0				 0,0 0			
6		 0,0 0						 0,0 0				 0,0 0				 0,0 0				 0,0 0				 0,0 0			

[illegible]

Atelier de TMP (coûts de fabrication) :

Base	1	2	3	4	5	6	7	8	9	10
Nombre de jours d'opération	362	363	362	362	362	363	362	362	362	363
Production quotidienne blanche à l'hydrosulphite	482,5	482,5	482,5	482,5	482,5	482,5	482,5	482,5	482,5	482,5
Production quotidienne blanche au peroxyde	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Production annuelle blanche à l'hydrosulphite	174676,3	175158,9	174676,3	174676,3	174676,3	175158,9	174676,3	174676,3	174676,3	175158,9
Production annuelle blanche au peroxyde	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Consommation annuelle de copeaux	541369	542865	541369	541369	541369	542865	541369	541369	541369	542865
Coût unitaire moyen des copeaux	49,13	49,87	50,61	51,37	52,14	52,93	54,53	55,34	56,17	56,94
Coût annuel des copeaux	26597466	27071003	27401374	27812395	28229581	28732176	29082820	29519062	29961848	30495285
Fournitures :										
- traitement des copeaux	154500	156818	159170	161557	163981	166440	168937	171471	174043	176654
- plaques de raffineur	927200	941108	955225	969553	984096	998858	1013841	1029048	1044484	1060151
- tamis et épaisseurs	103022	104567	106136	107728	109344	110984	112649	114338	116054	117794
- épurateurs centrifuges	0	0	0	0	0	0	0	0	0	0
- divers	103022	104567	106136	107728	109344	110984	112649	114338	116054	117794
	1287744	1307060	1328666	1346566	1366765	1387266	1408075	1429196	1450634	1472394
Sous-total :										
Vapeur :										
- chauffage	65000	65000	65000	65000	65000	65000	65000	65000	65000	65000
- production (par tonne)	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
- production (annuelle)	122273,4	122611,2	122273,4	122273,4	122273,4	122611,2	122273,4	122273,4	122273,4	122611,2
- vapeur récupérée mensuellement	8,36	8,52	8,67	8,82	8,98	9,13	9,30	9,46	9,63	9,79
- coût moyen du GJ	1568516	1597789	1623878	1652333	1681317	1712794	1740915	1771551	1802759	1836616
- coût annuel de la vapeur										
Électricité :										
- énergie aux raffineurs	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
- énergie aux auxiliaires	38,54	39,08	39,70	40,30	40,90	41,48	42,14	42,77	43,41	44,02
- coût moyen du Mwh	23561615	23956523	24273765	24637871	25007439	25426580	25763289	26149738	26541984	26986845
- coût annuel de l'électricité										
Blanchiment : (coût annuel par produit utilisé)										

Produit										
hydrosulphite	1484749	1511183	1529625	1552570	1575858	1603915	1623489	1647841	1672559	1702337
peroxyde	0	0	0	0	0	0	0	0	0	0
DTPA	0	0	0	0	0	0	0	0	0	0
silicate	0	0	0	0	0	0	0	0	0	0
acide sulphurique	0	0	0	0	0	0	0	0	0	0
caustique	0	0	0	0	0	0	0	0	0	0
Coût annuel de blanchiment :	1484749	1511183	1529625	1552570	1575858	1603915	1623489	1647841	1672559	1702337
Main-d'oeuvre : (coût annuel par poste)										
Poste										
opér. copeaux	0	0	0	0	0	0	0	0	0	0
opér. TMP	1931059	1979335	2028818	2079539	2131527	2184815	2239436	2295422	2352807	2411627
opér. blanchiment	0	0	0	0	0	0	0	0	0	0
entretien	1231201	1261981	1293531	1325889	1359016	1392991	1427816	1463511	1500099	1537601
personnel de bureau	0	0	0	0	0	0	0	0	0	0
cadres	315000	322875	330947	339221	347701	356394	365303	374436	383797	393392
Coût annuel de main-d'oeuvre :	3477260	3564191	3653296	3744628	3838244	3934200	4032555	4133669	4236703	4342621
facteur :	923401	946488	970148	994402	1019262	1044743	1070862	1097633	1125074	1153201
Matériel d'ent. ord. vs m.-o. ent.										
Matériel d'entretien ordinaire (budget)										
Coût total annuel de fabrication de TMP	58900749	59954236	60778752	61740765	62718466	63841674	64722005	65748391	66791562	67989298
Coût total unitaire du TMP (non blanchi)	328,70	333,66	339,19	344,57	350,03	355,32	361,23	366,97	372,80	378,44
Coût total unitaire du TMP (hyd.)	337,20	342,28	347,95	353,46	359,06	364,48	370,53	376,40	382,37	388,16
Coût total unitaire du TMP (hyd. + per.)	337,20	342,28	347,95	353,46	359,06	364,48	370,53	376,40	382,37	388,16

Caractéristiques												
Base	1	2	3	4	5	6	7	8	9	10		
jours d'opération	362	363	362	362	362	363	362	362	362	363	362	363
numéro du produit	1	1	1	1	1	1	1	1	1	1	1	1
production vendable sèche budgétée (bobineuse)	523,5	523,5	523,5	523,5	523,5	523,5	523,5	523,5	523,5	523,5	523,5	523,5
production de papier hors norme sèche (rejets)	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4
taux de perte (fibres et autres)	1	1	1	1	1	1	1	1	1	1	1	1
Coût annuel des matières premières vierges (portes incluses)												
TMP (hyd.)	59493266	60557356	61390204	62361917	63349477	64483993	65373222	66409960	67463653	68673449		
\$/an		0		0	0	0	0	0	0	0	0	0
SGW (hyd.)		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
PGW (hyd.)		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
HYS (hyd.)		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
TMP (per.)		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
SGW (per.)		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
PGW (per.)		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
HYS (per.)		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
Sauce de couchage		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
Désencré		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
Kraft		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
Glaise		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
PCC ou GCC		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
Calciné		0		0	0	0	0	0	0	0	0	0
\$/an		0		0	0	0	0	0	0	0	0	0
Sous-total annuel matières premières vierges :												
	59493266	60557356	61390204	62361917	63349477	64483993	65373222	66409960	67463653	68673449		
\$/an												
Fournitures :												
- produits chimiques		938875	952958	967252	981761	996488	1011435	1026607	1042006	1057636		
\$/an												
- amidon		0	0	0	0	0	0	0	0	0		
\$/an												
- recouvrement de rouleaux		418271	424545	430914	437377	443938	450597	457356	464216	471180		
\$/an												
- habillage		1097982	1114431	1131148	1148115	1165337	1182817	1200559	1218568	1236846		
\$/an												
- location & entr. de système		0	0	0	0	0	0	0	0	0		
\$/an												
- lubrifiant		0	0	0	0	0	0	0	0	0		
\$/an												
- divers		444413	451079	457845	464713	471683	478759	485940	493229	500628		
\$/an												
	2856671	2899521	2943014	2987159	3031966	3077446	3123608	3170462	3218019	3266289		
\$/an												
Sous-total :												
	65000	65000	65000	65000	65000	65000	65000	65000	65000	65000		
G/an												
Vapeur :		3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9		
G/MT												
- chauffage		739105	739105	739105	739105	741146	739105	739105	739105	739105		
G/an												
- production (par tonne)		8,39	8,54	8,69	8,84	9,00	9,32	9,48	9,65	9,81		
G/an												
- production (annuelle)		6749725	6880760	6988100	7110620	7235420	7376304	7523958	7758342	7909868		
\$/Gj												
- coût moyen du Gj												
\$/an												
- coût annuel de la vapeur		8	8	8	8	8	8	8	8	8		
Mwh												
- énergie aux auxiliaires		39,54	39,08	39,70	40,30	40,90	42,14	42,77	43,41	44,02		
\$/Mwh												
- coût moyen du Mwh		2878630	2723526	2759592	2800985	2843000	2890651	2937864	3017457	3068031		
\$/an												
- coût annuel de l'électricité												
Main-d'œuvre : (coût annuel par poste)												
Poste												
opér. machines	3055925	3132323	3210631	3290896	3373169	3457498	3543936	3632534	3723347	3816431		
\$/an												
entretien	2272987	2329811	2388057	2447758	2508952	2571676	2635968	2701867	2769413	2838649		
\$/an												
personnel de bureau	74479	76341	78250	80206	82211	84267	86373	88533	90746	93015		
\$/an												
cadres	315000	322875	330947	339221	347701	356394	365303	374436	383797	393392		
\$/an												
Coût annuel de main-d'œuvre :	5718391	5861350	6007884	6158081	6312033	6469834	6631580	6797369	6967304	7141486		
\$/an												
facteur:	1818389	1863849	1910445	1958206	2007162	2057341	2108774	2161493	2215531	2270919		
\$/an												
Matériel d'ent. ord. vs m.-o. ent.	0	0	0	0	0	0	0	0	0	0		
Matériel d'entretien ordinaire (budget)	0	0	0	0	0	0	0	0	0	0		
\$/an												
Coût annuel de fabrication du papier sur Mach. #1	79315071	80786362	81999239	83376969	84779058	86355569	87658156	89136107	90640304	92330042		
\$/an												
Coût unitaire de fabrication du papier sur Mach. #1	418,52	425,11	432,68	439,95	447,35	454,41	462,54	470,34	478,28	486,85		
\$/MT												

Sommaire des coûts Location :

Machine #1

Produit : 1

Base	1	2	3	4	5	6	7	8	9	10
TM/an	203778,5	204341,4	203778,5	203778,5	203778,5	204341,4	203778,5	203778,5	203778,5	204341,4
Production totale de bon papier										
Coûts directs										
M-O opération (avantages sociaux inclus)	40,22	41,12	42,26	43,32	44,40	45,38	46,65	47,81	49,01	50,09
Fibres (copeaux, bois rond, autres...)	131,83	133,80	135,81	137,85	139,92	142,01	144,14	146,31	148,50	150,73
Sauce de couchage	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Glaise, POC ou GCC	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Kraft	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Désencré	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Fournitures diverses opération	12,26	12,41	12,63	12,82	13,01	13,17	13,41	13,61	13,81	13,98
Produits chimiques blanchiment	7,36	7,47	7,58	7,70	7,81	7,93	8,05	8,17	8,29	8,41
Produits chimiques divers	7,18	7,27	7,40	7,51	7,62	7,72	7,85	7,97	8,09	8,19
Feutres et treillis	5,31	5,37	5,47	5,55	5,63	5,70	5,80	5,89	5,98	6,05
Fournitures d'apprêt/expédition	18,54	18,82	19,10	19,39	19,68	19,97	20,27	20,58	20,89	21,20
Électricité opération	136,49	138,40	140,62	142,73	144,87	146,89	149,25	151,48	153,76	155,90
Vapeur opération	22,66	23,00	23,34	23,69	24,05	24,41	24,78	25,15	25,53	25,91
Disposition des boues/écorses	0	0	0	0	0	0	0	0	0	0

Total des coûts directs : \$/TM 381,85 387,66 394,21 400,55 406,99 413,19 420,20 426,97 433,85 440,47

Coûts périodiques

M-O bureaux (avantages sociaux inclus)	8,82	8,81	9,05	9,28	9,51	9,72	9,99	10,24	10,50	10,73
M-O cadres (avantages sociaux inclus)	17,00	17,38	17,86	18,31	18,77	19,19	19,72	20,21	20,72	21,18
Électricité services/administration	1,48	1,50	1,52	1,55	1,57	1,59	1,62	1,64	1,67	1,69
Vapeur services/administration	5,13	5,19	5,26	5,36	5,44	5,51	5,61	5,69	5,78	5,85
Taxes et assurances	11,63	11,77	11,98	12,16	12,34	12,49	12,71	12,91	13,10	13,26
Fournitures diverses services/administration	8,85	8,96	9,11	9,25	9,39	9,50	9,67	9,82	9,97	10,09
M-O entretien (avantages sociaux inclus)	37,18	38,00	39,06	40,04	41,04	41,95	43,11	44,19	45,30	46,30
Matériel entretien	26,36	26,89	27,60	28,24	28,90	29,50	30,27	30,98	31,71	32,37

Total des coûts périodiques : \$/TM 116,24 118,50 121,48 124,19 126,98 129,45 132,71 135,69 138,73 141,46

Total des coûts de fabrication : \$/TM 498,09 506,16 515,69 524,74 533,95 542,64 552,91 562,65 572,58 581,93

Revenus de ventes de papier hors norme rebobiné # 1	732846	734870	732846	732846	732846	734870	732846	732846	732846	734870
Revenus de ventes de papier hors norme tel quel # 1	469209	470505	469209	469209	469209	470505	469209	469209	469209	470505
Impact sur coût de fabrication de bon papier (M.P. #1)	5,90	5,90	5,90	5,90	5,90	5,90	5,90	5,90	5,90	5,90
Coût réel total de fabrication sur la machine # 1 :	492,19	500,26	509,79	518,84	529,05	536,74	547,01	556,75	566,68	576,03

Simulation avec pâte désencrée

Coût de fabrication = 490.³⁵ \$CAN/tm de papier

Gamme de produits fabriqués :

Numéro de produit Nom	1 Newsprint	2	3	4	5	6
Spécifications du produit :						
- poids de base (g/m²)	48,8					
- lustre non-imprimé (% Hunter)	90					
- rugosité (PPS)	8					
- porosité (TAPPI)	58					
- formation (NUI)						
- brillance (° ISO)	45,4					
- coulage (g/m²/côlé)	45,4					
Spécifications de la feuille de base :						
- humidité feuille de base (%)	58					
- poids de base humide (g/m²)						
- poids de base sec (g/m²)						
- brillance (° ISO)						
Recettes/Base Pâtes (feuille de base)						
TMP (hyd.)	75,0					
SGW(hyd.)						
PGW(hyd.)						
HYS(hyd.)						
TMP(per.)						
SGW(per.)						
PGW(per.)						
HYS(per.)	26,0					
Désencré	0,0					
Kraft	0,0					
TOTAL	100,0					
Cendres						
(Naturelles = 0,52 %)						
Recettes/Base Papier						
TMP (hyd.)	75,0					
SGW(hyd.)	0,0					
PGW(hyd.)	0,0					
HYS(hyd.)	0,0					
TMP(per.)	0,0					
SGW(per.)	0,0					
PGW(per.)	0,0					
HYS(per.)	0,0					
Désencré	25,0					
Kraft	0,0					
Glaise	0,0					
PCC/GCC	0,0					
Calcinée						
TOTAL	100,0					
Recettes/Base Papier (produit fini)						
TMP (hyd.)	69,8					
SGW(hyd.)	0					
PGW(hyd.)	0					
HYS(hyd.)	0					
TMP(per.)	0					
SGW(per.)	0					
PGW(per.)	0					
HYS(per.)	0					
Sauce	0					
Désencré	23,3					
Kraft	0					
Glaise	0					
PCC/GCC	0					
Calcinée	7					
Humidité	100,1					
TOTAL						

Production & consommation de matières premières vierges :

Machine:	1	2	3	4	5	6	7	8	9	10
Caractéristiques										
jours d'opération	362	363	362	362	362	363	362	362	362	363
largeur à l'enrouleuse	7,68	7,68	7,68	7,68	7,68	7,68	7,68	7,68	7,68	7,68
largeur à la bobineuse	7,62	7,62	7,62	7,62	7,62	7,62	7,62	7,62	7,62	7,62
Production										
numéro du produit	1	1	1	1	1	1	1	1	1	1
poids de base	48,8	48,8	48,8	48,8	48,8	48,8	48,8	48,8	48,8	48,8
% du temps fabriqué	100	100	100	100	100	100	100	100	100	100
vitesse moyenne d'opération	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219
production à 100% d'efficacité (enrouleuse)	657,9	657,9	657,9	657,9	657,9	657,9	657,9	657,9	657,9	657,9
fermetures entretien planifié	4,72	4,72	4,72	4,72	4,72	4,72	4,72	4,72	4,72	4,72
fermetures non-planifiées (habillage, lavage, etc...)	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83	0,83
fermetures diverses non-planifiées (vapeur, élec. etc...)	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56
feuille cassée sur la machine	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
papier déchiré (épaisures, fonds et dessus de bobine)	2	2	2	2	2	2	2	2	2	2
efficacité budgétée	88	88	88	88	88	88	88	88	88	88
efficacité de rognure	98	98	98	98	98	98	98	98	98	98
rognure de papier bobiné qui retourne au cassé	1,76	1,76	1,76	1,8	1,8	1,8	1,76	1,8	1,8	1,8
matières premières vierges consommées (enrouleuse)	87,63	87,63	87,63	87,6	87,6	87,6	87,63	87,6	87,6	87,6
prod. avec % matières premières vierges (enrouleuse)	576,5	576,5	576,5	576,5	576,5	576,5	576,5	576,5	576,5	576,5
production vendable budgétée (bobineuse)	562,9	562,9	562,9	562,9	562,9	562,9	562,9	562,9	562,9	562,9
% d'humidité de la feuille	7	7	7	7	7	7	7	7	7	7
% de papier hors norme (rejeté)	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39
production de papier hors norme (rejeté)	9,1	9,1	9,1	9,1	9,1	9,1	9,1	9,1	9,1	9,1
production sèche à 100% d'eff. (enrouleuse)	611,8	611,8	611,8	611,8	611,8	611,8	611,8	611,8	611,8	611,8
production vendable sèche budgétée (bobineuse)	523,5	523,5	523,5	523,5	523,5	523,5	523,5	523,5	523,5	523,5
production de papier hors norme sèche (rejets)	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4
Matières premières vierges consommées à l'enrouleuse										
TMP (hyd.)	362,2	362,2	362,2	362,2	362,2	362,2	362,2	362,2	362,2	362,2
SGW (hyd.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PGW (hyd.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
HYS (hyd.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
TMP (per.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
SGW (per.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PGW (per.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
HYS (per.)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Sauce de couchage	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Désencré	120,9	120,9	120,9	120,9	120,9	120,9	120,9	120,9	120,9	120,9
Kraft	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Glaise	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PCC ou GCC	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Calciné	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Bois rond SGW (fact. cons. & perte incl.)	0	0	0	0	0	0	0	0	0	0
Bois rond PGW (fact. cons. & perte incl.)	0	0	0	0	0	0	0	0	0	0
Copeaux TMP (fact. cons. & perte incl.)	406318	407440	406318	406318	406318	407440	406318	406318	406318	407440
Copeaux HYS (fact. cons. & perte incl.)	0	0	0	0	0	0	0	0	0	0
Papier rebut journal (fact. incl.)	37312	37415	37312	37312	37312	37415	37312	37312	37312	37415
Papier rebut magazine (fact. incl.)	15991	16035	15991	15991	15991	16035	15991	15991	15991	16035

Codt total annuel de fabrication de TMP	\$/an	45765928	46591142	47245493	48003768	48774656	49655510	50355159	51165226	51988113	52929233
Codt total unitaire du TMP (non blanchi)	\$/BDMT	340,59	345,78	351,62	357,27	363,02	368,56	374,80	380,84	386,98	392,90
Codt total unitaire du TMP (hyd.)	\$/BDMT	349,09	354,40	360,37	366,16	372,04	377,71	384,09	390,27	396,55	402,62
Codt total unitaire du TMP (hyd. + per.)	\$/BDMT	349,09	354,40	360,37	366,16	372,04	377,71	384,09	390,27	396,55	402,62

Atelier de Désencrage (coûts de fabrication) :

	1	2	3	4	5	6	7	8	9	10
Base										
Nombre de jours d'opération	362	363	362	362	362	363	362	362	362	363
Prod. quotidienne de pâte désencrée (pertes incl.)	122,7	122,7	122,7	122,7	122,7	122,7	122,7	122,7	122,7	122,7
Production annuelle de pâte désencrée	44419,4	44542,1	44419,4	44419,4	44419,4	44542,1	44419,4	44419,4	44419,4	44542,1
Consommation annuelle de rebut "journal"	37312	37415	37312	37312	37312	37415	37312	37312	37312	37415
Consommation annuelle de rebut "magazine"	15991	16035	15991	15991	15991	16035	15991	15991	15991	16035
Coût unitaire moyen du rebut "journal"	135,00	136,37	137,75	139,15	140,57	141,99	143,43	144,89	146,36	147,84
Coût unitaire moyen du rebut "magazine"	120,00	121,22	122,45	123,69	124,95	126,21	127,50	128,79	130,10	131,42
Coût annuel du rebut "journal"	5037165	5102348	5139938	5192108	5244808	5318139	5368188	5408139	5461012	5531680
Coût annuel du rebut "magazine"	1918920	1943752	1958072	1977946	1988022	2003878	2038788	2059482	2080385	2107307
Coût annuel total du papier rebut	6956085	7046100	7098010	7170055	7242831	7336556	7390806	7465621	7541397	7638986
Fournitures :										
- produits chimiques	1100000	1116500	1133248	1150246	1167500	1185012	1202788	1220829	1239142	1257729
- chariot élévateur	100000	101500	103023	104568	106136	107728	109344	110984	112649	114339
- lames & épaisseurs	100000	101500	103023	104568	106136	107728	109344	110984	112649	114339
- épurateurs centrifuges	50000	50000	51511	52284	53068	53864	54672	55492	56325	57169
- divers	100000	101500	103023	104568	106136	107728	109344	110984	112649	114339
- revente du métal (broches)		0	0	0	0	0	0	0	0	0
Sous-total :	1450000	1471750	1493826	1516234	1538977	1562062	1585493	1609275	1633414	1657915
Vapeur :										
- chauffage	6500	6500	6500	6500	6500	6500	6500	6500	6500	6500
- production (par tonne)	1	1	1	1	1	1	1	1	1	1
- production (besoin annuel)	53303	53451	53303	53303	53303	53451	53303	53303	53303	53451
- coût moyen du GJ	8,31	8,45	8,61	8,76	8,91	9,06	9,22	9,39	9,55	9,71
- coût annuel de la vapeur	497134	506731	514647	523647	532814	543130	551664	561352	571222	582315
Électricité :										
- énergie auxiliaires	38,57	39,11	39,73	40,33	40,94	41,51	42,17	42,81	43,45	44,05
- coût moyen du MWh	856607	870963	882498	895736	909172	924409	936652	950701	964962	981134
- coût annuel de l'électricité										
Blanchiment : (coût annuel par produit utilisé)										
Produit										
hydrosulphite	377565	384287	388977	394812	400734	407869	412846	419039	425324	432897
peroxyde	0	0	0	0	0	0	0	0	0	0
DTPA	0	0	0	0	0	0	0	0	0	0
silicate	0	0	0	0	0	0	0	0	0	0
acide sulphurique	0	0	0	0	0	0	0	0	0	0
caustique	0	0	0	0	0	0	0	0	0	0
Coût annuel de blanchiment :	377565	384287	388977	394812	400734	407869	412846	419039	425324	432897
Main-d'oeuvre : (coût annuel par poste)										
Poste										
chariot-élévateur	320568	328582	335797	345216	353847	362693	371760	381054	390581	400345
opér. désencrage	386212	395867	405764	415908	426305	436963	447887	459084	470561	482325
entretien	378831	388302	398009	407960	418159	428613	439328	450311	461569	473108
personnel de bureau	0	0	0	0	0	0	0	0	0	0
cadres	105000	107625	110316	113074	115900	118798	121768	124812	127932	131131
Coût annuel de main-d'oeuvre :	1190611	1220376	1250885	1282157	1314211	1347067	1380743	1415262	1450643	1486909
Matériel d'ent. ord. vs m.-o. ent.	303065	310542	318408	326368	334527	342890	351462	360249	369255	378487
Matériel d'entretien ordinaire (budget)										
Coût total annuel de fabrication du Désencré	11631067	11810848	11947251	12109008	12273266	12463983	12609466	12781499	12956218	13158643
Coût total unitaire du Désencré (non blanchi)	253,35	256,53	260,21	263,72	267,26	270,67	274,58	278,31	282,10	285,70
Coût total unitaire du Désencré	261,85	265,16	268,96	272,61	276,30	279,82	283,87	287,75	291,68	295,42

Sommaire des coûts : location :

Machinerie #1

Produit : 1

Base	1	2	3	4	5	6	7	8	9	10
TM/an	203778,5	204341,4	203778,5	203778,5	203778,5	204341,4	203778,5	203778,5	203778,5	204341,4
Production totale de bon papier										
Coûts directs										
M-O opération (avantages sociaux inclus)	43,69	44,66	45,90	47,05	48,23	49,30	50,67	51,94	53,23	54,41
Fibres (copeaux, bois rond, autres...)	98,94	100,42	101,93	103,46	105,01	106,59	108,19	109,81	111,46	113,13
Sauce de couchage	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Glaise, PCC ou GCC	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Kraft	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Désencré	34,98	34,83	35,18	35,84	35,90	36,26	36,63	37,00	37,38	37,76
Fournitures diverses opération	13,98	14,15	14,40	14,62	14,83	15,02	15,28	15,51	15,75	15,94
Produits chimiques blanchiment	7,37	7,48	7,59	7,70	7,82	7,94	8,06	8,18	8,30	8,42
Produits chimiques divers	12,58	12,73	12,96	13,16	13,35	13,52	13,76	13,96	14,17	14,35
Feutres et treillis	6,31	5,37	5,47	5,55	5,63	5,70	5,80	5,89	5,98	6,05
Fournitures d'appât/expédition	18,54	18,82	19,10	19,39	19,68	19,97	20,27	20,58	20,89	21,20
Electricité opération	111,93	113,50	115,32	117,05	118,80	120,46	122,39	124,23	126,09	127,85
Vapeur opération	23,26	23,61	23,96	24,32	24,69	25,06	25,43	25,81	26,20	26,59
Disposition des boues/écoures	0	0	0	0	0	0	0	0	0	0
Total des coûts directs :	370,08	375,57	381,81	387,83	393,95	399,81	406,48	412,91	419,44	425,70
Coûts périodiques										
M-O bureaux (avantages sociaux inclus)	8,62	8,81	9,05	9,28	9,51	9,72	9,99	10,24	10,50	10,73
M-O cadres (avantages sociaux inclus)	17,52	17,91	18,41	18,87	19,34	19,77	20,32	20,82	21,35	21,82
Electricité services/administration	1,48	1,50	1,52	1,55	1,57	1,59	1,62	1,64	1,67	1,69
Vapeur services/administration	5,30	5,37	5,46	5,54	5,63	5,69	5,80	5,88	5,97	6,04
Taxes et assurances	11,63	11,77	11,98	12,16	12,34	12,49	12,71	12,91	13,10	13,28
Fournitures diverses services/administration	8,85	8,96	9,11	9,25	9,39	9,50	9,67	9,82	9,97	10,09
M-O entretien (avantages sociaux inclus)	39,04	39,90	41,01	42,04	43,09	44,04	45,27	46,40	47,56	48,62
Matériel entretien	27,84	28,42	29,16	29,84	30,54	31,17	32,00	32,75	33,52	34,22
Total des coûts périodiques :	120,27	122,62	125,71	128,53	131,41	133,99	137,38	140,47	143,63	146,47
Total des coûts de fabrication :	490,35	498,19	507,52	516,36	525,35	533,80	543,86	553,38	563,07	572,17
Revenus de ventes de papier hors norme rebobiné # 1	732846	734870	732846	732846	732846	734870	732846	732846	732846	734870
Revenus de ventes de papier hors norme tel quel # 1	489209	470505	469209	469209	469209	470505	469209	469209	469209	470505
Impact sur coût de fabrication de bon papier (M.P. #1)	5,90	5,90	5,90	5,90	5,90	5,90	5,90	5,90	5,90	5,90
Coût réel total de fabrication sur la machine # 1 :	484,45	482,29	501,63	510,46	519,45	527,90	537,96	547,48	557,18	566,27

A.I.F.Q.

Potentiel de réduction de la consommation d'énergie électrique dans l'industrie
papetière québécoise

Augmentation du potentiel d'utilisation de pâte désencrée au Québec

093-2F16 (60et)



Génivel-BPR

Annexe E

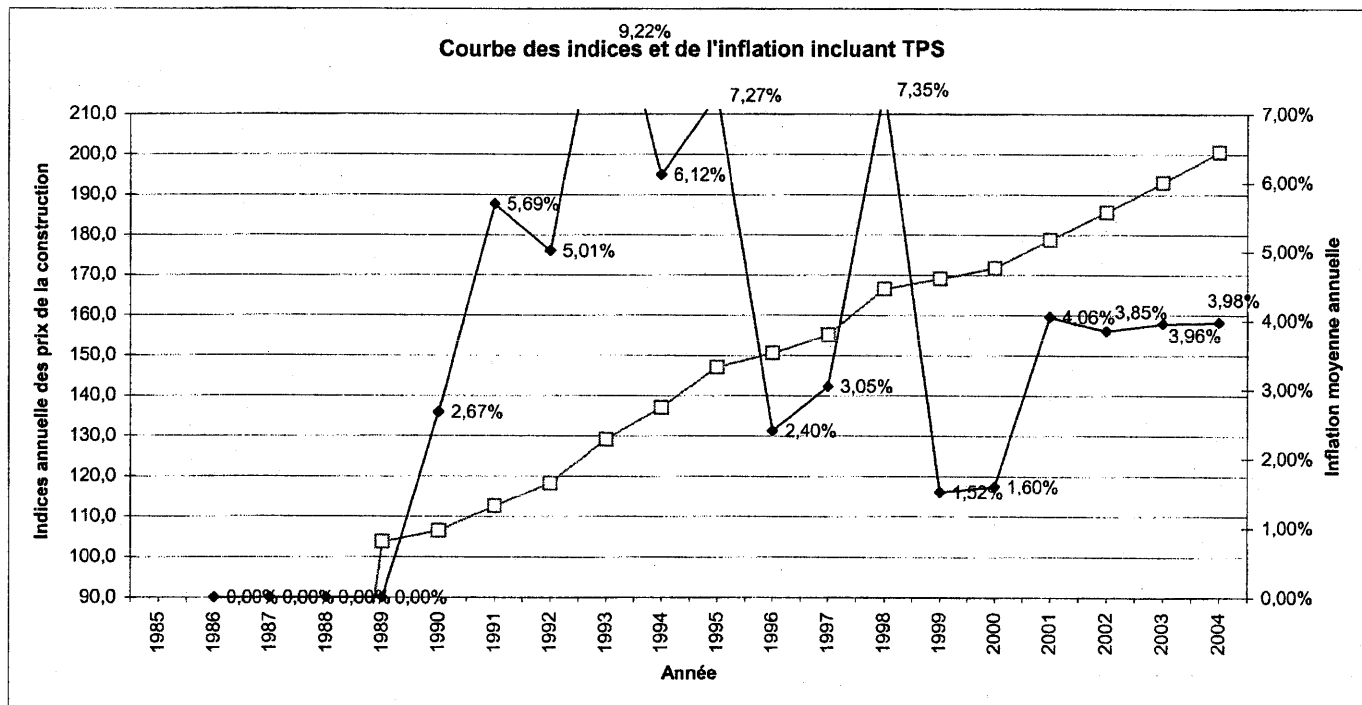
Tableau des indices de prix

12 septembre 2002

INDICES DES PRIX DE LA CONSTRUCTION NON RÉSIDENTIELLE
BÂTIMENT INDUSTRIEL DE PÂTES ET PAPIERS-QUÉBEC
STATISTIQUE Canada PLUS TPS ET TVQ (note1)
1986 = 100

ANNÉES	TRIMESTRE								Moyenne annuelle		Inflation Moyenne annuelle	
	I		II		III		IV					
	StatsCan	+Taxes	StatsCan	+Taxes	StatsCan	+Taxes	StatsCan	+Taxes	StatsCan	+Taxes	StatsCan	+Taxes
1985									0,0	0,0		
1986									0,0	0,0	#DIV/0!	#DIV/0!
1987									0,0	0,0	#DIV/0!	#DIV/0!
1988									0,0	0,0	#DIV/0!	#DIV/0!
1989	101,4		104		105,0		104,6		103,8	103,8	#DIV/0!	#DIV/0!
1990	106,0		106,2		106,6		107,3		106,5	106,5	2,67%	2,67%
1991	105,2	112,6	105,3	112,7	105,3	112,7	105,1	112,5	105,2	112,6	-1,22%	5,69%
1992	108	115,6	109,5	117,2	110,2	117,9	114,3	122,3	110,5	118,2	5,01%	5,01%
1993	113,6	126,4	114,8	127,7	117	130,2	118,8	132,2	116,1	129,1	5,02%	9,22%
1994	120,8	134,4	124,0	138,0	123,6	137,5	124,2	138,2	123,2	137,0	6,12%	6,12%
1995	128,5	146,4	129,0	147,0	129,0	147,0	129,5	147,6	129,0	147,0	4,75%	7,27%
1996	132,0	150,4	132,2	150,6	132,7	151,2	131,5	149,9	132,1	150,5	2,40%	2,40%
1997	133,3	151,9	136,0	155,0	136,6	155,7	138,6	157,9	136,1	155,1	3,05%	3,05%
1998	140,8	162,0	142,6	164,0	145,7	167,6	150,0	172,5	144,8	166,5	6,35%	7,35%
1999	148,7	171,0	145,9	167,8	146,4	168,4	146,9	169,0	147,0	169,1	1,52%	1,52%
2000	146,7	168,7	149,2	171,6	149,2	171,6	152,2	175,1	149,3	171,8	1,60%	1,60%
2001	153,5	176,7	154,9	178,3	155,4	178,9	157,3	181,1	155,3	178,7	3,98%	4,06%
2002	158,9	182,9	160,4	184,7	162,0	186,5	163,7	188,4	161,3	185,6	3,85%	3,85%
2003	165,2	190,2	166,8	192,0	168,4	193,9	170,1	195,7	167,6	193,0	3,96%	3,96%
2004	171,7	197,7	173,4	199,6	175,2	201,6	176,9	203,6	174,3	200,6	3,98%	3,98%

- (1) Statistique Canada inclut dans les indices les taxes de vente Fédérale et provinciale jusqu'au 1^{er} janvier 1991 et au 3 juin 1992 respectivement. Depuis ces dates Statistique Canada (StatsCan) exclut les taxes TPS ET TVQ dans leur indices. On aura intérêt à utiliser les indices de la colonne " + Taxes" si les comparaisons incluent ces taxes. 1^{er} janvier 1991 entrée en vigueur de la TPS à 7.0%, 1^{er} juillet 1992 entrée en vigueur de la TVQ à 4.0%, et 13 mai 1994 augmentation de la TVQ à 6.5%.



A.I.F.Q.

Potentiel de réduction de la consommation d'énergie électrique dans l'industrie
papetière québécoise

Augmentation du potentiel d'utilisation de pâte désencrée au Québec

093-2F16 (60et)



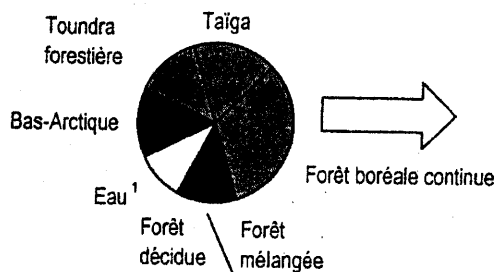
Génivel-BPR

Annexe F

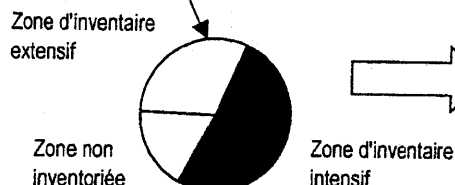
Ressources et industries forestières (Portrait statistique, décembre 2001)

12 septembre 2002

Superficie du Québec¹: 1 667 926 km²



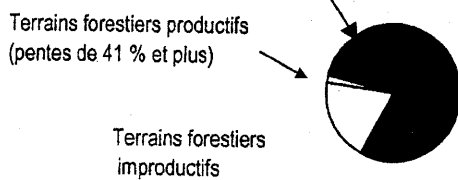
Zone et sous-zones de végétation ²		1 501 500 km ²
(selon la nouvelle classification écologique du territoire de 1998)		
• Arctique	• Bas-Arctique	232 100 km ²
• Boréale	• Toundra forestière	224 800 km ²
	• Taïga	294 300 km ²
	• Forêt boréale continue	541 500 km ²
• Tempérée nordique	• Forêt mixte	98 600 km ²
	• Forêt décidue	110 200 km ²



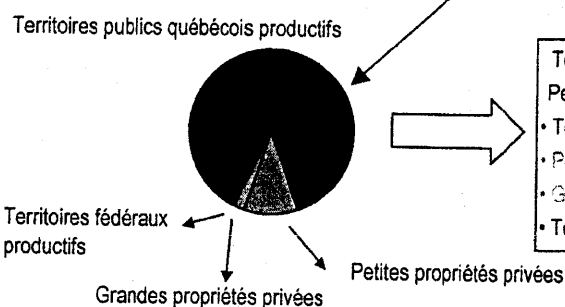
Superficie continentale ³		1 496 646 km ²
• Zone non inventoriée		267 322 km ²
• Zone d'inventaire extensif		464 481 km ²
• Zone d'inventaire intensif		764 843 km ²



Zone d'inventaire intensif ⁴		764 843 km ²
• Eaux douces	(-) 76 188 km ²	
• Terrains non forestiers	(-) 33 532 km ²	
• Terrains forestiers		655 123 km ²



Terrains forestiers	655 123 km ²
Terrains forestiers improductifs(-)	126 253 km ²
Terrains forestiers productifs	528 870 km ²
• Pentes de 41 % et plus	10 706 km ²
• Pentes de 0 % à 40 %	518 164 km ²



Territoires forestiers productifs		
Pentes de 0 % à 40 %		518 164 km ²
• Territoires publics québécois productifs		448 928 km ²
• Petites propriétés privées		55 126 km ²
• Grandes propriétés privées		11 072 km ²
• Territoires fédéraux productifs		3 039 km ²

Volume marchand		
		4 367 902 000 m ³
		3 722 564 000 m ³
		524 879 000 m ³
		88 191 000 m ³
		32 478 000 m ³

¹ Y compris les eaux du fleuve et du golfe Saint-Laurent, celles des baies James, d'Hudson et d'Ungava ainsi que celles du détroit d'Hudson (171 280 km²)

² Les limites des domaines bioclimatiques ont été révisées par le Comité sur la carte des régions écologiques, qui a défini le nouveau système de classification écologique du territoire, en 1998.

³ Les données sur le territoire proviennent en partie du deuxième inventaire décennal. Elles n'ont pas encore été toutes révisées pour tenir compte du dernier inventaire écoforestier, qui se terminera en 2002. La superficie continentale sera alors harmonisée à celle de la zone de végétation du Québec.

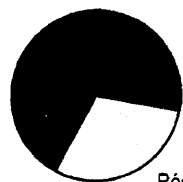
⁴ Territoires où les forêts sont aménageables conformément au principe du rendement soutenu, sur un horizon de 120 ans.

Sommaire (suite)

00 07 01

Répartition des territoires publics québécois productifs

Territoires couverts par des CAAF



Territoires couverts
par des CvAF

Réserves forestières
libres de droits

Territoires publics québécois productifs
(pentes de 0 % à 40 %)

- Territoires couverts par des contrats d'approvisionnement et d'aménagement forestier (CAAF)
- Territoires couverts par des conventions d'aménagement (CvAF)
- Réserves forestières libres de droits et territoires où toute production forestière est exclue (RNI¹, Parcs, etc.)

448 928 km²

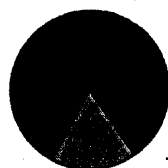
300 623 km²

13 605 km²

134 700 km²

Superficies considérées pour le calcul de la possibilité forestière

Territoires couverts par des CAAF



Territoires couverts
par des CvAF

Territoires privés

Territoires publics québécois sur lesquels des droits
sont consentis

- CAAF
- CvAF

Territoires privés productifs considérés dans le calcul
des prélèvements admissibles
(pente de 0 % à 40 %)

PPP² : 55 126 km², GPP² : 11 072 km²

300 623 km²

13 605 km²

66 198 km²

Possibilité forestière, au 31 mars 2001

Possibilité des forêts publiques



Prélèvements admissibles
dans les forêts privées

Possibilité des forêts publiques québécoises
(aires communes)

- Sapin, épinettes, pin gris, mélèzes
- Autres résineux
- Peupliers
- Autres feuillus

54 717 361 m³

41 858 061 m³

28 993 472 m³

1 386 887 m³

3 669 893 m³

7 807 809 m³

Prélèvements admissibles dans les forêts privées
(grandes et petites propriétés privées)

- Sapin, épinettes, pin gris, mélèzes
- Autres résineux
- Peupliers
- Autres feuillus

12 859 300 m³

4 636 500 m³

1 132 100 m³

2 529 500 m³

4 561 200 m³

Volumes attribués dans les forêts publiques en vertu des CAAF, au 31 mars 2001

35 022 442 m³

- Sapin, épinettes, pin gris, mélèzes
- Autres résineux
- Peupliers
- Autres feuillus

27 042 862 m³

858 939 m³

2 923 224 m³

4 197 417 m³

¹ RNI : Règlement sur les normes d'intervention dans les Forêts du domaine de l'Etat

² PPP : petites propriétés privées

GPP : grandes propriétés privées

Volumes attribués dans les forêts publiques en vertu des CvAF, au 31 mars 2001

	442 551 m ³
• Sapin, épinettes, pin gris, mélèzes	311 437 m ³
• Autres résineux	20 584 m ³
• Peupliers	49 792 m ³
• Autres feuillus	60 738 m ³

Volumes de matière ligneuse récoltés (1999-2000)

Forêts publiques

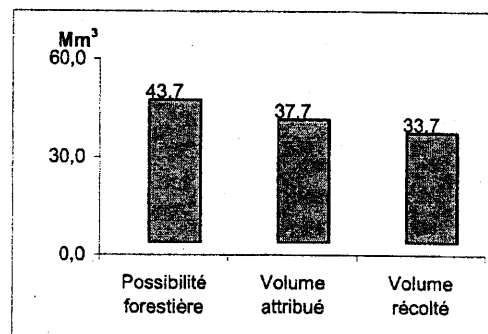


Forêts privées

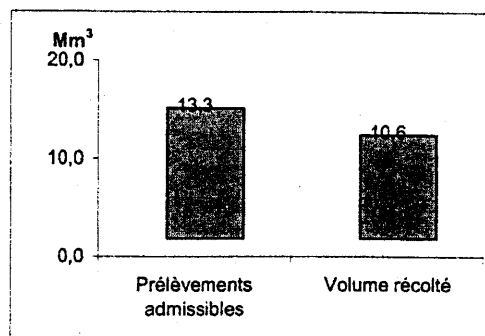
Forêts publiques	33 713 005 m ³
• sapin, épinettes, pin gris, mélèzes	28 228 351 m ³
• autres résineux	774 719 m ³
• peupliers	2 214 713 m ³
• autres feuillus	2 495 222 m ³
Forêts privées ¹	10 574 143 m ³
• sapin, épinettes, pin gris, mélèzes	4 307 637 m ³
• autres résineux	623 332 m ³
• peupliers	2 051 176 m ³
• autres feuillus	3 591 998 m ³

¹ Estimation

Forêts publiques (possibilité forestière, volume attribué, volume récolté)
(1999-2000)



Forêts privées (prélèvements admissibles, volume récolté)
(1999-2000)



5 Aménagement forestier

5.0 Points saillants

05.00.01

Possibilité forestière québécoise ('000 m³)

	2000	2001
Possibilité des forêts publiques (aires communes) (résineux : 72,6 %, feuillus : 27,4 %)	43 728,9	41 858,1
Prélèvements admissibles dans les forêts privées (résineux : 44,8 %, feuillus : 55,2 %)	13 304,4	12 859,3
TOTAL	57 033,3	54 717,4

Superficies considérées pour le calcul de la possibilité forestière au Québec ('000 ha)

	2000	2001
Forêts publiques productives ¹ - CAAF	30 836,4	30 082,3
- CvAF	1 384,9	1 360,5
Forêts privées productives ¹	6 619,8	6 619,8
TOTAL	38 841,1	38 042,6

¹ Pentés de 0 % à 40 %

Volumes de bois attribués dans les forêts publiques québécoises ('000 m³)

	2000	2001
Contrats d'approvisionnement et d'aménagement forestier (CAAF)	37 258,9	35 022,4
Conventions d'aménagement forestier (CvAF)	481,1	442,6

Vombre d'aires communes et de contrats d'approvisionnement et d'aménagement forestier

	2000	2001
Aires communes	121	114
Contrats d'approvisionnement et d'aménagement forestier (CAAF)	256	253
Conventions d'aménagement forestier (CvAF)	77	82

Bois récoltés au Québec, en 1999-2000 ('000m³)

Forêts publiques	33 713
Forêts privées ¹	10 574
• Volumes mis en marché par les syndicats et offices de producteurs de bois	6 096
TOTAL	44 287
Volumes récoltés / possibilité forestière ²	
• Résineux	91,5%
• Feuillus	51,9%
TOTAL	77,7%

¹ Y compris ± 2,0 Mm³ de bois de chauffage

² Possibilité forestière (forêts publiques et privées), toutes essences confondues

Superficie des aires de récolte au Québec, en 1999-2000 ('000 ha)

Forêts publiques	377,3
Forêts privées (estimation)	85,0
TOTAL	462,3
Superficie totale des aires de récolte / superficie des forêts productives ¹	1,22 %

¹ Superficie totale des forêts publiques et privées considérées dans le calcul de la possibilité forestière

Valeur marchande des bois sur pied (forêts publiques, toutes essences confondues), selon le taux unitaire moyen provincial

	(\$ / m ³)
1998-1999	10,52
1999-2000	11,56
2000-2001	10,90

Importance relative des moyens utilisés pour transporter les exportations québécoises de bois d'œuvre, en 2000-2001

Train	52,5%
Camion	44,7%
Bateau	2,8%
TOTAL	100 %

Réseau de chemins forestiers permanents au Québec, en 2000-2001

Longueur (km)	15 369
Ponts (n ^{bre})	520

Production québécoise de plants pour le reboisement

	1999-2000	2000-2001
Cônes récoltés (hl)	1090,5	4 775,2
Superficie des vergers à graines (ha)	1 278,8	1 278,8
Plants produits ('000)	155 257,4	157 986,5
• Pépinières du MRN	40 615,5	41 460,1
• Pépinières privées	114 641,9	116 526,4

Le reboisement au Québec¹

		('000 plants)	('000 ha)
Forêts publiques	1998-1999	111 093	68,3
	1999-2000 ^{1,2}	108 288	68,8
Forêts privées	1998-1999	33 200	14,5
	1999-2000 ¹	32 689	13,2
TOTAL	1998-1999	144 293	82,8
	1999-2000 ^{1,2}	140 977	82,0

¹ Données provisoires

² Inclut l'ensemencement

5 Aménagement forestier

5.2 Récolte

Volumes de bois récoltés dans les forêts publiques et privées

05.02.01

A) Selon la tenure et les groupes d'essences

	1995-1996 ¹		1996-1997 ¹		1997-1998 ¹		1998-1999 ¹		1999-2000		2000-2001	
	TOTAL		TOTAL		TOTAL		TOTAL		TOTAL		TOTAL	
	('000 m ³)	(%)	('000 m ³)	(%)	('000 m ³)	(%)	('000 m ³)	(%)	('000 m ³)	(%)	('000 m ³)	(%)
TOTAL	41 080	100	38 026	100	42 152	100	43 025	100	44 287	100	n.d. ³	
Résineux	31 529	77	29 656	78	32 440	77	32 308	75	33 934	77	n.d.	
Feuillus	9 551	23	8 370	22	9 712	23	10 717	25	10 353	23	n.d.	
Territoire public québécois ⁴	31 275	100	28 599 ¹	100	32 571 ¹	100	33 002	100	33 713 ²	100	n.d.	
Résineux	26 772	86	25 095	88	27 950	86	27 754	84	29 003 ²	86	n.d.	
Feuillus	4 503	14	3 504	12	4 621	14	5 248	16	4 710 ²	14	n.d.	
Propriétés privées ⁵	9 805	100	9 427 ²	100	9 581 ²	100	10 023	100	10 574	100	10 098 ²	100
Résineux	4 757	49	4 561	48	4 490	47	4 554	45	4 931	47	4 891 ²	48
Feuillus	5 048	51	4 866	52	5 091	53	5 469	55	5 643	53	5 207 ²	52

1 Données révisées

2 Données provisoires

3 Données non disponibles

4 Volumes de bois récoltés et mesurés dans les forêts publiques, à l'exclusion des petits volumes prélevés à des fins particulières (travaux d'utilité publique, activités minières, aménagements fauniques ou récréatifs, etc.)

5 Estimation des volumes de bois récoltés dans les forêts privées, par des producteurs individuels ou regroupés, y compris les copeaux et le bois de chauffage ($\pm 2 \text{ Mm}^3$), mais à l'exclusion des petits volumes de bois ronds exportés

10 Industries des pâtes et papiers

10.0 Points saillants (suite)

10.00.01

Indicateurs économiques de l'industrie québécoise des pâtes à papier, des papiers et des cartons ¹, en 1998

Emplois (n sm)	20 723
Traitements et salaires ('000 \$)	1 203 999
Valeur des livraisons et autres recettes ('000 \$)	7 858 054
Valeur ajoutée ² à l'activité totale ('000 \$)	3 865 425
Dépenses en immobilisations et en réparations ('000 \$) ³	1 212 200

¹ Selon SCIAN 3221, qui est une subdivision du groupe 322 (industrie de la fabrication du papier), de Statistique Canada

² Y compris l'achat de services.

³ Données estimées

Destination des livraisons québécoises de pâtes et papiers, en 1999 ('000 tm)

	Canada	États-Unis	Autres pays	TOTAL
Papier journal	545	2 560	903	4 008
Pâtes destinées à la vente	327	561	687	1 575
Autres papiers et cartons	1 474	2 804	206	4 484
TOTAL	2 346	5 925	1 796	10 067

Destination des livraisons québécoises de pâtes et papiers, en 2000 ('000 tm)

	Canada	États-Unis	Autres pays	Total
Papier journal	518	2 468	874	3 860
Pâtes destinées à la vente	301	569	768	1 638
Autres papiers et cartons	1 471	3 020	187	4 678
TOTAL	2 290	6 057	1 829	10 176

Importance relative des exportations québécoises de pâtes et papiers (M\$)

	1999	2000
Exportations de pâtes et papiers	6 975	7 927
Exportations totales	61 988	74 152
Importance relative (%)	11,3	10,7

Part des exportations québécoises de papier journal dans la consommation américaine ('000 tm)

	1999	2000 ¹
Exportations québécoises de papier journal vers les États-Unis	2 560	2 468
Consommation américaine de papier journal	11 367	11 852
Importance relative (%)	22,5	20,8

¹ Données provisoires

Balance commerciale québécoise ¹ dans le secteur des produits de pâtes et papiers, en 2000 ² (M\$)

	Exportations	Importations	Balance commerciale
Pâtes de bois ou d'autres matières fibreuses cellulosiques, papiers ou cartons à recycler (déchets et rebuts)	1 112,2	218,9	893,3
Papiers et cartons, produits de cellulose en papier ou en carton	6 815,1	910,9	5 904,2
TOTAL	7 927,3	1 129,8	6 797,5

¹ Sur la base des données douanières

² Appellations conformes au système harmonisé de désignation et de codification des marchandises de l'Organisation mondiale des douanes

Protection de l'environnement

	1981	2000 ¹	2000 / 1981
Matières en suspension dans les effluents (MES) (kg / tonne de production)	26,0	2,7	-90 %
Demande biochimique en oxygène (DBO ₅) dans les effluents (kg / tonne de production)	59,1	1,7	-97 %
Eau consommée dans les usines (m ³ / tonne de production)	121,0	56,0	-54 %

¹ Données estimées

Investissements des papetières pour l'assainissement de leurs émissions atmosphériques, en 1999

Investissements au Québec ('000 \$)	15 467
Investissements au Canada ('000 \$)	47 058
Québec / Canada (%)	32,9

10 Industries des pâtes et papiers

10.1 Points saillants

10.00.01

Usines québécoises de pâtes, papiers et cartons, en juin 2001

Usines consommatrices de bois ronds, copeaux, sciures et rabotures (usines de transformation primaire)	40
Usines consommatrices de pâtes achetées et de fibres recyclées	23
TOTAL	63

Usines québécoises de pâtes, papiers et cartons et capacité de production, en juin 2000¹

	Usines (n ^{bre})	Capacité de production (⁰⁰⁰ tma / année)
Pâtes destinées à la vente	11	2 338,5
Papier journal fini machine, surcalandré, etc.	21	6 014,9
Cartons d'emballage et autres	11	1 639,9
Panneaux à basse densité	2	99,8
Papiers fins et spéciaux	7	975,6
Cartons de construction	2	101,2
Papiers kraft (emballage, carbone)	2	110,2
Papiers hygiéniques	7	567,3
TOTAL	63	11 847,4

¹ Classification selon la production principale

Approvisionnements de l'industrie québécoise des pâtes et papiers en matière ligneuse, en 2000¹ (⁰⁰⁰ m³)

Bois ronds et copeaux (forêts publiques)	1 665,2
Bois ronds et copeaux (forêts privées)	2 339,0
Bois ronds, copeaux, sciures et rabotures en provenance des usines québécoises	20 238,1
Bois ronds, copeaux, sciures et rabotures en provenance de l'extérieur du Québec	1 618,3
TOTAL	25 860,6

¹ Données provisoires

Matières premières utilisées par les usines québécoises de pâtes et papiers, en 2000¹ (⁰⁰⁰ tma)

Bois ronds	1 994
Produits conjoints des scieries	8 725
Fibres recyclées et pâtes commerciales	2 621
TOTAL	13 340

¹ Données provisoires

Consommation de fibres de papier et de carton recyclées par l'industrie québécoise des pâtes et papiers, en 2000¹ (⁰⁰⁰ tma)

Papiers de récupération pour le désencrage	822,4
Cartons de récupération pour le désencrage	201,8
Papiers de récupération sans désencrage	317,9
Cartons de récupération sans désencrage	393,5
TOTAL	1 735,6

¹ Données provisoires

Types de pâtes produits par l'industrie québécoise des pâtes et papiers (⁰⁰⁰ tm)

	1999	2000
Pâtes thermomécaniques	3 060	3 305
Pâtes chimicothermomécaniques	1 223	1 193
Autres pâtes mécaniques	607	610
Sous-total	4 890	5 108
Pâte au sulfate (kraft)	2 227	2 261
Autres pâtes chimiques	395	393
Sous-total	2 622	2 654
TOTAL	7 512	7 762

Production québécoise de papiers et cartons (⁰⁰⁰ tm)

	1999	2000
Papier journal	4 007	3 848
Papiers spéciaux pour l'impression et l'écriture	2 473	2 746
Papiers hygiéniques	348	341
Cartons	1 567	1 504
Autres produits	101	100
TOTAL	8 496	8 539

Part du Québec dans la production canadienne de papiers et cartons (⁰⁰⁰ tm)

	1999		2000	
	Papier journal	Autres papiers et cartons	Papier journal	Autres papiers et cartons
Québec	4 007	4 476	3 848	4 692
Canada	9 204	10 994	9 222	11 461
Québec / Canada (%)	43,5	40,7	41,7	40,9

Indicateurs économiques de l'industrie québécoise de la fabrication du papier¹, en 1998

Emplois (n ^{bre})	34 029
Traitements et salaires (⁰⁰⁰ \$)	1 726 325
Valeur des livraisons et autres recettes (⁰⁰⁰ \$)	10 861 591
Valeur ajoutée ² à l'activité totale (⁰⁰⁰ \$)	5 072 113
Dépenses en immobilisations et en réparations (⁰⁰⁰ \$)	1 384 000

¹ Selon SCIAN 322 (industrie de la fabrication du papier), de Statistique Canada
² Y compris l'achat de services.

10 Industries des pâtes et papiers

10.2 Production

Sources d'approvisionnement de l'industrie québécoise des pâtes et papiers en matière ligneuse ('000 m³)

10.02.01

	1996 ¹	(%)	1997 ¹	(%)	1998 ¹	(%)	1999 ¹	(%)	2000 ²	(%)
Bois ronds et copeaux des forêts publiques	2 471,7	10,4	2 306,6	9,1	1 792,0	7,4	1 730,9	6,7	1 665,2	6,4
Bois ronds et copeaux des forêts privées	2 721,4	11,5	2 811,7	11,1	2 430,4	10,0	2 534,6	9,8	2 339,0	9,0
Bois ronds, copeaux, sciures et rabotures des usines québécoises	17 135,4	72,1	18 510,2	73,3	18 619,2	76,8	19 970,5	77,5	20 238,1	78,3
Bois ronds, copeaux, sciures et rabotures importés	1 433,9	6,0	1 618,9	6,4	1 406,7	5,8	1 538,6	6,0	1 618,3	6,3
Total	23 762,3	100,0	25 247,4	100,0	24 248,3	100,0	25 774,5	100,0	25 860,6	100,0

1 Données révisées

2 Données provisoires

Source : Ministère des Ressources naturelles, Direction du développement de l'industrie des produits forestiers

A.I.F.Q.

Potentiel de réduction de la consommation d'énergie électrique dans l'industrie
papetière québécoise

Augmentation du potentiel d'utilisation de pâte désencrée au Québec

093-2F16 (60et)



Génivel-BPR

Annexe G

**Extraits de « Bilan 2000 de la gestion
des matières résiduelles au Québec »**

Recyc-Québec

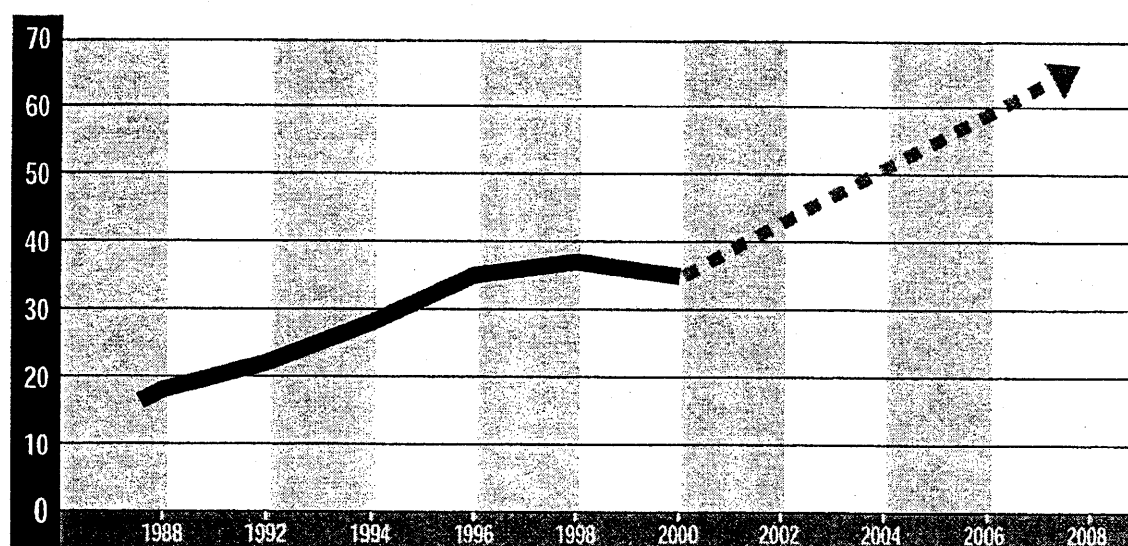
12 septembre 2002

VERS UNE collectivité
outillée,
organisée... et informée

ÉVOLUTION DU TAUX DE RÉCUPÉRATION DE 1990 À 2000 EN PRÉVISION

DE L'ATTEINTE DES OBJECTIFS DE LA POLITIQUE QUÉBÉCOISE DE GESTION DES MATIÈRES RÉSIDUELLES 1998-2008

OBJECTIF 2008 : 65 %



BILAN DE LA GESTION DES MATIÈRES RÉSIDUELLES DE 1988 À 2000 (EN MILLIONS DE TONNES MÉTRIQUES)

Destination	1988	1992	1994	1996	1998	2000
Génération	7,0	7,1	7,2	8,5	9,1	10,9
Élimination	5,7	5,5	5,2	5,5	5,7	7,1
Récupération	1,3	1,6	2,0	3,0	3,4	3,8
Taux de récupération	18 %	22%	28 %	35 %	37 %	35 %
Population	6 860 400	7 150 700	7 275 000	7 208 884	7 334 094	7 372 448
Taux par habitant (tonne/personne/année)						
Génération	1,02	0,99	0,99	1,18	1,24	1,48
Élimination	0,84	0,77	0,71	0,76	0,78	0,96
Récupération	0,18	0,22	0,27	0,42	0,46	0,52

Également, un meilleur taux de réponse de la part des gestionnaires des installations d'élimination a permis de préciser davantage les quantités éliminées. Cette mise à jour a eu pour effet d'augmenter le nombre de tonnes vouées à l'enfouissement pour l'an 2000.

Les activités de mise en valeur

La récupération dans le secteur municipal

Le tableau 5 présente les quantités de matières résiduelles récupérées par le secteur municipal. Dans ce secteur, les matières récupérées proviennent des programmes et des services suivants :

- La consigne sur les contenants à remplissage unique (CRU) de bière et de boissons gazeuses;
- La collecte sélective des matières recyclables;
- Les collectes de résidus verts ou de matières putrescibles destinés au compostage;
- Les programmes de récupération des résidus domestiques dangereux (RDD) générés par les résidants et s'adressant à ceux-ci;
- Les quantités de textiles et de biens réutilisables (mobilier, matériel informatique, etc.) récupérés par les résidants ou rejetés par les organismes et entreprises, destinés au recyclage;
- Les boues de stations d'épuration municipale et de fosses septiques qui ont fait l'objet d'une valorisation agricole.

Tableau 5 : Quantités de matières résiduelles récupérées du secteur municipal au Québec de 1992 à 2000 (en tonnes)¹

	1992	1994	1996	1998	2000
Matières					
Fibres cellulosiques	101 000	130 000	198 000	216 000	258 000
Verre	41 000	41 000	50 000	56 000	56 000
Métaux ferreux	5 000	6 500	11 000	10 500	11 800
Métaux non ferreux	6 000	8 500	11 000	11 500	11 700
Plastiques	10 000	13 600	20 000	17 000	20 000
Textiles	0	20 000	9 600	9 500	14 100
Résidus organiques	17 000	51 000	84 000	91 000	66 000
RDD	600	1 900	2 200	2 500	5 100
Boues municipales	2 000	20 000	21 000	22 000	23 000
Autres²	15 000	0	0	0	1 700
Total:	198 000	293 000	406 000	436 000	466 000

¹ Incluant, la collecte sélective municipale des matières recyclables et la consigne sur les contenants à remplissage unique (CRU) de bière et de boissons gazeuses

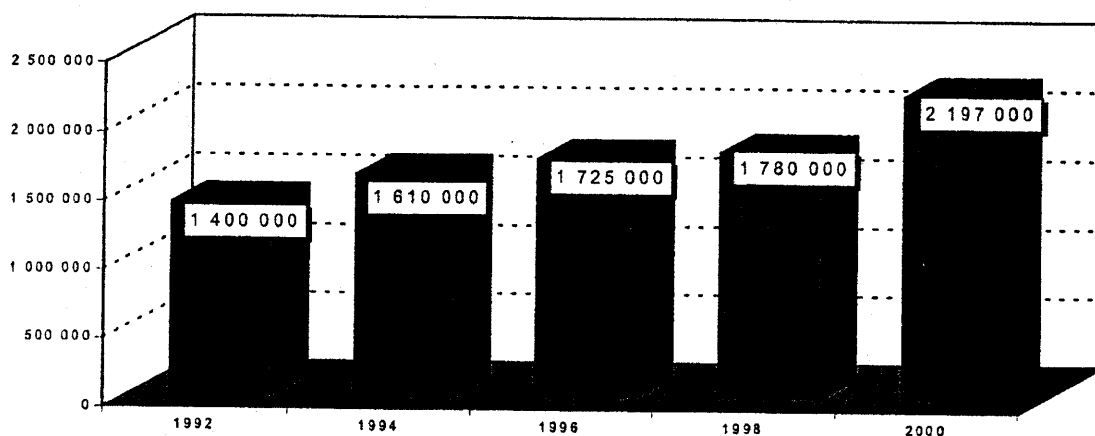
² En 1992, 15 000 tonnes correspondent aux encombrants comptabilisés au secteur ICI pour les autres années

Les quantités de matières récupérées dans le secteur municipal ont augmenté d'un peu plus de 7 %, de 1998 à 2000, se situant maintenant à plus de 466 000 tonnes. À l'exception des résidus organiques, toutes les autres matières ont connu une augmentation au cours de cette même période. La figure 5 illustre l'évolution des quantités récupérées au niveau municipal depuis 1992.

Tableau 8 : Quantités de matières résiduelles récupérées du secteur industriel, commercial et institutionnel au Québec de 1992 à 2000 (en tonnes)

Matières	1992	1994	1996	1998	2000
Fibres cellulosiques	344 000	512 000	598 000	562 000	572 000
Verre	13 000	23 000	36 000	45 000	35 000
Métaux ferreux	888 000	910 000	905 000	905 000	1 127 000
Métaux non ferreux	98 000	95 000	95 000	95 000	143 000
Plastiques	23 000	17 000	26 000	33 000	43 000
Textiles	22 000	0	17 000	11 000	17 000
Pneus	12 000	9 000	17 000	44 000	47 000
Résidus organiques	0	44 000	30 000	84 000	211 000
Autres	0	0	500	1 400	1 700
Total	1 400 000	1 610 000	1 725 000	1 780 000	2 197 000

Figure 7
Évolution des quantités de matières résiduelles récupérées
du secteur industriel, commercial et institutionnel (en tonnes)



Les fibres cellulosiques

La récupération des fibres cellulosiques (papiers et cartons) dans les ICI a enregistré une augmentation de 10 000 tonnes, passant de 562 000 tonnes en 1998 à 572 000 tonnes en 2000. La récupération de fibres cellulosiques n'a jamais cessé d'augmenter depuis 1990 (voir tableau 8).

Le verre

La récupération du verre dans le secteur ICI a diminué de 22 % en 2000, passant de 45 000 à 35 000 tonnes. Cette baisse est essentiellement attribuable à une modification des procédés de tri et de contrôle de qualité dans l'industrie brassicole, laquelle a grandement réduit les quantités de bouteilles rejetées (voir tableau 8).

A.I.F.Q.

Potentiel de réduction de la consommation d'énergie électrique dans l'industrie
papetière québécoise

Augmentation du potentiel d'utilisation de pâte désencrée au Québec

093-2F16 (60et)



Génivel-BPR

Annexe H

Répertoire des usines québécoises

12 septembre 2002

Projet : Étude du potentiel de réduction de la consommation électrique dans l'industrie papetière québécoise
N/Réf. : # 093-2F16

Date : 2002-06-12

Par : Denis Chabot ing., MBA

Répertoire des usines québécoises

USINE	Type de papier produit	Quantité produite TM/jour	Pâte mécanique				DIP TMan/jour	Energie électrique		Utilisation eau m³/TM	Remarque
			PTM TMan/jour	PTCM TMan/jour	PTCMB TMan/jour	# Stages	# Lignes	Source	Quantité kWh/jour		
- ACI, Papeterie Alma	journal annuaire & catalogue	450 350	1000			2	2	privé & H.-Q.	2880000	43.8	- Raffineurs Sunds CD76
- ACI, Amos	journal	520	625			2	4	H.-Q.	1800000	48	- Raffineurs Hymac/Jylhavara, épurateurs
- ACI, Baie-Comeau	journal	1540	860			2	3	privé & H.-Q.	2700000	48	- Raffineurs Hymac, épurateurs - Projet de nouvelle ligne de 500 TMan par jour, sans épurateurs, en cours
- ACI, Baie-Comeau			350			2	1	H.-Q.			- Raffineurs Hymac
- ACI, Papeterie Beaupré	impression couché & non couché	550	600			2	3	H.-Q.	ND	42.7	- Raffineurs Twin50 Sprout Waldron, épurateurs
- Les Fibres Breakey Fibres, Breakeyville	pâte	140						H.-Q.	ND	7.3	
- Kruger Inc., Bromptonville	journal pâte	800 200	740			2	4	H.-Q.	2160000	30.3	- Raffineurs Sprout/Bauer et Jylhavara, épurateurs - Épurateurs sur DIP
- Perkins Papers Ltd, Candiac	"tissue"	192						H.-Q.	ND	15.8	

Source : 2002 Lockwood Post's Directory of the Pulp, Paper and Allied Trades

Projet : Étude du potentiel de réduction de la consommation électrique dans l'industrie papetière québécoise
N/Réf. : # 093-2F16

Date : 2002-06-12

Par : Denis Chabot ing., MBA

Répertoire des usines québécoises

USINE	Type de papier produit	Quantité produite TM/jour	Pâte mécanique			DIP TM/an/jour	Energie électrique		Utilisation eau m³/TM	Remarque
			PTM TM/an/jour	PTCM TM/an/jour	PTCMB TM/an/jour		# Stages	# Lignes		
Canacraft Inc. Cap-De-La-Madeleine										Non-épuré
- Désencrage C.M.D Inc., Cap-De-La-Madeleine	pâte	350				350			11.4	- Épureurs
Canacraft Inc. (Chaudière) Chaudière										Non-épuré
- Papiers Gaspesia Inc. Chaudière	couche #4	665	350				2	1	42.2	Raffineurs Sunds CD76
- ACI, Clermont	journal	950	1100				2	4	31.6	- Raffineurs Sunds RGP 70", épureurs
- Scott Paper Limited, Crabtree	"tissue"								ND	
Danish Paper Inc. (Société) Société										Non-épuré
- Bowater Canada Forest Products, Dolbeau	"book" impression	225 350			600			3	42.8	- Raffineurs Sunds CD70, épureurs
- Bowater Canada Forest Products, Donnacona	spécialités à base de PTM	665	506					ND	52.7	- Raffineurs Jyhavara et Sprout Waldron - Épureurs
										Non-épuré

Source : 2002 Lockwood Post's Directory of the Pulp, Paper and Allied Trades

Projet : Étude du potentiel de réduction de la consommation électrique dans l'industrie papetière québécoise
N/Réf. : # 093-2F16

Répertoire des usines québécoises

USINE	Type de papier produit	Quantité produite TM/jour	Pâte mécanique				DIP TMan/jour	Energie électrique		Utilisation eau m³/TM	Remarque
			PTM TMan/jour	PTCM TMan/jour	PTCMB TMan/jour	# Stages		# Lignes	Source		
- Paperboard Cartech, East Angus											
		230							H.-Q.	297500 pour les deux usines	71.4 pour les deux usines
	carton	120					200				
	journal	1200				2	2	500	H.-Q.	3600000	ND
- Bowater Pulp and Paper Canada Inc., Gatineau											- Raffineurs Sunds RGP-76CD
- ACI, Grand-Mère	supercalandré & spécialités	950							H.-Q.	1500000	35.9
- ACI, Kénogami Div., Jonquière											
	impression supercalandré	500							privé & H.-Q.	1940000	70
- Paperboard Jonquière, Jonquière	pâte	200							H.-Q. pour les deux usines		82.6 pour les deux usines
	carton	350				2	1			ND	- Raffineurs Asplund Refinator RL-50S et RL-54S, épurateurs

Source : 2002 Lockwood Post's Directory of the Pulp, Paper and Allied Trades

Projet : Étude du potentiel de réduction de la consommation électrique dans l'industrie papetière québécoise
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Date : 2002-06-12

Par : Denis Chabot ing., MBA

Répertoire des usines québécoises

USINE	Type de papier produit	Quantité produite TM/jour	Pâte mécanique			DIP TM/an/jour	Énergie électrique		Utilisation eau m³/TM	Remarque
			PTM TM/an/jour	PTCM TM/an/jour	PTCMB TM/an/jour		Source	Quantité kWh/jour		
Cascades Papiers-Papier Kingsey Falls										Non pertinent
Noranda Inc. (usine d'Angers)										Non pertinent - Epurateurs
Papier Masson Ltee (usine d'Angers)										Non pertinent
- Perkins Papers Ltd., Kingsey Falls	"issue"	225				140	ND	ND	ND	
Simons-Stone (usine d'Angers)										Non pertinent
Angers Papiers-Papier (usine d'Angers)										Non pertinent
Angers Papiers-Papier (usine d'Angers)										Non pertinent
Angers Papiers-Papier (usine d'Angers)										Non pertinent
Angers Papiers-Papier (usine d'Angers)										Non pertinent
Angers Papiers-Papier (usine d'Angers)										Non pertinent
- Matériaux Cascades Inc., Louiseville	construction	92 M ft²/j	70			2	H.-Q.	ND	5.1 m³/M ft²	- Raffineurs Bauer
- Papier Masson Ltee, Masson-Angers	journal	630	740			2	H.-Q.	750000	52.4	- Raffineurs Metso CD82

Source : 2002 Lockwood Post's Directory of the Pulp, Paper and Allied Trades

Projet : Étude du potentiel de réduction de la consommation électrique dans l'industrie papetière québécoise
N/Réf. : # 093-2F16

Date : 2002-06-12

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Répertoire des usines québécoises

USINE	Type de papier produit	Quantité produite TM/jour	Pâte mécanique				DIP TM/an/jour	Energie électrique		Utilisation eau m³/TM	Remarque
			PTM TM/an/jour	PTCM TM/an/jour	PTCMB TM/an/jour	# Stages	# Lignes	Source	Quantité kWh/jour		
- Tembec Matane Inc., Matane	pâte	550			550	2	3	ND	ND	ND	- Rafineurs "single disc" Hymac 60", épurateurs
- Uniforêt Scierie-Pâte Inc., Port Cartier	pâte	535			535	2	3	Turbo-générateur	ND		- Rafineurs Hymac HXD, épurateurs

Source : 2002 Lockwood Post's Directory of the Pulp, Paper and Allied Trades

Projet : Étude du potentiel de réduction de la consommation électrique dans l'industrie papetière québécoise
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Répertoire des usines québécoises

USINE	Type de papier produit	Quantité produite TM/jour	Pâte mécanique			DIP TM/an/jour	Énergie électrique		Utilisation eau m³/TM	Remarque
			PTM TM/an/jour	PTCM TM/an/jour	PTCMB TM/an/jour		# Stages	# Lignes		
- Compagnie Papiers Stadacona, Québec	journal, spécialités & annuaire carton	1350 125	800			650	3	2	H.-Q. 36000000	- Raffineurs Andritz Sprout Twin60, basse consistance - sans épurateurs
- F.F. Soucy Inc., Rivière Du Loup	journal & annuaire	625	750				2	4	ND ND	- Raffineurs Bauer 485P et 489, épurateurs
- Motalet, St-Jovite, St-Jovite, St-Jovite										- Épurateurs
- Motalet, St-Jovite, St-Jovite, St-Jovite										- Épurateurs
- Motalet, St-Jovite, St-Jovite, St-Jovite										- Épurateurs
- Malette Québec Inc., Saint-Raymond De Portneuf	"MF Roto"	180	240				2	1	ND ND	- Raffineurs Sprout Bauer (APMP)
- ACI, Belgo Div., Shawinigan	journal impression	800 165	800			200	2 2	2 1	H.-Q. 30000000	- Raffineurs Sprout Bauer Twin60 - Raffineurs Sunds CD70 - Épurateurs
- Tembec Inc., High-Yield Pulp Div., Témiscaming	pâte	460							moyenne de 71.8 pour (3) usines	- Épurateurs
- Tembec Inc., High-Yield Pulp Div., Témiscaming	pâte	700			800		2	2	H.-Q. 10560000	- Raffineurs Sunds RGP-70CD et RGP-76CD

Source : 2002 Lockwood Post's Directory of the Pulp, Paper and Allied Trades

Répertoire des usines québécoises

USINE	Type de papier produit	Quantité produite TM/jour	Pâte mécanique			DIP TM/an/jour	Énergie électrique		Utilisation eau m³/TM	Remarque
			PTM TM/an/jour	PTCM TM/an/jour	PTCMB TM/an/jour		# Lignes	# Stages		
- Kruger Inc., Trois-Rivières	carton	400								- Épurateurs
										- Épurateurs
										- Épurateurs
- ACI, Port-Alfred Div., Ville De La Bale	journal	1000	950				6	2	50.5	- Raffineurs Jyhavara 54", 60" et 65" - Raffineurs Sprout Waldron 42" et 36" - Épurateurs
	supercalandré	350								
	couché #5	450								
- ACI, Port-Alfred Div., Ville De La Bale	impression	435							ND	- Épurateurs
										- Épurateurs
										- Épurateurs
- ACI, Port-Alfred Div., Ville De La Bale	journal	1083	400				3	2	51	- Raffineurs Asplund Raffinador RL-50S et RL-54S, Sunds RLP 585, épurateurs
										- Épurateurs

A.I.F.Q.

Potentiel de réduction de la consommation d'énergie électrique dans l'industrie
papetière québécoise

Augmentation du potentiel d'utilisation de pâte désencrée au Québec

093-2F16 (60et)



Génivel-BPR

Annexe I

Articles de référence

12 septembre 2002

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9.2.1 World Trade in Waste Paper

WP is traded worldwide. The *major world WP trade flows*, of the total 18 million ton traded in 1996, were according to Jaakko Pöyry (in million ton):

	To:	North <u>America</u>	Western <u>Europe</u>	Eastern <u>Europe</u>	<u>Asia</u>	South <u>America</u>
From:						
North America		2.6*	0.4	-	3.9	0.3
Western Europe		-	5.7*	0.2	1.3	-
Eastern Europe		-	-	-	-	-
Asia		-	-	-	1.0*	-
South America		-	-	-	-	-

* Intra-bloc trade. [Cesar, M.J. The role of recovered paper in the changing Eastern European paper industry. PPI Paper Recycling '98 Conference, Amsterdam, Nov 1998].

USA. Historically, the *main* trade flow has been from the USA to her neighbors and some Southeast Asian economies. The latter has been made possible by low freight rates, due to the lack of return loads for containers and vessels bringing exports from these countries. The distribution of 1996 US export tonnage was estimated [Paper Recycler, Jan 1997]:

- *By country.* South Korea (20%), Canada (18%), Mexico (15%), China (12%), Taiwan (12%), Indonesia (7%), Thailand (5%), Japan (4%), and Rest of World (7%).
- *By grade.* OCC (39%), news (22%), mixed waste (21%), deinking grades, other than news (9%), and pulp substitutes (9%).

The bulk of this tonnage is OCC. In Southeast Asia, OCC from the USA is locally called **AOCC** and OCC from Europe is called **EOCC**. According to Andover International, *total* demand for US OCC was increasing at 6.3% pa, but supply was growing only by somewhat over 2.3% pa. With the US OCC recovery rate already up against several ceilings at 70% in 1995, and moving only slowing towards Andover's maximum achievable level of 74% (click here for more detail/update), a shortfall would soon result. Turning to *file stock* and junk mail would meet competition from office waste collectors and ONP collectors respectively. [Iannazzi, F.D. and Clarke, R. Linerboard and OCC Markets. PaperTree Letter, Oct 1996]. *The Asian turmoil* has since *delayed* the shortfall. It will presumably be filled by increased WP imports from Europe (*see below*), and *lower quality* WP grades plus unbleached *virgin* pulps to maintain strength (eg: softwood kraft, NSSC and nonwood pulps). In 1998, US WP exports rose 7.9% (from 1997) to 6.67 M ton, of which the largest destinations were: Canada 1.98 M ton, Mexico 1.0 M ton, and China 0.91 M ton. [Cody, H. Recovered paper usage up, costs may be on the rise too. Pulp & Paper, June 1999, pg. 61]. In 2000, mixed waste paper overtook OCC as China's main WP import from the USA, *with the mixed WP being sorted in China*. In that year, the USA exported a total of 9.9 million

ton of WP. [The recovered paper market - global influences. Paper Technology, April 2001, pg. 16]. For 2001, Moore & Associates expect China's imports of AOCC to increase significantly, while those of the other 2 main importers of this grade decline:

(' 000 ton)	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>
China	300	430	330	540	950
Canada	510	620	520	570	470
South Korea	400	360	390	470	370

[Moore, B. Recycling trends in Asia. Solutions!, Oct 2001, pg. 37].

In Europe, the German Duales System initially created an excess of WP. Exports were expanded, particularly to Southeast Asia. By 1992 (according to the German trade statistics), German net exports of WP totalled 1.173 million ton, of which 0.84 M ton went outside the EU. With the revival of European economic growth in 1994, shortages of WP developed in Europe. Subsequently, German net exports have grown to 2 million ton. As other EU countries raise their recovery rate in line with the EU Directive on Packaging and Packaging Waste, the overall recovery rate is expected to rise from 48.6% in 1996 to about 55.0% in 2005. In 1996, high utilization rates already prevailed in Western Europe for containerboard-making materials (86%) and newsprint-making materials (54%), so a period of further adjustment is indicated. [Uutela, E. and Walker, E. Making the most of waste opportunities. Pulp & Paper International, Oct 1997, pg. 62].

In 1997, EU WP exports were 1.80 million ton, imports were 0.75 M ton, and intra-EU trade was 5.05 M ton. *Following the Asian turmoil*, exports to Southeast Asia declined. Moreover, freight rates between Europe and Asia dropped *from* up to \$1,200 per 40 ft container 12-18 months previously *to* below \$300 in Sept 1998 - thus putting Europe and the USA on a fairly equal freight footing. [Wastepaper rides a rough wave. PPI This Week, 9-13 Nov 1998, pg. 5. and Wastepaper: concerns raised. PPI This Week, 7-11 Sept 1998, pg. 1].

In 1999, the West European paper industry collected 40.7 million ton of WP (ie: 51.6% recovery rate) according to CEPI. The EU had *net exports* of 2.007 M ton of WP. *Net trade* in the main European countries was approximately as follows, with Portugal, Finland and Switzerland being approximately in balance (- means net imports):

(million ton)	<u>Net Trade</u>		<u>Net Trade</u>
Germany	2.649	Spain	- 0.646
Belgium	1.018	Italy	- 0.578
United Kingdom	0.383	Sweden	- 0.536
Norway	0.241	Austria	- 0.483
Netherlands	0.150	France	- 0.240

[1999 - Western Europe recovers 40.7 m tonnes of paper. Paper Technology, Oct 2000, pg. 14].

In 1999-2000, WP prices rose steadily due to:

- Rising WP demand in Asia, which was consuming about 47 million ton. Between the strong US\$ and falling US WP stocks, Asian buyers were diverted from US to European suppliers. Asia usually took about half of the US's 8 million ton of WP exports.
- Rising WP demand in Europe, due to both greater paper production and WP utilization rate. The German DSD's recycling target was reduced to 60%. Some European mills were competing with Asian mills for merchant stocks.

[Papermaking margins squeezed by steady rise of pulp prices. Paper Technology, June 2000, pg. 7].

In 2000, European countries collected 41.1 million ton of WP. Usage of WP, by sector, was (according to CEPI):

	<u>% Usage</u>		<u>% Usage</u>
Case materials	44.8	Household and sanitary	8.3
Newsprint	16.9	Other graphic papers	6.5
Wrappings, other packaging paper	9.6	Others	4.5
Folding boxboard	9.5		100.1

[Recovered paper sector may see price movements. PPI This Week, 1-5 Oct 2001, pg. 4].

FAO has forecast the following growth in WP *consumption*. The largest growth was expected in Asia (77 million ton), Europe (32 M ton) and North/Central America (30 M ton). Realization of this consumption *is likely to be delayed by the Asian turmoil* influences.

(million ton)	<u>1993</u>	<u>2010</u>	<u>% Increase</u>
North/Central America	29.335	59.372	102
Europe	27.015	58.909	118
Former USSR	1.152	2.568	123
Asia	32.090	109.032	240
South America	2.770	8.869	220
Oceania	1.028	2.107	105
Africa	848	2.829	234
World	94.238	243.686	159

[PPI This Week, 22-26 Jan 1996, pg. 4].

Jaakko Pöyry estimated *net trade* in WP in the year 2000 to be (- means net imports):

(million ton)	<u>1994</u>	<u>2000</u>
USA	7.0	9.7
Asia	- 5.8	- 7.2
Canada	- 1.9	- 1.9
Latin America	- 1.4	- 1.7
Western Europe	- 0.5	1.3

[Cesar, M. Fiber supply: is waste paper a viable fiber source? PPI Publication and Business Papers 8 Conference, London, Nov 1996]. Their *post-Asian turmoil onset* estimate of world demand for papermaking fiber to 2010 was:

(million ton)	<u>1980</u>	<u>1990</u>	<u>1996</u>	<u>2000</u>	<u>2005</u>	<u>2010</u>
Wood/nonwood <i>pulp</i>	130	160	175	185	205	225
Recycled fiber	50	90	120	145	170	195
Total	180	250	295	330	375	420

[Cesar, M.J. The role of recovered paper in the changing Eastern European paper industry. PPI Paper Recycling '98 Conference, Amsterdam, Nov 1998].

Future *Asian paper consumption and WP demand* look favorable, according to some pointers from WPS Pte, Singapore:

- Asian WP consumption has grown from under 2 million ton in 1962 to about 33 M ton in 1997 - of which about 6 M ton was imported.
- Less than 10% of Asia's paper and fiber demand comes from the countries with almost half the population. China accounts for about 70% of Asia's net imports of paper.
- Asia's utilization rate grew from 21% in 1962 to 51% in 1992, but dropped to 46.5% in 1997 - leaving about 50 M ton of WP unrecycled. However, in some countries (eg: South Korea and Taiwan), the utilization rate exceeds 70%.

[Gupta, V. Recycling in Asia - growth or crisis? PPI Paper Recycling '98 Conference, Amsterdam, Nov 1998].



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9.5 Sources of Waste Paper

Sources of WP can be grouped according to whether they originate *before* or *after* the consumer:

Pre-consumer waste comes from paper converting plants, and is essentially unprinted or otherwise uncontaminated. Eg: guillotine trimmings.

Post-consumer waste is available mainly from manufacturing and municipal sources - the latter sometimes being called the **urban forest**. *Of these:*

- ONP potential supply in NA is estimated by Andover International (using 1996 figures) as 14.1 million *short* ton, of which 2.1 million ton were inserts and flyers (mainly coated and uncoated mechanical papers) discarded with them. Of the total available, 7.0 M ton were recovered (ie: recovery rate 50%) - with 2.8 M ton being used for *paper* manufacture, 1.7 M ton for *board* manufacture, 1.7 M ton exported, and 0.9 M ton going for other uses. [Iannazzi, F.D. and Clarke, R.E. Is the recovered paper goal out of reach? Resource Recycling, Aug 1998, pg. 1]. Moore estimates the ONP supply sources, to a typical NA newsprint mill, as being:

	(%)		(%)
Solid waste hauler	30	Industrial generators	5
Independent packer	25	Independent broker	5
Mill captive packer/broker	20	Supermarkets	0
Local government	15	Commercial/retail generators	0

[Moore, B. Recovered paper supply impacts on recycle newsprint production. Preprints of 5th Research Forum on Recycling, Ottawa, Sept 1999, pg. 75].

- Supermarkets, department stores and other large shops provide much of the OCC. For OCC in the USA, Andover International estimated the 1995 *breakdown by waste source* of the 27.9 million *short* ton consumption of corrugating materials, together with 1995 and maximum possible recovery rates, as follows:

Source of Waste	Portion of Total OCC Supply (%)	1995 Recovery Rate (%)	Maximum Possible Recovery Rate (%)
Pre-consumer (ie: converters)	8	93	95
Manufacturing	28	73	75
Retail/commercial - large	36	81	83
Retail/commercial - small	15	70	77
Residential	13	5	25
Total overall	100	70	74

[Iannazzi, F.D. and Clarke, R. Linerboard and OCC markets. PaperTree Letter, Oct 1996].

A "large" retail/commercial source is exemplified by a regional shopping mall, and a "small" one by either a strip mall or fast food restaurant. Residential collection is by

a municipal collection program. *Subsequent Andover figures* are 29.6 million short tons (73% recovery rate) for OCC consumption in 1996, and a *post-Asian turmoil onset* estimate of 33 M short tons (74% recovery rate) by 2000. [Finchem, K. USA looks to be off-target for its 50% recovery goal. Pulp & Paper International, June 1998, pg. 50].

- Offices and institutions are the main source of **office waste paper (OWP)**, which may be *either unsorted mixed office waste (MOW, office mixed paper, OMP), or sorted (sorted office paper, SOP)*. These sources remained largely uncollected until the 1990s. It requires good organization with regard to separation from contraries (eg: plastic mugs, carbon paper) and shredding confidential material.

Eg:

- In NA, 20 million ton of MOW were *produced* in 1996, according to Mead Pulp Sales. Of this, 52% was *available* from offices, schools and other public institutions - and was the source of most of the 3 M ton/yr *collected*. The other 48% was *available* from households. On arrival at the packers, the MOW was less than half CPO and white ledger. When it left, these two WP grades accounted for 86%, plus 4-5% each of colored paper, mechanical paper, and coated paper. [Hofverberg, U.J. Status of the new market DIP mills in the USA. PPI Paper Recycling '96 Conference, London, Nov 1996]. OWP is *defined* by Andover International as *post-consumer* printing and writing paper that is collected by commercial hauliers, and so does not include material potentially recoverable by municipal collection systems (and thus not from SoHo). Of Andover's estimated US p&w consumption in the year 2000 (of 32.0 M short ton), about 40% will be potential OWP material, 42% will be thrown out by households, 15% will be recycled as *pre-consumer* waste, and 4% will go into permanent records. Of the potential OWP material, only about 65% is available for recovery; of that, only 67% (ie: 5.4 M short ton) is suitable as a *high quality* (eg: deinking) feedstock. [Iannazzi, F.D. and Clarke, R.E. Is the recovered paper goal out of reach? Resource Recycling, Aug 1998, pg. 1].
- In Europe, the UK was *producing* around 1.12 million ton (*cf: below*) of office waste in 1996, of which only 22% was recycled. Only Germany produced more office waste, but recycled 42%. The Benelux countries recycled about 40% of their office waste. [£100 m investment to make Britain a recycling leader in Europe. Paper Focus, Aug 1996, pg. 34]. The *largest office* buildings (around 5,000 m²) generated 25-50 ton/yr of WP. By contrast, the *average small office* or business (100-200 m²) generated less than 1 ton/yr of WP; they represented over 65% of all offices, and were more widely spread geographically. Around 15% of these amounts were irretrievable. [Harris, R. Trends in recycled printing/writing markets. PPI Paper Recycling '96 Conference, London, Nov 1996]. A 1999 estimate was an average office paper *usage* of 75-85 kg/employee from the 20 million offices in Western Europe. [Recycled and recycling. Paper Europe, Office Papers Supplement, April 1999, pg. vi].
- In the UK, Mercury Communications has desktop "Treecycler" collection trays for employees, and recycling bins for departments. This mixed office waste is collected, sorted, deinked, Oxypro bleached, and made into copier paper and laser printer paper at Alloa. Some of this paper is purchased by Mercury. They intend recycling 50% of their office waste, including envelopes and magazines. The UK *consumes* 1.3 million ton/yr (*cf: above*) of office papers, most of which goes to landfill. [Recycling mixed office waste - a prototype for a UK recovery loop. Paper Technology, April 1996, pg. 6]. In London, the BioRegional Development Group is organizing the collection of white WP from offices - which then buy back the resulting paper from the surrounding mills that use it. The cost saving to offices

comes partly from donations (eg: from WWF and the landfill tax credit scheme), and partly from the display materials provided by BioRegional (with hints on cutting paper consumption). A similar Local Paper scheme was planned *for Scotland* for 2000. [Get your own back with 'Local Paper for London'. Paper Europe, Nov 1999, pg. 4].

- **Households.** Paper accounts for around 30% of **household waste**, which makes it 2nd after the organic material from kitchen waste (if it is not composted separately). *Traditionally*, household waste has been a source of mixed waste paper. *Nowadays* it is commanding attention as residential mixed paper, which is a substitute for medium quality OCC. It contains 48% of the MOW produced in NA, and is starting to be collected as such [see Hofverberg reference *above*].

Systems exist for separating the components of such **municipal waste (garbage, trash)** into some, but not usually all, of:

RCF pulp; **metal** (ferrous and nonferrous separately); **cullet (glass)**; recycled plastics; **animal feed**; compostable; and a fraction (**refuse-derived fuel, RDF**) for energy generation (**incineration**) - sometimes after briquetting or pelletizing. *Wet* systems in part resemble pulper disintegration and screening in stock preparation, but *dry* classification systems (eg: by air) also exist.

Jump to a New Topic Area



Recovered Paper and Pulpwood

Demand for recovered paper in North America will slow markedly over the forecast period as compared to the decade of the 1990s. North American recovered paper-based paper capacity surged over the past decade, spurred on by large investments in research and equipment which were motivated by lower production costs and improved profitability associated with the use of recovered paper. Enhancing its cost position were abundant supplies, generated by a rapid upsurge in the number of collection programs. Advances in its use will be harder to achieve as compared to recent history as new supplies of recovered paper become more costly to obtain and as real virgin fiber costs continue to decline. However, the usage of recovered paper will still increase due to: attractive production cost economics for newsprint, tissue and recycled paperboard; lower average capital costs compared to virgin pulp; and further advances in deinking/sorting technology, allowing for a greater range of recovered paper grades to be utilized. Other sectors, namely printing and writing papers, still have both high processing costs and technological hurdles to overcome, constraining its use as an alternative to virgin fiber.

Demand

Regional consumption of recovered paper across all paper and paperboard end uses surged in the 1990s, climbing 6.7% per year on average in 1990-1999. However, the situation appeared quite different in 2000 as regional consumption fell for the first time in 14 years, slipping 0.4% to 42.5 million tons. Despite explosive economic growth of more than 5% in 2000, a sharp 1.6% drop in paper and paperboard output dragged down consumption of recovered paper. Paper and paperboard output will continue to play a dominant role in determining the domestic consumption of recovered paper over the next five years since the pace of recovered paper-based capacity expansions will remain low as compared to the 1990s. In fact, at the time of this writing, announcements for new recycled paper and paperboard projects for North America total just four. We foresee domestic output of paper and paperboard increasing just 1% per year in 2001-2005, while a limited number of new recycled-based projects will hold domestic demand to a 2% average annual pace over the same period.

Long-term growth in North American recovered paper demand will slow considerably as compared to recent history. The increased utilization of recovered paper will hinge heavily on the relative cost of using recovered paper versus virgin wood fiber in each segment of the pulp and paper industry. We predict that recovered paper will remain competitive relative to virgin fiber for tissue, newsprint, and recycled board manufacturers. However, the use of recovered paper in printing and writing papers will continue to face high processing costs, reducing the use of recovered paper as a competitive alternative to virgin fiber. In addition, the furnish share of mineral coatings and fillers in printing and writing papers should also be increasing over the forecast, limiting the need for both recovered paper and virgin fiber. Whereas the usage of recovered paper in the production of paper and paperboard reflected the strong investment climate of the 1990s (the recovered paper utilization rate climbed from 23.7% in 1990 to 34.5% in 1999), recovered paper usage is called upon to climb to just 39.6% in 2016. We project that consumption of recovered paper in the region will slow to a 2.1% average annual pace in 2001-2016, reaching some 57.8 million tons in 2016.

Trade

The keys for North American recovered paper net exports in 2000 were strong export demand from China and higher recovered paper prices in Europe relative to the U.S. Robust market conditions for newsprint

Table 1
Major Recovered Paper-Based Capacity Expansion at North American Paper and Board Mills (1)
 Short Tons

Company	Location	Timing	Paper Expansion	Recovered Pulp Expansion	Incremental Recovered Paper Usage
TISSUE					
Kimberly-Clark	Loudon, TN	2001	70,000	35,000	45,000 (e)
NEWSPRINT					
Alliance	Coosa Pines, AL	2001	60,000	310,000	360,000 (e)
Inland Empire	Millwood, WA	2001	135,000	45,000	52,000 (e)
RECYCLED CONTAINERBOARD					
Solvay	Syracuse, NY	2002	180,000	180,000	205,000 (e)

(1) Projects in this list are those that have been announced with a startup date, and a reasonable assurance that the project is definite.

(e) Estimate

and containerboard and major new capacity additions in China led to a sharp increase in export demand early in the year. Although worldwide demand for paper and paperboard began to soften in the second half of the year, higher recovered paper prices in Western Europe as compared to the U.S. were able to shepherd orders along, thus allowing North American net exports to climb to a near-record level of 6.7 million tons.

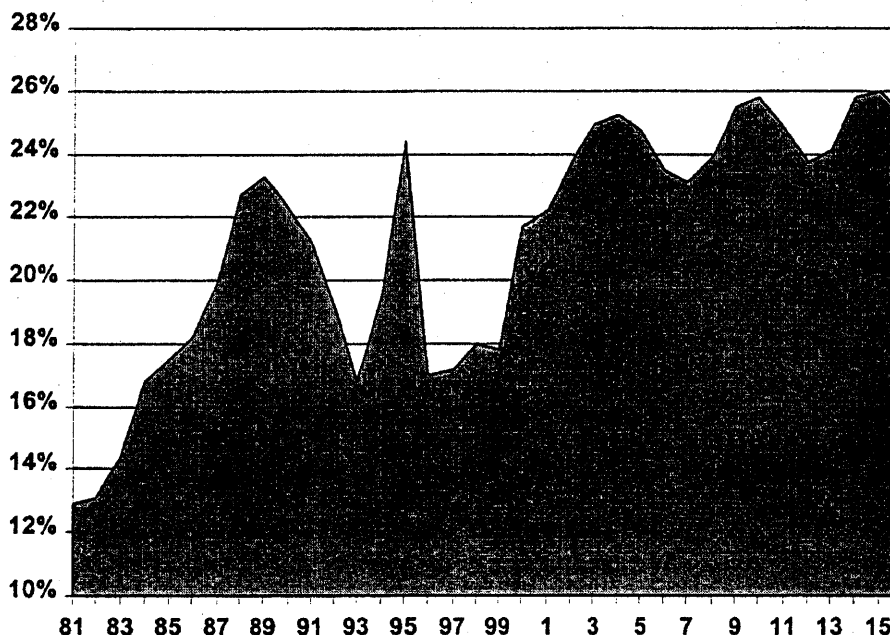
Net exports of recovered paper out of North America will build upon last year's record performance as Asian paper and paperboard producers continue to encounter shortfalls in their own domestic supplies of recovered paper. Although Europe will continue to function as a major supplier of recovered paper to world markets, the combined effects of slowing recovery efforts and major additions to its regional recovered paper-based capacity will temper the region's role in world markets as compared to recent history. Net export are forecast to grow at an average rate of 3.8% per year in 2001-2016, fully one point higher than the average annual rate of 2.8% recorded in 1990-1999.

Price

Our short-term price forecast calls for loose market conditions in the world recovered paper industry over the remainder of the summer, with average industry operating rates for North American paper and paperboard largely remaining at their second quarter levels. Not only will North American demand be a problem, but Asian (outside of China) and European paper and paperboard production is showing increasing signs of weakness, and we expect this to remain the case over the summer as well. The feeble demand situation over the rest of the summer will keep recovered paper prices low with the average price of U.S. No. 11 OCC, for example, remaining below \$40 per ton.

We foresee conditions in the world recovered paper market strengthening this fall, lifting prices from their mid-year lows. Our forecast calls for some upturn in paper and paperboard output worldwide as growth in the major world economies accelerates. Although we are calling for demand conditions to improve, our

Figure 1
Percent of Exported U.S. Recovered Paper



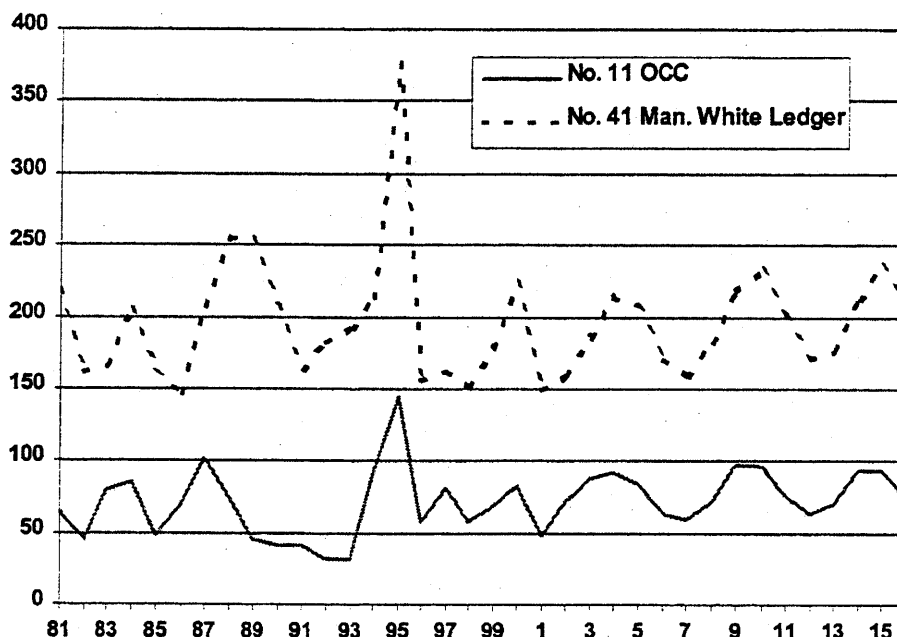
optimism does not extend into the supply side of the market. Potential supplies of recovered paper are suffering from the lagged effects of weak paper and paperboard demand while effective supplies of recovered paper are under pressure from low prices. Our prognosis for tighter market conditions in the world recovered paper business this fall should lead to higher prices with the average price of No. 11 OCC climbing above \$70 per ton.

Recovered paper demand will stumble early in 2002 as seasonal factors undermine paper and paperboard demand, and therefore, recovered paper usage. Moreover, our forecast calls for continued weak economic growth worldwide forcing producers to again phase-in market-related downtime. Although we fully expect that recovered paper prices will react to the market conditions outlined above, our analysis suggests that most recovered paper prices are unlikely to drop back to variable costs, allowing processors to maintain ground in their collection and sorting efforts.

Launching into a new round of inventory building by next summer, paper and paperboard producers will likely act on the low prices for recovered paper witnessed earlier in the year. In fact, we can probably count upon papermakers in China to buy quite heavily in order to build-up their inventories for the next round of new recycled containerboard and newsprint machines. However, the recovered paper price response will be modest given our call for continued sluggish paper and paperboard demand during this time. This assessment should allow prices to record an increase (albeit muted) by mid-year 2002, with the average U.S. price of No. 11 OCC climbing to \$70 per ton in the second quarter of 2002.

Our assessment of the world recovered paper market over the next 12 months underscores the papermakers' inventory behavior. Contributing to this behavior is the same demand/supply imbalance that has plagued most grades of paper and paperboard throughout much of the past 12 months. We feel that it will not be until the second half of 2002 before accelerating worldwide economic growth allows the market to break free of this cycle. Recovered paper prices could respond smartly, forcing demand up the

Figure 2
Real U.S. Recovered Paper Prices
 2001\$ per Short Ton, FOB Dealer's Dock

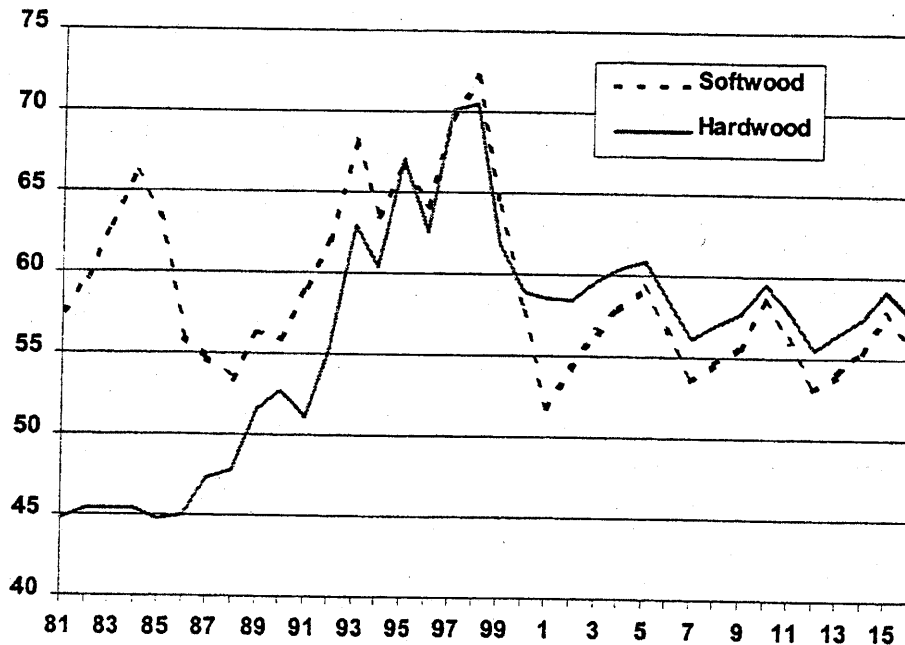


steep portion of the short-term supply curve and causing the average U.S. price of No. 11 OCC to climb above \$100 per ton in 2003-2004.

The major factors influencing recovered paper prices over our long-term forecast are: collection and processing costs; the demand/supply balance for recovered paper; and the price of competing raw materials. The collection and processing cost of suppliers will have an increasingly important influence on recovered paper pricing as recovered paper supply conditions tighten in the future. Support for higher prices will come from the continuing spread of municipal collection efforts to more rural areas, which are likely to keep upward pressure on collection costs. Higher processing costs will also support upward price pressure and will be a function of more contaminants finding their way into the supply stream as more commingled mixed paper is collected and as overall recovery levels continue to rise. Offsetting the upward pressure on recovered paper prices will be more efficient collection/processing systems, stemming from advances in sorting and processing technology and lower transportation costs.

The cyclical nature of recovered paper demand (domestic and overseas) compared to a relatively inelastic effective supply curve results in wide price swings. As demand grows, prices will be driven up and supply is slow to follow. Over the next 15 years, domestic and overseas demand for recovered paper will continue to grow. Meanwhile, supply will grow at a slower pace. Cyclical upswings in demand will test the short-run supply capabilities of recovered paper throughout the forecast period, leading to wide swings in prices. During periods of strong demand growth, the short-run supply capabilities for recovered paper will approach its upper limits. Increases in demand for old corrugated beyond this point will cause a sharp upswing in price, but these higher prices will not be able to stimulate a significant increase in collection efforts. Instead, a rationalization of demand (a shift between end use markets for old corrugated based on relative value) and a substitution towards lower cost recovered paper grades will result from the higher prices. Under these conditions, the cost differential between virgin fiber and recovered paper will become increasingly important, as end users respond to the higher recovered paper prices by increasing their utilization of virgin fiber.

Figure 3
Real Pulpwood Prices in the U.S. South
 2001\$ per Cord, Delivered to Roadside



The average U.S. price of No. 11 OCC, for example, is expected to average \$91 per ton (\$75 per ton in 2000 dollars) over the entire 15-year forecast. As noted above, these price levels reflect supply limits that will serve to funnel old corrugated into the highest value applications such as linerboard while forcing marginal end users, such as recycled boxboard producers to increasingly source alternative grades of recovered paper such as mixed papers. On an equivalent basis, the price for softwood fiber will average \$106 per ton (\$88 per ton in 2000 dollars) over the next 15 years. Although old corrugated containers will have a slight competitive price advantage as compared to pulpwood fiber, overall variable costs associated with using old corrugated or virgin fiber will be about equal.

Southern Pulpwood Prices

Southern pulpwood prices entered their third year of sharp declines in 2001. As of mid-2001, softwood roundwood prices are down 30% from their early 1998 levels, and they are at the lowest level since the 1991 recession. Hardwood prices dropped by a more moderate 20% due to the start of some new OSB capacity that kept demand for hardwood at a higher level.

The reasons for the large, unprecedented drop in southern pulpwood prices are: 1) numerous pulp mill closures due in part to the implementation of the Cluster Rules; 2) further reductions in mill operations due to permanent shutdowns announced by International Paper at Courtland and Savannah, SAPPI at Mobile, Smurfit Stone at Jacksonville and Port Wentworth, Florida Coast's St. Joe mill, and others; 3) loss of export demand; and 4) substantial market-related downtime due to the generally poor market conditions. The overwhelming factor in the price drop was the mill closures that accounted for about 2 million tons of capacity.

Our past analysis has focused on the reduced supply of southern pulpwood, but in the short term, the large drop in demand has been the big story. However, most of the mill closures are now history, so demand

grade centers

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Grade	Price	Grade	Price	Grade	Price
Top OCC	38.50	Recy. 1	38.50	Recy. 2	38.50
Top OCC	38.50	Recy. 3	38.50	Recy. 4	38.50
Top OCC	38.50	Recy. 5	38.50	Recy. 6	38.50
Top OCC	38.50	Recy. 7	38.50	Recy. 8	38.50

NORTH AMERICAN MARKET TRENDS: Recovered paper

[Market Overview](#) | [Pricing](#) | [Market Update](#) | [Background](#)

Prices fall continuously in 2000-01: Weak demand from U.S. containerboard, paperboard, and newsprint mills in second half 2000 led a decline in U.S. prices that continued through July 2001. In July 2001, prices for almost every material were off between 30 percent and 70 percent. The biggest volume materials, old corrugated containers (OCC) and old newspapers (ONP) No. 8 were down year-over-year in July 2001 by 54 percent and 46 percent, respectively. U.S. paper and paperboard production was down 7 percent through May, causing the reduction in the demand for recovered paper in the U.S. OCC was down to \$38.50/ton, f.o.b. seller's dock, for a U.S. average in July 2001. ONP No. 8 ran higher -- at \$48/ton.

Export demand from Asia, principally China, remained solid, but was not enough to move up U.S. prices. Through May 2001, China imported a record 454,409 tonnes of U.S. OCC for the year and was on its way to taking 1.1 million tonnes of U.S. OCC in 2001.

Mixed papers: Mixed papers are used primarily in construction paper and paperboard products such as roofing felts and gypsum wallboard, though some containerboard mills use this grade. The market for mixed paper is strengthening as increased demand for office papers is causing more of the unsorted mixed paper to be sorted into the desired grades of office papers. China has become the top buyer of U.S. mixed paper, using the material at board mills.

The U.S. consumed nearly 5.6 million tons of mixed paper in 1999, an increase of 2.5 percent over 1998 and 178,000 tons. The big increase in use of U.S. mixed paper has come in exports; mixed paper exports rose 60 percent in 1999 over 1998 to 2.24 million tons from 1.7 million tons in 1998.

Corrugated: During the 1999-2003 period, the growth in recovered containerboard -- which includes both linerboard and corrugating medium -- will slow to 1.25 percent annually. This is partly due to the fact that nine new containerboard projects became operational during 1996-97, two additional projects came on stream during 1998-99 period, and no major expansions are on the horizon except for recycled projects by Solvay Paperboard in 2002 at its mill in Syracuse, N.Y.

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Grade Centers

- newsprint
- groundwood / mechanical
- free-sheet / woodfree
- corrugating medium
- linerboard
- cartonboard / folding boxboard
- tissue
- pulp
- recovered paper
- woodfiber / timber
- nonwovens

Despite the growth in recycled containerboard capacity in recent years, OCC prices did not rebound to their historic highs of about \$200/ton experienced in mid-1995. In 1999, the U.S. f.o.b. seller's dock average OCC price peaked at \$90.63/ton in July and August. In 2000, prices, pushed up by strong export demand, reached \$124/ton in May before falling by half in September to \$47.50/ton due primarily to significant shutdowns at U.S. containerboard mills. The U.S. price for OCC reached a U.S. average of \$124/ton in May 2000 -- its highest price since the peak in 1995. But prices steadily fell and haven't increased from June 2000 through July 2001.

News: No. 8 news, which is a deinked-quality version of ONP, normally is more expensive than No. 6 news because it is a cleaner grade, and the prime grade demanded by newsprint deinking facilities. Also, many municipalities find it more difficult to attain the quality of No. 8 news, so supplies are limited. Record high U.S. prices were attained in mid-1995, when they reached an average of \$196.25/ton. Prices have weakened along with the overall market since mid-1995, with some pockets of improvement in the interim. In July 2001, U.S. No. 8 news was on average \$48/ton, down from \$62/ton in January.

High grades: High grades recovered paper prices also reached record levels by mid-1995 due to a combination of the low-grade rebound and improved virgin pulp markets. As substitute fibers became more expensive, demand and prices for pulp substitutes and high-grade deinking improved. Like the general wastepaper market, prices began to slip for the high grades in third-quarter 1995 and were in an overall downturn until early 1999. During the first seven months of 1999, average U.S. prices for laser CPO rose to \$166.25/ton in July from \$148.13/ton in January; hard white envelope cuttings (HWEK) rose to \$275.63/ton from \$208.75/ton, and hard white shavings (HWS) increased to \$247.50/ton from \$177.50/ton.

The rise in prices in first-half 2000 resulted from strong export demand in the second quarter and steady U.S. buying. But the market changed for the worse when containerboard mills began taking massive downtime in June.

By July 2001, prices were down considerably, with U.S. averages for laser CPO at \$122.50/ton, for HWS at \$189.50/ton, and for HWEK at \$217/ton.

Read previous market trends articles for recovered paper in North America.

Updated August 2001.

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market intelligence



Pulp Technology

RISI VIEWPOINT
Analysis of global paper and forest products markets

Chinese Recovered Paper Imports Soar This Year, But Prices Show Little Response

By Peter Cardellicchio, vice president, RISI

BEDFORD, Mass., Dec. 27, 2001 (paperloop.com) - Chinese recovered paper imports have surged in 2001, and final statistics are likely to show an increase of more than 50 percent, or about 2 million tonnes. As shown in the chart, Chinese recovered paper imports have been rising sharply since 1995 and growth has averaged an astounding 35 percent per year since that time.



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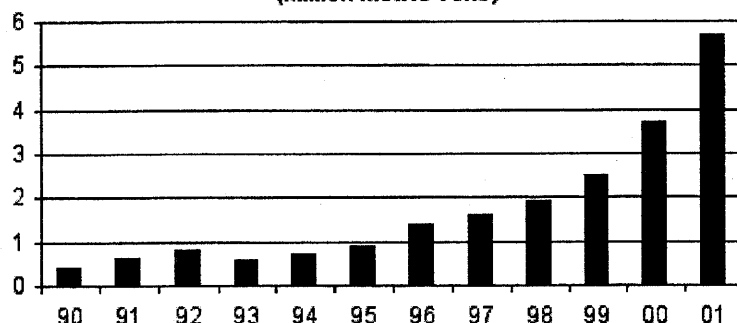
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Chinese Recovered Paper Imports
(Million Metric Tons)



The primary factor driving this sustained climb in Chinese imports has been the enormous investment in large, modern paper machines that utilize recovered paper as their primary furnish. While there have been significant additions to newsprint and boxboard capacity, most of the volume growth can be attributed to the expansion of containerboard mills—in 2000 and 2001 alone, about one million tonnes of new containerboard capacity were added each year.

The huge increases in Chinese recovered paper demand have translated into rapid growth in imports, while domestic collection has figured less prominently. Recovery rates in China have remained low (and have probably fallen) due to low prices of wastepaper imports, fragmented collection systems, lack of government involvement in recycling initiatives and logistical support, and quality issues related to the high percentage of straw

pulp that is contained in domestically produced paper.

The magnitude of the well-publicized expansion in Chinese recycled mills has raised concerns that the resulting increase in recovered paper demand and imports would drive prices much higher. However, recovered paper prices collapsed in the second half of last year and have remained relatively flat (and low) for all of 2001. Why has the sharp increase in Chinese demand failed to lift recovered paper prices?

One reason is that China's rapid growth has been offset by flat or declining demand elsewhere. In the rest of Asia, imports have been flat in 2001 as increases in countries such as India and Indonesia have been offset by decreases in other Asian countries (especially South Korea and Taiwan). Recovered paper demand also has been flat in Western Europe, and has fallen significantly in the U.S.

Second, recovered paper markets have become increasingly global so substitution between supply sources occurs quickly, thus dissipating the impact of supply shortages that appear in any single region. This substitution may be direct; for example, Chinese buyers may adjust purchases from Europe to keep prices in line with those from the U.S. Or substitution may be indirect; for example, Thai buyers may shift purchases from the U.S. to Europe, in response to an increase in Chinese imports from the U.S.

Third, Japan has emerged as a substantially larger source of recovered paper exports<exports jumped from about 400,000 tonnes in 2000 to over one million tonnes in 2001, with China being the number one destination. This increase was not driven by higher prices, but instead by changes in packaging and recycling laws, rising disposal costs, and growing consumer acceptance (outside of Japan) of Japanese recovered paper grades.

Finally, substitution between recovered paper grades has also relieved some of the pressure on traditional supply sources. Recovered paper buyers in China have an ample supply of low cost labor available to sort paper and may adjust their choice of grades (and sources) accordingly. For example, Chinese buyers have reportedly shown an increasing preference for European mixed grades rather than standard ONP grades, which can be explained by relative ONP content (European soft mix may contain as much as 60 percent ONP) and relative prices.

In addition to the above factors, market conditions in the U.S. remain critical in determining recovered paper prices. While U.S. exports to China have risen sharply this year, total U.S. exports were down 3 percent in January–October compared to year-earlier levels. Excluding China, shipments to the four other top destinations in 2000 (Canada, South Korea, Mexico, and Taiwan) were each down by more than 20 percent in the first ten months of this year. U.S. consumption has also declined significantly in

2001. While it is difficult to accurately measure potential supply (particularly the influence of trade in merchandise goods and produce packaged in corrugated boxes), the trend in U.S. prices leaves little doubt that the demand-supply balance in the U.S. has remained slack throughout this year.

Chinese buyers managed to increase recovered paper imports by a huge amount in 2001, and did so without driving prices higher. Weak worldwide demand, new supplies, and increasing efficiency in sourcing and using recovered paper combined to make this possible. As Chinese wastepaper imports inevitably continue their upward march over the next few years, a rebound in recovered paper consumption in the U.S., Europe, and/or Japan could very well bring about the upswing in prices that has been both feared and anticipated. In fact, the longer recovered paper prices stay low while Chinese imports continue to rise, the greater the chances that the next cycle in recovered paper prices will be explosive!

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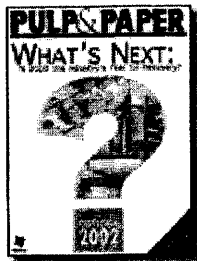
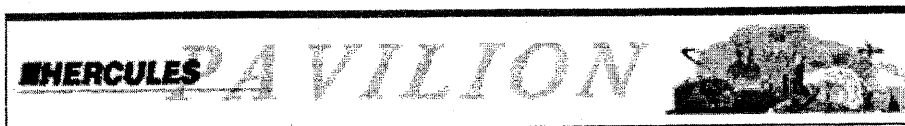
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Table of Contents
Back Issues

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Issue FOCUS:

Outlook 2002

As inventory levels keep prices stable, North American pulp and paper producers will have to wait for a mid-year economic recovery to elevate demand, prices

by Pulp & Paper Week editors **GREG RUDDER, KATHRYN MACKENZIE, NOEL DEKING, ALISON ATIKIAN, BRYAN SMITH, and RAE ANN ROCKHILL**

Inventory Levels, Fiscal Stimulus Offer Hope For Mid-2002 Price Recovery

The North American pulp and paper industry was severely tested last year by the first economic recession to hit U.S. shores in over a decade. Even before the terrorist attacks in New York and Washington, D.C., on Sept. 11, demand for most grades of printing and packaging papers were drifting downward, and the country was falling into recession. Along with declining industry shipments and weak product prices, high energy costs early in the year and a flood of cheap paper imports from Europe pushed many companies into a severe financial crisis.



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In response to these challenges, the country's largest paper and forest products producers moved quickly to cut production to keep supply in line with declining demand. In addition, many older, single mill operations were forced to permanently shut down. A number of paper companies that traced their history back 100 years or more were forced to close. Among the casualties were Lyons Falls Pulp and Paper Co. (1894), Plainwell Paper Co. (1886), Deferiet Paper Co. (1899); and Newton Falls Paper Co. (1894).

As a result of these actions, total U.S. industry production of paper and paperboard fell by about 4.7 million tons, or 5%, last year. Additional

production cuts are forecast for the first half of this year. Besides rolling back production, paper companies also initiated massive and widespread restructuring efforts to wring out costs from their business operations.

International Paper Co. (IP) grabbed headlines last June when it announced an additional 4,000 job cuts and plans to sell off an additional \$2 billion of non-core assets, on top of \$3 billion of divestments previously identified during 2000. Like many other companies, IP said it is focused on improving its balance sheet and taking steps to ensure the long-term profitability of the company. IP has permanently closed or downsized seven paper mills and about 30 printing, converting, and packaging facilities worldwide in the 2000-2001 period.

"International Paper continues to take measures that strengthen our company—focusing on core businesses, improving our operational performance, working to manage our capacity and aggressively pursuing divestitures," said company chairman and CEO John Dillon in a release.

While market conditions remain extraordinarily tough in the paper and forest products industry, it is reasonable to forecast a recovery later this year based on the massive amount of fiscal and monetary stimulus already in place. Financial history has shown that when recession is finally acknowledged, "that means we're already about two-thirds of the way through it," said Ned Riley, chief investment strategists at State Street Global Advisors. Also, post-war U.S. recessions have lasted an average of six to 18 months, putting the time frame of recovery around mid-year

Still, the industry will be faced with many of the same challenges that have dominated the market during the last two years: overcapacity, dwindling exports, and increased competition from imports. The industry's U.S. production base will probably continue shrinking in the short-term as more high cost facilities are closed, according to forecasts from Resource Information Systems Inc. (RISI). But with customer inventories at very low levels, any pickup in demand could lead to a rapid restocking and paper production gains.

MARKET PULP

Producers hope to prevent 1Q inventory buildup

Most participants in the North American pulp market are likely pleased just to have 2001 behind them. The year saw benchmark northern bleached softwood kraft (NBSK) list prices plummet by over 32%, from \$710/mton to a low of \$480/mton as inventories surged out of control. The U.S. dollar remained strong despite a temporary fall in September, and flurries of shipments went to Asia at rock bottom prices.

Table 3. Pulp operating rates and prices fell in 2001.

PULP OPERATING RATES AND PRICES - 2001
 NORSCAN CHEMICAL MARKET PULP OPERATING RATES BY QUARTER
 (%)

2001	Q1	Q2	Q3	Q4
	85.3	82.3	82.0	n.a.*

WORLD CHEMICAL MARKET PULP OPERATING RATES BY QUARTER
 (%)

2001	Q1	Q2	Q3	Q4
	89.3	85.7	86.7	n.a.*

U.S. NORTHERN BLEACHED SOFTWOOD KRAFT(NBSK) PRICES BY
 QUARTER

2001	Q1	Q2	Q3	Q4
	\$680	\$570	\$485	n.a.*

n.a. = not available.

Sources: Pulp and Paper Products Council, Pulp & Paper Week.

This year's market isn't much better. Although producers were finally able to push through a price recovery for all of the primary grades traded in North America—NBSK rose \$20/mton within two months after producer announcements on total third-quarter pulp supply reductions of some 870,000 mtons—going into 2002 there are signs that prices could likely fall again before rising ahead of the year's midpoint

Despite major advances in bringing down inventories by the end of 2001, producers appeared concerned about the likelihood of a slow winter. Just two months after North American/Scandinavian (Norscan) producers drove down their inventories to 1.501 million mtons (in October 2001) sources across the board worried about inventories building up during the first few months of 2002. Because producers had taken major periods of downtime to pull themselves out of a terrible downwards cycle, the fourth-quarter recovery in pricing and shipments were considered tenuous. By year's end, sellers in the U.S. and Canada indicated that demand was weak and suggested they would again take outages to protect prices.

**TABLE 11. Pulp capacity has increased
 about 0.2%/year over the last 10
 years.**

U.S. PULP CAPACITY 1985-2002 (000
 tons)

	Capacity
2002p	69,942
2001p	70,245
2000p	70,069
1999	69,650
1998	69,893

1997	70,336
1996	69,534
1995	69,432
1994	68,533
1993	68,214
1992	68,700
1991	67,489
1990	65,985
1989	65,026
1988	63,754
1987	62,076
1986	60,686
1985	59,615

p=preliminary.

Source: American Forest & Paper Assn.

Predictions of strong shipments to Asia materialized last year, but robust volumes did little to stimulate prices upwards, and lower volumes expected in early 2002 can't help. For example, year-over-year market pulp shipments to China rose 36% to total 3.93 million mtons though October 2001, but prices for NBSK were said to be in the \$400/mton range. Demand in Asian countries such as Taiwan and South Korea was relatively better than Europe and North America but after a year in which sellers conceded nearly any price to customers, few see exports there salvaging market conditions. Nevertheless, incremental price increases were occurring at the end of 2001, particularly in spot markets where hardwood supplies were slim. If a best case possibility (continued strong shipments to Asia) does occur then it's still not likely to boost prices.

Economic fundamentals are weak in the first half of 2002, and demand for paper and related products likewise are considered dim. Economists belatedly admitted the U.S. had spent most of last year in a recession, and many of the same forecasters expect that low interest rates and increased consumer spending would prop up the economy by this year's midpoint. If market pulp producers keep their inventories from skyrocketing during the first half of the year, some capacity reductions that were the byproduct of last year's slowing economy could serve as a benefit to pulp price recovery. International Paper Co., NorskeCanada, and Georgia Pacific Corp., among others, permanently closed market pulp mills last year, which could help overall supply and demand balances.

In addition, if producers can stall a substantial loss in pricing during the first quarter they could be poised to benefit from increased paper demand, and an increase in pulp shipments, that would accompany a stronger economy. RISI has forecast that shipments from key North American and global regions will improve in 2002 vs. last year. For bleached softwood kraft pulp, RISI expects worldwide shipments to

grow by 4.4% over year-ago results to 19.362 million mtons; from the U.S. up 0.8% to 4.768 million mtons; and shipments from Canada to rise 3.8% to 6.903 million mtons this year.

Most market watchers agree that the second half of 2002, and not the first half, will take the majority of the volume increases. But if producers are to gain profits and not simply regain lost ground, they will have to prevent substantial price losses during the first half of the year.

RECOVERED PAPER

Market waiting for demand to pick up

U.S. paper and paperboard production and demand must increase this year to possibly push up recovered paper prices that are at their lowest levels in years. The average price for the largest volume U.S. recovered paper, old corrugated containers (OCC), was on track to be \$40/ton last year—its lowest annual level since 1993.

Production of paper and paperboard was off 6% for the year through September, with significant output reductions in the two sectors that use the most recovered paper: containerboard and newsprint. A weak U.S. economy reduced paper/board demand and output.

As a result, consumption of recovered paper last year was on track to decline 3.4% and total 39.2 million tons, according to a report by RISI. Consumption declined an estimated 1.36 million tons, compared with recovered paper consumption in 2000. Total consumption declined the last two years, according to RISI, after 14 straight years of positive growth per year.

The main reasons for the decline in consumption last year was a 6% drop-off in U.S. containerboard output and a 9% fall in newsprint production. The sectors combined use an estimated 55% of all U.S. recovered paper consumed each year. Last year, U.S. containerboard mills operated at an estimated 86%, and North American newsprint mills ran at an estimated 89%. This resulted in a production decline of an estimated three million tons compared with 2000 output.

Solid export demand, especially from China, Canada, and Mexico, periodically helped the U.S. suppliers last year, but was not enough to pressure up prices on the U.S. market. By year-end last year, export demand had also fallen off.

Through September, U.S. recovered paper exports were up 2.4% (compared with exports in 2000 through September) and on track to total 9.4 million mtons by year-end. Export mixed paper and OCC were on track to register positive consumption growth last year over 2000.

On domestic consumption, RISI estimated that consumption of high-grade deinking materials was on track to total 3.3 million tons, up 0.7% over 2000 consumption. Consumption of old newspapers was on

track to total nearly 6.2 million tons, down 6.7%. Consumption of OCC, the largest volume U.S. recovered paper material used by paper and paperboard mills, was on track to total 21.0 million tons, down 3.4%.

RISI forecasted that U.S. consumption of recovered paper this year would increase by 0.3% based on an anticipated late-year pickup in paper and paperboard production and demand.

Exports are expected to continue to increase, led by China, which planned 2.44 million mtons of new containerboard capacity from 2000 to 2003. Through September last year, China was on track to take nearly 900,000 mtons of U.S. OCC. In 1999, China took just 300,000 mtons of U.S. OCC. China also had become the largest buyer of U.S. mixed paper last year, on track to take 1.7 million mtons. In 1999, China took just 450,000 mtons of U.S. mixed paper.

U.S. suppliers throughout last year counted on a slimmer supply line from reduced collection and reduced output from U.S. paper and paperboard producers to generally hold up prices.

The f.o.b. seller's dock average U.S. price for OCC stayed between \$40 to \$43/ton all year. ONP No. 8 was the best-performing major grade through the first five months of last year, with the average U.S. price at \$51.63/ton through November.

Mixed paper, the lowest-cost U.S. recovered paper material, became the fastest-growing grade, with strong export demand from China where mills sort the materials they need from the mixed paper.

Most suppliers and mill buyers didn't expect an upturn in demand for recovered paper—or an increase in prices—until at least the spring of this year and possibly even later. The key factor, once again, depends on when paper and paperboard production improves and mills, especially in newsprint and containerboard, run at least to an operating rate of 90% to 92%. When U.S. recovered paper prices last spiked in May 2000 and OCC hit \$124/ton, U.S. containerboard mills operated at 95%, and North American newsprint mills ran at 96%.

CONTAINERBOARD

Horrific box demand slows business, downtime surges

After running at about 86% last year and taking an estimated 4.5 million tons of downtime, U.S. containerboard producers believe they found an answer for weak demand markets: shut down linerboard and corrugating medium machines and try to carefully match supply to demand.

TABLE 4. Containerboard producers have aggressively managed inventory.

U.S. CONTAINERBOARD INVENTORY AT
BOX PLANTS, MILLS—1997-2001* (000

tons)

2001	2,635
2000	2,849
1999	2,671
1998	2,827
1997	2,465

* As of end of October.

Source: American Forest & Paper Assn.,
Fibre Box Assn.

This strategy in 2001 helped keep board prices from what many thought could have been a free fall. The benchmark 42-lb unbleached kraft linerboard in the East fell 5% on average in 2001 compared with 2000, to about \$444/ton from \$468/ton.

The big factor pushing down prices was an extraordinarily weak U.S. box market. Average-week shipments were on track to be off 5.5% last year.

The box market was impacted by a recession in U.S. manufacturing that began in October 2000, 13 consecutive months of negative month-to-month U.S. industrial production output (through October), and a strong U.S. dollar that attracted imports and made U.S. kraft linerboard uncompetitive in export markets.

Table 5. Board prices felt pressure throughout 2001.

Containerboard prices (delivered in eastern U.S.)

U.S. \$/short ton

	42-lb unbleached kraft linerboard	26-lb semi chemical corrugating medium
2001		
4Qe	\$426*	\$386*
3Q	\$438*	\$395*
2Q	\$452*	\$408*
1Q	\$460*	\$425*
2000		
4Q	\$475*	\$445*
3Q	\$475*	\$452*
2Q	\$475*	\$460*
1Q	\$442*	\$427*
1999		

4Q	\$425*	\$400*
3Q	\$425*	\$400*
2Q	\$387*	\$340*
1Q	\$365*	\$305*

1998

4Q	\$345*	\$280*
3Q	\$370*	\$310*
2Q	\$385*	\$335*
1Q	\$390*	\$340

1997

4Q	\$390*	\$340
3Q	\$340*	\$280
2Q	\$300*	\$230
1Q	\$320*	\$240*

1996

4Q	\$365*	\$290*
3Q	\$345*	\$280
2Q	\$370*	\$280
1Q	\$450*	\$360

1995

4Q	\$500*	\$460*
3Q	\$530	\$525*
2Q	\$530	\$530
1Q	\$480	\$480

*e=estimate.**

Discounting has been reported below transaction price reported.

Source: Pulp & Paper Week

Actual box shipments for 2001 were on track to total 347.5 billion ft²—the lowest annual shipment total since 1993's total of 353.7 billion ft² and way below 1999's peak of 401 billion ft² of shipments.

The key ingredient for generally holding up containerboard prices last year was significant market-related downtime. Smurfit-Stone Container Corp. (SSCC)—the largest paper-based packaging company in the world—took more than one million tons of market-related downtime. IP took an estimated almost one million tons of market-related downtime. In any given month last year, about one-third of North American containerboard producers scheduled market-related downtime.

With the downtime, U.S. containerboard inventory at box plants and mills dropped to 2.6 million tons at the end of October because of

downtime and a weak market that left box makers confident that they didn't need to build stock.

Producers expected inventory to rise through the weak demand months of December 2001 and this month and total no more than 2.9 million tons at the end of next month. Only once in 2001—in February—did U.S. inventory total more than 3.0 million tons.

"We are currently experiencing the largest sustained period of inventory stability, and inventory variation has remained below historical levels," said William Wandmacher, vice president and general manager for SSSC's North American containerboard mills, in a speech at the Global Outlook conference in November in New York City.

"The idea of losing a dollar per ton but making up with volume has finally been recognized as a bad business model," Wandmacher said.

In 2001, producers shut a number of machines either permanently or indefinitely due to the weak market conditions.

Weyerhaeuser Co. permanently shut a 240,000-tpy linerboard machine at its Springfield, Ore., mill and indefinitely shut a 196,000-tpy recycled corrugating medium machine at its Plymouth, N.C., mill; IP converted 200,000 tpy of linerboard capacity away from its Roanoke Rapids, N.C., mill and indefinitely shut 610,000 tpy on three linerboard machines at its Savannah, Ga., mill; Georgia-Pacific Corp. indefinitely shut a 240,000-tpy corrugating medium machine in Toledo, Ore.; and Inland Paperboard and Packaging Inc. shut a 220,000-tpy linerboard machine at its Orange, Tex., mill.

Still, discounting on containerboard contract/pricing agreement levels continued throughout last year, mainly from smaller producers that rarely take market-related downtime. This discounting also was significant among recycled linerboard and recycled medium producers, because the price of their main raw material, old corrugated containers (OCC), remained at historically low-running levels of about \$40 to \$45/ton all year in the U.S.

Pricing of 42-lb unbleached kraft linerboard in the East dropped from \$475/ton in November 2000 to \$430/ton in November 2001. A steeper fall hit 26-lb semichemical corrugating medium, which was down to \$390/ton in November in the East from \$460/ton in July 2000.

Still, the price decline was subtle compared to the drop-off in the box market and for U.S. kraft linerboard offshore. In November last year, the difference between 42-lb kraft linerboard in the U.S. and Ecuador was \$120/ton. (Ecuador is the U.S.'s fourth largest export market for kraft linerboard.)

With weak global economic conditions and two consecutive years of negative growth in U.S. box shipments, North American producers should continue to see weak market conditions in the first half of this year. Most analysts expect the market to remain weak until at least the third quarter. U.S. box shipments are expected to increase by up to

1% this year, if the slight upturn in demand takes hold in the third quarter.

PRINTING AND WRITING PAPERS

Coated papers collapse, uncoated paper demand skids

Despite controlled production on the part of major coated and uncoated manufacturers throughout 2001, prices plummeted with demand for printing and writing papers. The dot-com blowout resulted in sharp declines in magazine subscriptions and advertisements, as well as weakening office reprographic consumption. In addition, the January postal rate increase and the threat of an additional rate increase (slated for October 2002) has caused much downgrading among bulk mailers, such as magazine publishers and direct marketers. A further blow came after the Sept. 11 attacks, when the threat of anthrax caused an even greater decline in volumes mailed, temporarily reducing direct mailer staples of coated and uncoated offset demand.

TABLE 6. U.S. printing/writing papers' shipments dropped an estimated 7.3% last year.

U.S. PRINTING/WRITING PAPERS SHIPMENTS 1996-2001 (000 tons)

	1996	1997	1998	1999	2000	2001 ^e
Uncoated free-sheet	13,165	13,681	13,605	14,038	13,607	12,677
Coated free-sheet	4,363	4,811	4,932	5,105	4,797	4,342
Uncoated groundwood	2,028	2,068	2,062	1,952	1,819	1,482
Coated groundwood	3,821	4,506	4,370	4,475	4,622	4,578
Total printing/writing papers	24,870	26,628	26,501	27,157	26,935	24,958

e=estimate.

Source: American Forest & Paper Assn.

Uncoated papers. Forecasting a weaker economy in 2001, IP closed multiple machines and mills beginning in the latter part of 2000. The industry leader closed its 330,000-tpy Mobile, Ala., uncoated free-sheet (UCFS) mill and its 230,000-tpy Lock Haven, Pa., UCFS mill. In addition, IP shut multiple machines, including a 135,000-tpy UCFS paper machine in Courtland, Ala.

Georgia-Pacific Corp. (G-P) closed four older UCFS machines at its Camas, Wash., mill, removing some 140,000 tpy from the market.

Despite cuts in capacity and downtime efforts that will continue throughout 2002, RISI analyst John Maine expects UCFS capacity to rise in 2003 and 2004, hitting an estimated 15.2 million tpy in the U.S.

alone. Canadian UCFS capacity will begin its climb in 2002, ending 2003 with an additional 110,000 mtpy, for a total of just under 1.7 million mtpy.

Some producers discussed a possible price increase on repro bond for early second quarter this year, and RISI's Maine agreed that an increase was possible because of the shutdowns and inventory management by producers.

TABLE 7. An uncoated free-sheet price rise is forecasted for 2002.

U.S. UNCOATED FREE-SHEET QUARTERLY PRICES/FORECAST (per short tons)

	3Q 2001	4Q 2001	1Q 2002	2Q 2002	3Q 2002	4Q 2002
No. 3 offset, 50-lb rolls	\$680	655	655	674	690	715
Change (%)	-4.9	-3.7	0.1	2.9	2.4	3.5
No. 4 repro bond, 20-lb	\$768	750	750	769	785	810
Change (%)	-2.7	-2.4	0.1	2.5	2.1	3.1

Source: Resource Information Systems Inc. (RISI)

With North American UCFS operating rates usually in the low 90s, 2001 saw that number drop as low as 79% in September. With list prices around \$890/ton in the first quarter of 2001, 20-lb repro bond paper prices began slipping in April, hovering between \$800 and \$850/ton. By June, repro bond fell an average of \$10/ton and ended the third quarter averaging \$770/ton, with very few transactions at \$800/ton. Reprographic paper prices fell approximately 10% from third quarter 2000 to third quarter 2001.

Uncoated web printing papers, such as 50-lb uncoated offset, skidded at 3% to 4% below year-to-date prices until October, when the post-Sept. 11 anthrax scare put a dent in demand. In October, 50-lb offset transacted at an average of \$685/ton, nearly 7.5% below October 2000 prices.

The only grade of UCFS to hold its ground in 2001 was 20-lb stock tab, which rose 1.4% from year-ago levels.

Coated paper. The dot-com bust most directly affected the free-fall in demand and prices for both lightweight coated groundwood (LWC) and coated free-sheet. This was mostly due to the sudden decrease in demand for technology-based magazines and a decrease in advertising pages overall due to weakened consumer confidence.

In November 2001, the Magazine Publishers of America (MPA) reported a \$77.7 million dollar loss (down 39.9%) in technology-based magazine advertising. This translates into a 44.2% decrease in the

number of pages in technology magazines.

Coated No. 5 40-lb web, used as a thicker and relatively cheap magazine paper, began the fourth quarter 2001 a dramatic 19.8% below year-to-date transaction prices. The more popular 34-lb basis weight LWC also fell 11.6% year-to-date in October, for an average loss of \$125/ton. Nevertheless, these bottom prices were still undercut by offshore coated papers, most notably from Asia.

Curtailing production was popular in coated free-sheet (CFS), which ended May of 2001 at 17% lower operating rates than year-to-date levels. Entering the fourth quarter, however, North American operating rates rose as mill inventories declined.

Coated paper also felt competition from lower grades. Supercalendered A and A+ have taken some demand from LWC, most notably among catalogue publishers wishing to cut costs, sources said.

While coated paper demand is expected to remain stagnant into 2002, several North American manufacturers are preparing for the worst: an additional 2.9 million tons of added coated paper capacity to come online globally by the end of 2002. Several of the projects in North America are conversions.

Overall, hope for coated paper price recoveries in the coming year has diminished because many analysts expect an overall drop in print media.

NEWSPRINT

Outlook is precarious after weak 2001

The year 2001 was disappointing, to say the least, for newsprint producers and newspaper publishers in North America. Following a stellar year in 2000, advertising spending dropped dramatically throughout the year, prompting an unprecedented drop in demand and consumption and a subsequent slide in newsprint prices.

TABLE 8. Operating rates plunged to 84% from 96% last year.

NORTH AMERICAN NEWSPRINT OPERATING RATES 2000-2001

%	Q1	Q2	Q3	Q4
2001	96	91	84	n.a.
2000	97	95	97	n.a.
% Chg.	-1.0	-4.2	-13.4	n.a.

n.a. = not available.

Source: Pulp and Paper Products Council.

Between July and November of 2001, the average transaction price of standard 30-lb newsprint dropped \$105/mton, or 16.8%, on both U.S. coasts to \$520/mton following a 10-month drop in demand of 11.1% in

the U.S. Total North American demand was off 10% for the same period. Even though demand began falling at the beginning of the year, newsprint producers still tried and failed to implement a \$50/mton price increase last March. In 2000, newsprint prices had climbed 16% by year-end, to \$610/mton, thanks in part to a huge boom in the dot-com sector, which all but disappeared in 2001. In addition to the dot-com fall-off, a weak economy in general, as well as the Sept. 11 attacks, contributed to the drop-off in advertising spending.

The drop-off in advertising also contributed to a 10.3% drop-off in U.S. dailies' consumption through October on a year-over-year basis. In 2000, consumption at U.S. dailies had grown about 4% for the same period.

TABLE 9. Newsprint price increase failed last year and prices fell.

NORTH AMERICAN NEWSPRINT PRICES

Average transaction price—Standard 30-lb newsprint

	Q1	Q2	Q3	Q4
2001	610	625	580	n.a.
2000	515	555	575	n.a.
% Chg.	15.6	11.2	0.9	n.a.

n.a. = not available.

Source: *Pulp & Paper Week*

In December 2001, some industry analysts were predicting there could be the beginnings of a slow rebound in ad spending in 2002 following one of the worst years ever for advertising in 2001. The NAA reported that, according to preliminary estimates, newspaper advertising spending fell 10.3% in the third quarter compared to the period a year ago. Last year, third-quarter spending rose 4.3% compared to the previous year. Robert Coen of Universal McCann, a well-respected industry forecaster, reported at the end of 2001 that he expected U.S. ad spending to turn positive in 2002, but at a mere 2.4%, following a 4.1% fall-off this year.

As demand began falling in the early part of 2001, producers responded by announcing market-related downtime. Throughout the year, newsprint producers took an estimated 900,000 mtons of downtime in an effort to shore up the price slide, which seemed almost unstoppable in the latter part of the year. Prices fell an average of \$20/mton each month for five consecutive months.

Abitibi-Consolidated Inc. permanently removed 400,000 mtons of newsprint from the market in 2001 through machine closures and conversions. In May, Abitibi-Consolidated permanently shuttered the No. 8 newsprint machine at its Kenora, Ont., mill and converted the No. 9 machine to produce specialty papers.

The machine closures and market-related downtime led to low

operating rates throughout much of 2001. The North American operating rate remained below 90% from July through October last year, averaging an estimated 85% for the period, compared to 97% for the same period in 2000.

Into 2002, producers have already announced plans to take an estimated 150,000 mtons of downtime during the first quarter. However, many industry sources believe that much more downtime will be needed to turn the market around and keep an excess of newsprint off the market. Sources believe the newsprint market won't begin to tighten up until at least the second quarter, when the effects of the downtime taken in 2001 might finally begin to be felt. To that end, the price of newsprint was expected to fall further in December 2001, and possibly into January of 2002.

Due to low overseas pricing, weak economies, and an excess of newsprint in those markets, the overseas export market did not offer much in the way of relief for newsprint producers. Early in the year, it was thought by some sources that producers might look to overseas markets as an outlet for excess paper. However, exporting did not prove to be a viable option for ridding the domestic market of excess tonnage. Through October 2001, total North American overseas exports were down nearly 25% to 179,000 mtons. The export situation was not expected to improve considerably in 2002, primarily due to the continued strength of the U.S. dollar as well as a global recession.

Import into the U.S. were insignificant in 2001, a dynamic that is expected to continue into 2002. Although sources at major U.S. dailies reported being offered paper from South Korea, Indonesia, and Germany in 2001, sources said they weren't buying because they "just don't need the paper." Overseas imports to the U.S. were off about 20% through the first ten months of 2001.

BOXBOARD

Weak consumer sales hurt cartonboard

The U.S. folding carton industry stumbled badly as the U.S. economy slipped into recession in the second half of 2001. Carton manufacturers and paperboard suppliers are bracing for another year of competitive market conditions among solid bleached sulfate (SBS), coated recycled boxboard (CRB), and coated unbleached kraft (CUK) boxboard. Weak volumes not only reduced revenues and operating efficiencies at paper mills, but also forced mills to take market related downtime to balance inventories with new orders.

Mills announced indefinite machine shutdowns, and even permanent closings, in an effort to balance supply with lower demand. By moving aggressively to cut production, producers are hoping to avoid a severe price collapse.

International Paper Co. permanently closed its 500-tpd bleached board mill in Moss Point, Miss., in June, saying the 97-year-old mill could no

longer compete against newer, more modern paper machines. The mill employed 375 people and was temporarily shut twice earlier in the year due to lack of orders. IP also idled a bleached board machine at the Riegelwood, N.C., pulp and paper mill for three months last fall. IP is the country's largest bleached producer with almost 2 million tons of production capacity at five U.S. mills.

In the recycled boxboard area, Smurfit-Stone Container Corp., Carastar Industries Inc., and Newark Group Inc. all closed older, high-cost facilities during the year. Meanwhile, Sonoco Products Co. purchased U.S. Paper Mills of De Pere, Wis., and an uncoated recycled board mill in Hutchinson, Kans., from Republic Goup LLC.

U.S. markets for folding boxboard and other paperboard packaging and converting grades remain weak, and operating rates are averaging just 86% for the sector.

The main problem for folding boxboard producers is the absence of growth in the primary consumer packaging markets. Total production of folding boxboard grades has declined in each of the past two years. Last year, solid bleached folding boxboard output fell about 6%, recycled folding boxboard was down 5%, and recycled industrial paper was down almost 7%. Coated unbleached kraft was up about 3%, mainly due to higher volumes in beverage packaging and market share gains against bleached and recycled.

Exports have also fallen, mainly due to the strength of the U.S. dollar. The high-value dollar has eroded the U.S. competitive position in overseas markets, while making imports relatively cheaper. The biggest shortfalls have been exports of liquid packaging, i.e., bleached milk carton stock (down 8%) and unbleached kraft beverage cartons (down 10%). Exports of all folding boxboard grades were down last year, putting even more pressure on domestic markets to absorb the surplus supply.

So far, U.S. producers have avoided widespread declines in folding boxboard prices, but price discounting is present say suppliers and customers alike. The question now is whether the industry can maintain price stability over the first half of 2002 until demand recovers to more normal levels in the second half of the year.

U.S. CAPACITY

Paper/board capacity set to increase 0.9%, pulp to fall

After weak market conditions and pricing last year, U.S. paper and paperboard capacity this year was expected to increase just 0.9%, and market pulp capacity was expected to decline 0.3%.

Paper capacity was expected to total 50.38 million tons, up 1.1% over 2001 capacity. Paperboard capacity was expected to rise 0.6% and total 55.05 million tons this year. Overall paper and paperboard capacity was set to total 105.44 million tons this year.

Various sectors including containerboard and newsprint took significant market-related downtime and were in the process of permanent shutdowns of mills or of converting capacity to other grades.

TABLE 1. U.S. paper/board production declined 1.1% last year.

U.S. PAPER INDUSTRY PRODUCTION (000 tons)

Paper	1996	1997	1998	1999	2000	2001e	2002e
Uncoated free-sheet	13,161	13,687	13,605	14,038	13,897	12,991	12,889
Coated papers	8,184	9,314	9,302	9,580	9,615	9,010	8,943
Newsprint	6,949	7,215	7,248	7,179	7,360	6,567	6,335
Tissue	6,264	6,429	6,585	6,847	6,911	7,088	7,362
Packaging and converting	4,397	4,425	4,425	4,796	4,431	4,300	4,180
Other*	3,520	3,629	3,594	3,540	3,423	2,929	3,075
Total paper	42,475	44,699	44,759	45,980	45,637	42,885	42,784
% change	-1.0%	5.2%	0.1%	2.7%	-0.7%	-6.0%	-0.2%
Paperboard							
Unbleached kraft	22,179	23,222	23,198	23,141	21,796	20,463	20,258
Recycled board	14,868	15,514	15,170	16,201	15,804	15,707	15,408
Semichemical board	5,619	6,047	5,893	6,010	5,949	5,573	5,258
Bleached board	5,236	5,548	5,487	5,712	5,437	5,291	5,207
Total paperboard	47,902	50,331	49,748	51,064	48,986	47,034	46,131
% change	2.7%	5.1%	-1.2%	2.6%	-4.1%	-4.0%	-1.9%
Total paper and paperboard	90,377	95,030	94,507	97,044	94,623	89,919	88,915
% change	0.9%	5.1%	-0.6%	2.7%	-2.5%	-5.0%	-1.1%

e=estimate

** Other includes uncoated groundwood, bristols, thin and cotton fiber papers.*

Source: American Forest & Paper Assn.; Resource Information Systems Inc. (RISI)

Weyerhaeuser Co. permanently shut its 240,000-tpy linerboard machine at the Springfield, Ore., mill last year. The company cited weak domestic and export demand. Another ten machines that make linerboard or corrugating medium were indefinitely shut last year by

U.S. producers.

Bowater Inc. planned the total conversion of 250,000 mtons of newsprint capacity to its Nuway coated groundwood plants. The company planned to start up a second Nuway plant this year (one was being constructed at the end of last year), and a site had not yet been chosen for a third plant.

Abitibi-Consolidated Inc. also converted newsprint production at its Lufkin, Tex., mill to supercalendered (SC) production. The project was completed last November. Three of four machines were shut down and replaced by one 255,000-mtpy SC machine.

**TABLE 10. In the last 10 years,
paperboard capacity has increased
2.3%/year.**

U.S. PAPER/BOARD CAPACITY 1984-2002
(000 tons)

	Paper Capacity	Paperboard Capacity
2002p	50,384	55,057
2001p	49,828	54,689
2000p	49,321	54,396
1999r	49,020	53,412
1998	48,174	53,659
1997	48,016	53,247
1996	47,167	51,327
1995	46,700	49,049
1994	45,940	47,324
1993	45,154	45,416
1992	44,984	44,482
1991	43,777	43,099
1990	42,315	42,078
1989	41,165	40,993
1988	40,211	40,321
1987	39,081	39,106
1986	38,013	37,765
1985	37,581	36,720
1984	37,104	35,992

p=preliminary; r=revised.

Source: American Forest & Paper Assn.

As for capacity additions, Williamette Industries Inc. was moving ahead with building a new 432,000-tpy uncoated free-sheet machine at the Kingsport, Tenn., mill. The machine replaces an older and smaller

machine, 167,000 tpy. The Kingsport project was expected to be finished in 2003.

Solvay Paperboard LLC planned to start up a 180,000-tpy recycled corrugating medium machine at its mill in Syracuse, N.Y., by this summer.

Tissue capacity was expected to increase 2.7% this year over last year, with total capacity reaching an estimated 7.8 million tons.

TABLE 2. Canadian paper/board production fell almost 5% last year.

CANADIAN PAPER INDUSTRY PRODUCTION (000 tons)

					Chg. (%)
Production	1998	1999	2000	2001	2001/2000
Total paperboard	18,722	20,198	20,682	19,732	-4.6
Newsprint	8,581	9,204	9,222	8,516	-7.6
Printing/writing	5,154	5,748	6,304	6,105	-3.3
Containerboard	2,826	3,025	2,962	2,980	0.6
Market pulp	9,080	9,886	9,671	9,208	-4.7

					Chg. (%)
Capacity	1999	2000	2001	2002	2002/2001
Total paperboard	21,559	21,692	22,089	22,397	1.4
Newsprint	9,939	9,572	9,561	9,623	0.6
Printing/writing	6,100	6,603	6,821	6,978	2.3
Containerboard	3,182	3,158	3,260	3,295	1.0
Market pulp 2	9,372	9,732	9,755	9,768	0.1

1. Estimated based on production rates through September.

2. Market pulp is chemical paper-grade.

Source: Pulp and Paper Products Council.

Coated groundwood capacity was to increase 2.7% this year and total 4.89 million tons, and uncoated groundwood capacity was to increase 8.6% and total 2.44 million tons this year. Madison Paper Industries at the Alsip, Ill., mill planned a conversion to 120,000 tpy of lightweight coated paper, and Great Northern Paper Inc. at the Millinocket, Maine, mill planned a conversion to SC-A output of 140,000 mtpy. Both projects were completed late last year.

U.S. market pulp capacity was set to fall to 10.4 million tons, down 31,000 tons from last year's total. The decline was completely in the chemical paper grade sulfate sector. Sulfate capacity was to be down to 9.18 million tons this year.

P&P

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Take the Paperloop poll: Which of the following issues presents the

biggest challenge for the pulp & paper industry in 2002? Overcapacity, dwindling exports, or increased competition from imports? [Vote now!](#)

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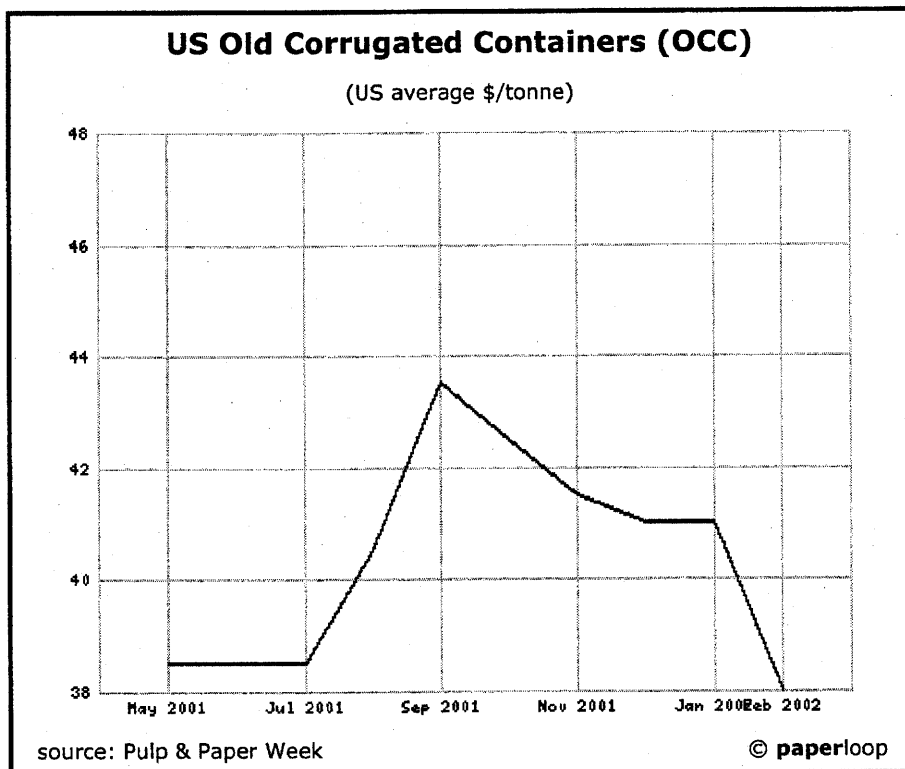
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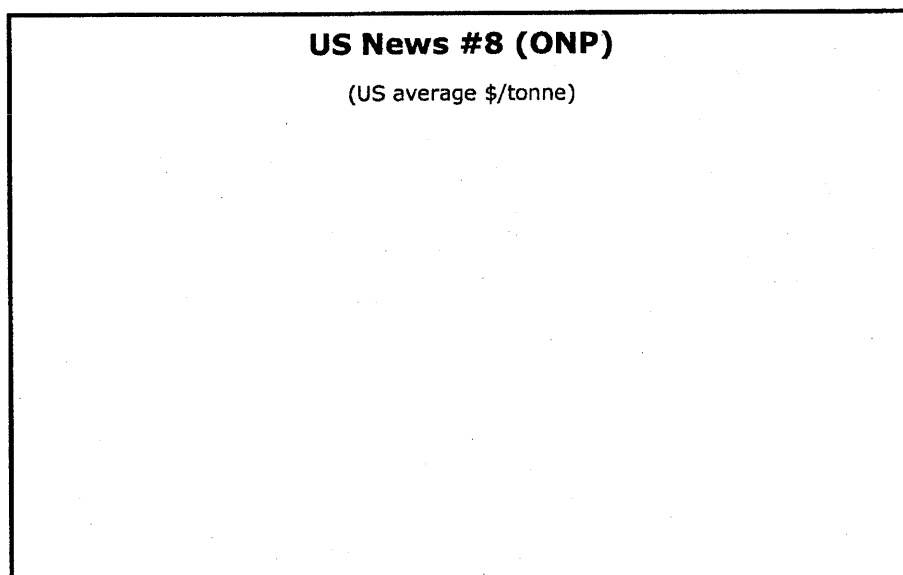
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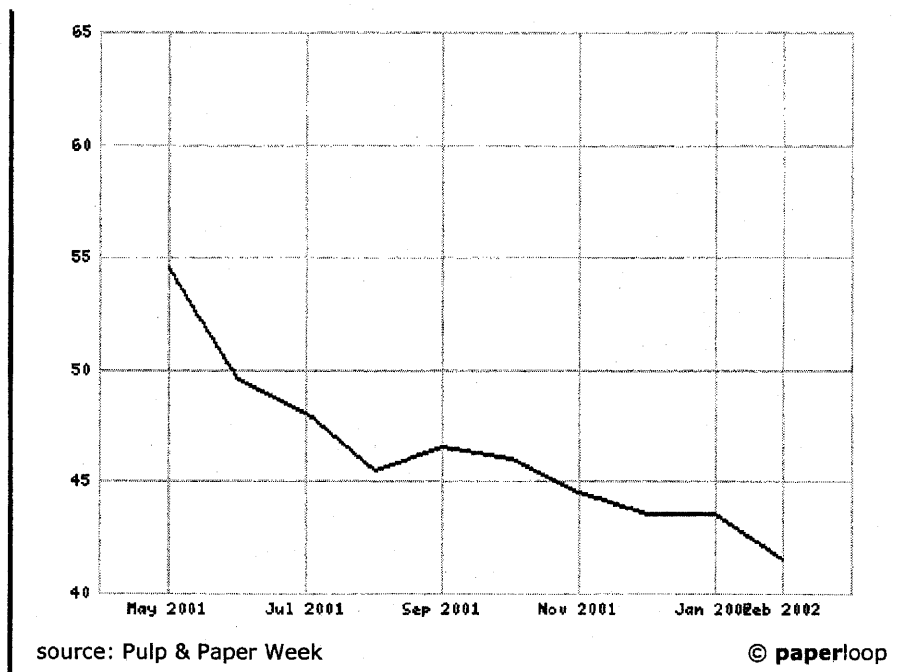
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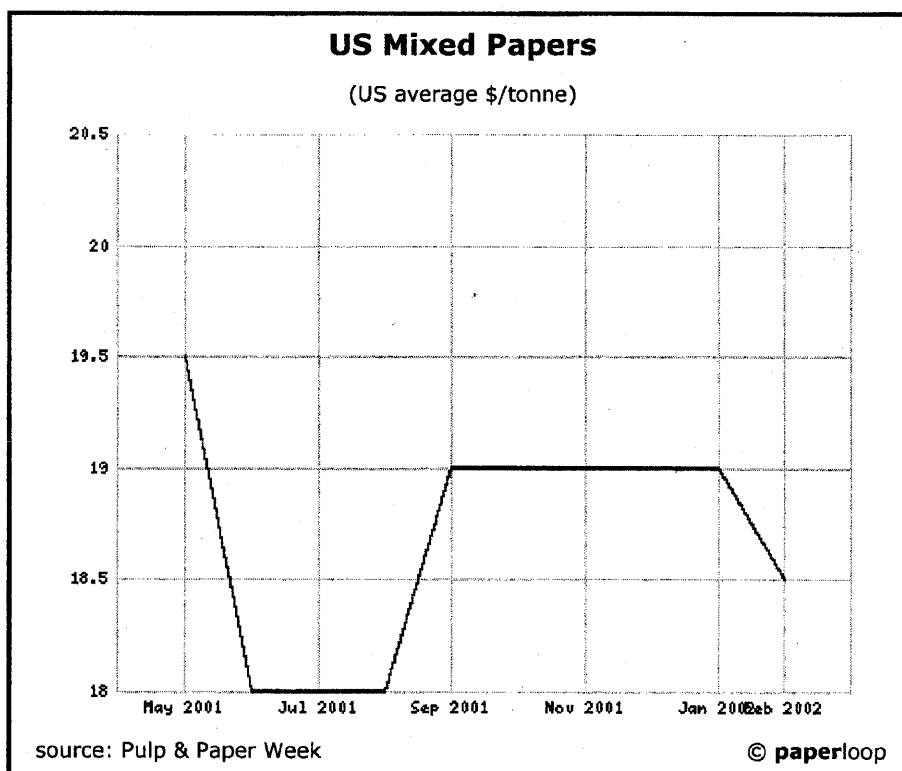


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Pulp Technology

RISI VIEWPOINT
Analysis of global paper and forest products markets

OCC: It's time to think about the supply response

By David Clapp, senior economist, RISI

BEDFORD, Mass., March 7, 2002 (paperloop.com) - For the past 18 months, we have witnessed a generally oversupplied containerboard market with only erratic periods of strength revolving around consumer inventory rebuilds.



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Consequently, despite major recovered paper-based capacity additions totaling some 3 million tonnes during this period, the poor performance in the general economy and a commitment on the part of containerboard producers to keep their output levels in line with demand have undermined consumption of recovered paper in most world regions.

Recovered paper packers in North America have had little opportunity to raise prices within this environment: When buyers decide that prices are moving up too rapidly, they have cut short their inventory rebuild in order to force prices back down, with No. 11 OCC falling to around \$40/ton. However, recent levels of purchases may be indicating that the market may soon break free of this cycle.

Currently, old corrugated demand appears to be benefiting from the normal seasonal strength of the containerboard sector. However, the strength of recent overseas orders may also be indicating that there is a shift in the motivating factor behind inventory rebuilds from taking advantage of low recovered paper prices to building stocks ahead of stronger future consumption.

As we face the prospects of stronger worldwide recovered paper consumption, the short-run supply response will play an important role in any price assessment. Specifically, does the prospect of stronger demand conditions later this year, when combined with the contracting of the North American supply chain after quarters of very low prices, have the potential to propel old corrugated prices skyward?

More importantly, are prices likely to explode to the levels last witnessed in 1995?

While normal seasonal strengthening in the containerboard sector over the next several weeks may lead to a short-term bounce in consumption, stronger economic growth later in the year will have a decidedly positive

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impact on containerboard output and, therefore, worldwide consumption of recovered paper.

Typically, consumption would begin to falter during the summer months as the containerboard industry moves through its seasonally slow period; however, we are assuming that demand will begin to pick-up during this time, freeing the hand of producers to throttle-up production.

At the same time that recovered paper consumption is being positively affected by an acceleration in economic activity, additional recovered paper demand will hit the world market as recovered paper-based capacity rises by an additional 3 million tonnes in 2002 (see table below). Led by an upturn in containerboard output, these new machines will lift recovered paper consumption to much higher levels.

Major Recovered Paper-Based Containerboard Expansions 2002
Thousand Metric Tons

Country	Company/Mill	Location	Capacity
Bulgaria	Pirinhard	Razlog	35
China	Shanying Paper	Anhui	70
China	Dongju Paper	Fujian	160
China	Jingxing Paper	Zhejiang	100
China	Tianjin Paper	Tianjin	50
China	Wan Li Da	Guangdong	150
China	Zhongshan Rengo Hung Hng	Guangdong	150
China	Guihe Paper	Shandong	80
China	Shanying Paper	Anhui	200
China	Dongguan Nine Dragons Paper	Guangdong	400
China	Lee & Man	Guangdong	350
France	Papeteries Etienne	Aries	60
Germany	Papierfabrik Palm	Wörth am Rhein	600
Germany	Julius Schulte Trebsen	Trebsen	80
Italy	Cartiera del Polesine	Loreo	140
Portugal	Gescartao	Mourao	150
United States	Solvay	Syracuse	165
Total			2940

While potential supplies of old corrugated will likely suffer from the lagged effects of weak U.S. box shipments (which were down 5.4 percent in 2001), a less obvious conclusion can be drawn concerning the ability of effective old corrugated supplies in North America to respond to our call for a strong upturn in worldwide demand later this year.

Consolidation in the pulp and paper and municipal solid waste industries and the subsequent move towards national supply accounts have provided sufficient support under North American old corrugated supplies to effectively outpace global demand needs over the past 18 months.

However, the weight of low prices has steadily reduced the incentive for many small- to medium-sized packers to effectively collect and process supplies. For example, many packers are operating with skeleton crews, allowing equipment and warehouse leases to expire, and postponing investments into new sorting and bailing equipment. In addition, few packers are stockpiling supplies in anticipation of higher prices.

The short-run supply response will become an increasingly important factor in the face of stronger demand conditions. Specifically, the ability (or inability) of small to medium-sized packers in North America to effectively respond to higher worldwide containerboard output later this year while at

the same time serving the needs of the latest crop of containerboard machines will likely mean the difference between No. 11 OCC prices climbing to around \$75/ton or skyrocketing well above \$100/ton.

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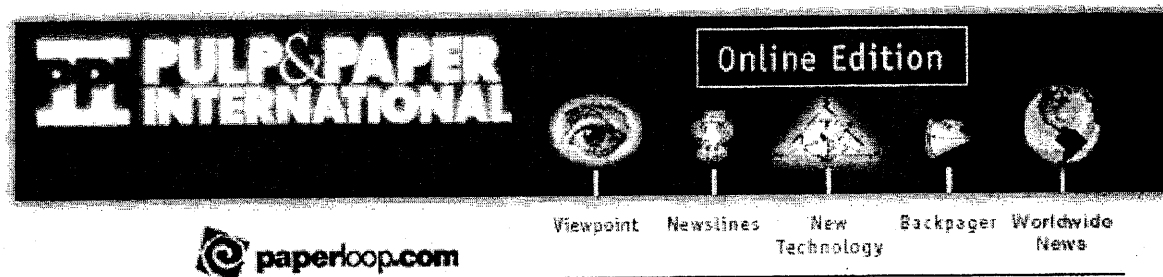
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Product	Unit	Price	Unit	Price
100% Recycled Paper	1000 lbs	\$12.50	100% Recycled Paper	\$12.50
100% Recycled Paper	1000 lbs	\$12.50	100% Recycled Paper	\$12.50
100% Recycled Paper	1000 lbs	\$12.50	100% Recycled Paper	\$12.50
100% Recycled Paper	1000 lbs	\$12.50	100% Recycled Paper	\$12.50



RECYCLING

MAY 2002

Making the most of the 'Urban Forest'



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by Graham Moore

The entire cycle is being improved: collection, sorting, repulping, end uses

Recycled fiber has been and will continue to be a major raw material for the paper and board industry. The main drivers for the use of recycled fiber are availability at an economic price; legislative and voluntary agreements resulting from environmental pressure; and continuously improving deinking and other recovered fiber processing technology.

Utilization of recovered paper reached 41.1 million tonnes in Europe in 2000, which gave a recycling rate of 49.8%. The situation is not uniform across Europe and this is explained by differences in market and industry structures, population density, transportation distances, education and attitude to recycling. The country variations in terms of collection and use means that a number of countries are exporters (of which Germany is the largest, exporting more than 2.5 million tonnes in 2000), and a number are importers (of which Austria is the largest, importing more than 600,000 tonnes in 2000).

The 56% commitment

The European paper industry is committed to increasing recycling further. A joint declaration launched by the Confederation of European Paper Industries (CEPI) and the recovered paper collectors and merchants (ERPA), the European Declaration on Paper Recovery (November 2000), states that the European paper industry is committed to having 56% of paper and board products consumed in Europe recycled by 2005.

The packaging sector is the biggest consumer of recovered paper and board in Europe with more than 60% of the total. Recovered paper use rates are also high in the newsprint and household and sanitary papers. Many European newsprint operations are already running on 100% recovered fiber. Although the printings and writing papers sector represents almost 40% of all paper and board production, it uses only limited volumes of recovered paper.



Europe is committed to having 56% of paper and board products consumed in Europe recycled by 2005.

Photo courtesy Voith Paper Fiber Systems

This sector still relies mostly on virgin pulp. The recovery of paper in the US has increased steadily since 1990. More than 49 million tons of paper was recovered for recycling during 2000, which gives the US a recovery rate of 48%. Containerboard has the highest recovery and utilization by grade.

Canada has become a leading importer of recovered fiber, which for the most part is sourced from the US. It typically uses around five million tonnes/yr as part of the furnish for new products. Recycling is an expensive option for Canada as the paper industry was developed and built around virgin fiber use and most of the mills are located far from sources of recovered paper. Its relatively low population and large land mass add to the expense.

The Japanese paper industry used almost 18 million tonnes of recovered fiber in 2000, which accounted for 57.2% of the fibre used. The corrugated sector is the largest user. Shifts in Japan's environmental policies have resulted in the creation of a recycle-orientated society. Changes in existing packaging laws in April 2000 resulted in collected volumes for recovered paper exceeding internal recycled-based capacity.

Huge demand in China

The growth and expansion of the Chinese paper industry has fuelled a huge demand for recovered fiber. Such demand is being satisfied by imports that reached 5.8 million tonnes in 2001. The primary factor driving this sustained growth in imports has been the enormous investment in large, modern paper machines that are using recovered paper as the primary furnish. Corrugated based mills have shown the greatest growth in volume.

Recovery of waste paper and board continues to attract political and social attention in North America and Western Europe. For example, the European Commission in conjunction with governments of the Member States is introducing a range of measures to implement such policies and setting waste diversion and recycling targets that have to be met. Such moves will mean that recovery will continue to be ahead of utilization and the already large export surplus of North America is still forecast to expand. Some of the key countries within Western Europe will continue to develop and enlarge their export markets.

China and other countries within Asia will have a soaring recovered fiber deficit, as local paper and board production continues to develop and expand. They will not be able to find sufficient domestic collection for their raw material needs. It has been estimated that an additional four million tonnes will be required through to 2005. North American and European collection operations will further develop to service this market need. Imports of

packaging grades are expected to grow the most - with mixed paper and board being sourced alongside old corrugated containers.

Improving collection methods

Increasingly, however, as recycling targets grow, there are determined attempts to improve the collection of material from households. Local authorities are the key mechanism for collection of household waste. In the UK, for example, there are three principal ways in which local authorities collect or receive recyclable materials:

- * curbside collection schemes - where material is collected directly from the householder;
- * 'bring' schemes to which the public can bring their recyclables to recycling banks;
- * civic amenity sites provided by local authorities for the reception of excess household and garden waste.

The use of curbside collections is well established globally. They are for the most part still in their infancy in the UK. While they are generally referred to as being multimaterial collection schemes, paper tends to dominate the material collected.

The 'bring' schemes have traditionally been the single most important route by which household waste in the UK is recycled. Paper, predominantly newspapers, is the major material recycled.

Recycler responsibility

For the paper industry to be able to effectively use any recovered paper arising from such collection routes, then the material must not be mixed with any other household material and should be sorted at source by the householder. Such requirements require effective collection and segregation systems to be provided by local authorities.

However, recovered paper processing is moving from a highly source separated collection and manually separated system to one involving mixed incoming streams and state-of-the-art manufacturing techniques. To improve the economics of the operation, wastepaper collectors are now picking up large quantities of mixed paper and delivering them to sorting facilities for processing into graded paper stock.

To handle these new householder and commercial fiber streams, sorting facilities have to change. Progress has been made using mechanical separation equipment, such as special disc screens. However, such technologies are limited to the mechanical properties of paper such as size and weight. To meet this challenge research and development effort has been directed at developing high-speed optical based systems. One such system, the PaperSort system is now commercially available.

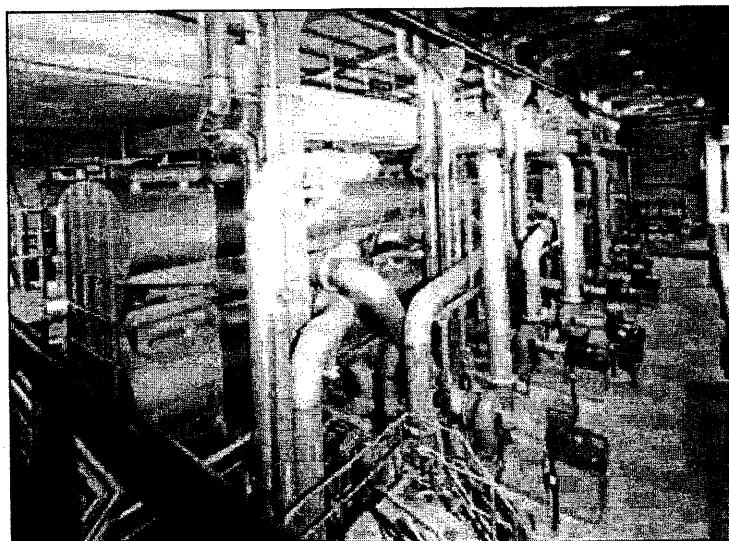
The continuing increase in the use of recovered fiber in newsprint and other printing and writing grades has seen a steady stream of new deinking plants and rebuilds around the world. It has also prompted development and refinement of the deinking process. These have included dual loop water circuits; high speed disc dispersion and pre and post flotation.

Technology begets technology

The continued developments in printing technologies have meant the arrival of new inks and toners in the recycling stream. To counter some of the potential adverse effects of such materials, research has enabled alternative resins to be developed that are more easily deinked.

The variability of incoming raw material and changes arising from seasonal and climatic variations have all been identified as factors that can affect the efficiency of deinking operations. Manipulation of deinking conditions and chemistry can limit such effects. Further minimization can be achieved through the design and flexibility of the deinking hardware. New systems such as Metso's OptiBright technology and developments from E & M Lamort are examples of developments of new deinking hardware. Future projections for deinking indicate that:

- * Deinking will be further developed and used for newsprint manufacture world- wide, particularly in Asia. Older deink- ing lines in Europe and elsewhere will be continually upgraded and expanded.
- * Continuing developments will enable further use of recovered fiber in mechan- ical fiber based publication grades.
- * Tissue grades will continue to use deinked pulp. The market-led require- ments of properties such as softness and high absorbency may prevent the universal use of recovered fibers in all grades.
- * The use of recovered fiber in woodfree printing and writing grades is not going to increase much above existing levels unless there is legislative intervention.



Developing technology helps maximize recycled fiber properties. This is a Voith Paper Eco Cell pre- and post-flotation deinking system in compact design at a 600 tonne/d DIP line

The final end use and market acceptance of a product depends on its fitness for purpose and cost. The quality of recycled fiber pulps is a function of the recovered paper grades, the processing techniques applied and the operating mode of the processing plant. Depending on their end use, recycled fiber pulps are subject to certain strength requirements and may only contain controlled amounts of filler. Recycled furnishes need to be free of adhesive contaminants (stickies) and for graphic paper end uses need to have appropriate optical properties.

Currently such criteria are met and recovered fiber and the resultant recycled fiber containing products have market acceptance in many grades. Such acceptance may however become increasingly difficult to meet as:

- * end use demands become more stringent;
- * incoming raw materials become more difficult to recycle;
- * fibre properties deteriorate;
- * a combination of two or more of such factors.

Recyclability will become increasingly important to ensure the increasing use of recovered

fibers. It will need to be considered throughout the development process of new paper products to ensure that the recycling potential of the product is maximized.

The recycling of fibers is not new and as such the concerns on fiber quality and properties on recycling have been voiced as long as paper has been recycled. However, with the increasing trend to recover and use more recycled fibers the issues related to fiber deterioration and quality have taken on increased momentum. It is widely accepted, but not proven, that there is a maximum number of times a recycled fiber can be recycled. This number is strongly dependent on the fiber origin and morphology. However continual enhancements in recycling technologies will see the maximum rise. In addition, the papermaker can apply a number of processes to the recycled material that maximize the fiber properties and hence its papermaking potential. These include refining, fractionation, chemical reprocessing and high consistency pulping.

Recycled fiber has been an integral part of papermaking for many years. Many papermaking operations having relied on it as the sole or major part of the papermaking furnish. It has assumed even greater importance in recent times as the world has become environmentally conscious and a greater emphasis has been put on recycling. The material is fast becoming a globally traded commodity with recycled fiber rich countries developing important export businesses around its trade.

The Far East and notably China are currently eager recipients of the material to service rapidly expanding papermaking industries. Packaging, particularly old corrugated containers, is the highest traded material. Such changes in demand and requirements have highlighted issues that require attention from the various players in the supply chain if the utilization of the 'Urban Forest' is to be optimized. Amongst the most notable are:

- * the development of worldwide specifications for recovered paper;
- * the development of effective collection and sorting systems;
- * improvements in market acceptability of printings and writings paper containing recycled fiber;
- * effective communication between all parties involved in the supply chain.

Graham Moore is strategic consultancy manager at Pira International. This article is based on aspects of Pira International's on-going Strategic Futures Program of research. This exclusive program aims to assist Pira Members in their strategic planning by providing information and insight on a wide variety of issues across the sectors of paper, packaging and printing. Further details can be obtained by emailing graham@pira.co.uk

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China's threat to impose tariffs on US recovered paper imports worries market

SINGAPORE, May 30, 2002 (paperloop.com) - The Chinese recovered paper market has been spooked by reports that China has threatened to impose tariffs on imports of US recovered paper, according to several international traders and suppliers.



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China submitted a proposal to the World Trade Organization (WTO) on imposing tariffs on imports of recovered paper from the US, according to the Chinese government's official media outlet, Xinhua News Agency. Sources said that China's move came in retaliation against US tariffs on steel imports.

China currently levies no import tariffs on US recovered paper, but is threatening to slap a 24% duty on shipments, according to several international traders and suppliers. Sources reported the threat has provoked panic in the Chinese recovered paper market, even though the move is only at the submission stage and the WTO has not yet reacted to the proposal.

One major agent said that trade in US recovered paper in China has all but ground to a halt as buyers adopt a "wait and see" attitude. According to the source, buyers are concerned they will be adversely affected and forced to bear the extra cost if tariffs are imposed. Another contact reported that some customers are worried that China will not wait for the WTO's decision and will go ahead and impose the punitive tariffs anyway, meaning orders that are placed now could be affected.

According to a number of traders, Chinese buyers are now relying more heavily on European and Japanese supplies of recovered paper to meet their needs, while US suppliers are offloading their recovered paper in other Asian markets.

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May 29, 2002- [Chinese threaten special tariffs on recovered paper if U.S. steel tariff compensation not given](#)

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India on the road to becoming a major buyer of recovered fiber

BRUSSELS, June 4, 2002 (paperloop.com) - Indian demand for recovered fiber is tipped to burgeon by 2005, as the country's paper industry expands while domestic supplies of raw materials dwindle. The prediction was made by ITC Bhadrachalam Paperboards Division's general manager, Jogarao Bhamidipati, at the Bureau of International Recycling (BIR) World Recycling Conference in Monte Carlo, Monaco, on May 31, 2002.

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"The Indian economy is on the threshold of a giant leap," said Bhamidipati, without making any reference to the current political crisis with Pakistan. "But there is an acute shortage of raw materials [for the paper industry] so the import market will be very large in five to 10 years' time," he added.

Bhamidipati revealed that India consumed 5.2 million tonnes of paper and board last year, but said this figure is predicted to grow to 5.5 million tonnes in 2002 and 6.3 million tonnes in 2004. This represents a growth rate of some 6.5%/yr, although certain sectors, such as duplex board and specialty paper, are tipped to grow at a rate of 8%/yr.

India currently consumes just 5 kg per capita/yr of paper and board compared to the global average of 50 kg per capita/yr. "[But] with over a billion in population and literacy levels rapidly increasing, with better educational facilities and a thriving silicon valley industry, India is expected to join the large paper and board consuming countries of the world in the near future," said Bhamidipati. The general manager predicted that per capita consumption will hit 20-25 kg/yr by 2008.

The lion's share of India's paper and board demand is supplied by the nation's 515 mills, which had a total output of some 5.1 million tonnes last year. The shortfall was met by importing some 180,000 tonnes of paper, mainly specialty grades. Bhamidipati predicted that the bulk of the future increase in demand will be met by internal capacity expansion, although some 395,000 tonnes of paper will still be imported in 2004.

Government plans to ease import duties on paper making equipment, chemicals and raw materials, including recovered fiber, will help Indian paper producers to spread their wings. "The import tariffs on coating and sizing chemicals, for example," said Bhamidipati, "are currently 67%, compared to 12% in the rest of southeast Asia. India will also drop to 12% in the near future."

But while India's paper industry expands, the country's raw material resources have been fenced off for good. Rapid urban and agricultural development has left India with just 629,000 km² of forest cover in a

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country that spans almost 3.3 million km² in total. "The National Forest Policy has indicated that no forest wood supply would be forthcoming for the paper industry," said Bhamidipati, "If you want permission to build a new mill, you have to commit to using nonwood resources."

Many of India's paper producers are already committed to recovered fiber, and Bhamidipati believes that many more will have to follow suit. Of the existing 515 mills, 36% use agricultural residue such as bagasse, rice straw and jute, while 32% use recovered fiber as furnish. India's own fiber recovery is hamstrung by low collection rates and old technology. Many mills operate 50 year-old machines that cannot sift out sticky and non-sticky contaminants, leading to recovered fiber wastage.

Last year, India experienced a "stupendous" fiber shortfall of 1.7 million tonnes, but by 2010 this figure is set to hit 3.6 million tonnes. "India is opening its gates to the world and there will be a lot of recovered fiber demand," concluded Bhamidipati.

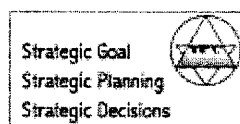
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May 31, 2002 - Non-Japan Asia tipped to emerge as new top dog in recovered fiber markets, BIR predicts

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Non-Japan Asia to emerge as new top dog in recovered fiber markets, BIR predicts

MONTE CARLO, May 31, 2002 (paperloop.com) - The Far East is set to become the leading force in recovered paper consumption growth over the next three years, as the North American and West European markets reach maturity. Overall, the global growth rate of recovered fiber usage will fall by 2005, but actual demand will continue to rise year on year.



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These trends were predicted by Edward Walker of the UK's Edward Walker Consultants in his keynote address at the Bureau of International Recycling (BIR) World Recycling Convention held in Monte Carlo, Monaco, May 29-31. "The baton of growth is well and truly being passed to Asia and a new world order is emerging in the recycling business," said Walker, "China and the Far East will increasingly dictate developments in the global recovered fiber business as well as world trade patterns."

World consumption of recovered fiber grew by 5.8%/yr during the 1990s to reach some 160 million tonnes in 2002. While volumes will continue to increase over the next three years to a level of some 185 million tonnes/yr by 2005, the annual growth rate is tipped to fall to 4.1%, according to Walker. The decline in growth will be led by North America, western Europe and Japan (the notable exception to the Asian trend), which together account for almost two thirds of present global recovered fiber consumption.

Several factors are contributing to the slowdown in "the big three" regions. The growth rate of paper and board consumption has begun to fall. During the 1990s global consumption of paper and board grew by an average of some 3%/yr. But the rate is set to dip to 2.1% in the period 2000 to 2005 due to a maturing newspaper market and government pressure to reduce packaging waste, through, for example, a move toward lightweight packaging options. "In some important parts of the world demand for paper and board is now leveling out, if not declining in some cases," said Walker.

While the US currently accounts for over a third of world recovered fiber consumption, the country will contribute a mere 2.1 million tonnes to the 21 million tonnes of new paper and board capacity investments slated between 2002 and 2005. The Japanese demand for waste-based containerboard and newsprint will grow only "marginally" in the next three years. The fall in growth will be at its mildest in western Europe, where Walker believes that there is still scope for newspapers to increase their pagination. There are also a number of new waste-based containerboard projects in the pipeline. "But the growth in demand in western Europe is slowing," he cautioned.

Walker also highlighted a push toward a lower proportion of recovered fiber usage in the furnish of paper and board producers in developed markets.

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"Recycled fiber content levels are getting nearer and nearer to the optimum under present conditions of recycling and paper making technology," he said.

Complicating the process

But producers have also been turned off an increased usage of recovered fiber for other reasons. The growth in collection activity in the key regions has brought about a deterioration in recovered fiber quality. Paper and board manufacturers are having to fork out for new recovered paper processing technology in order to maintain the integrity of their raw materials. Many producers are also being forced to mix in higher amounts of virgin fiber pulp into their furnish.

The European, North American and Japanese tissue markets have also experienced a swing toward bulkier and softer products that require virgin fiber pulp as the main raw material.

"[Meanwhile] the continuing high level of investment [in paper and board production] in the Asia Pacific region catches the eye," said Walker, highlighting China as a "spectacular" example. China has already unveiled capacity increases of 6.7 million tonnes by 2005. "Additional investment plans are still being announced and more will emerge," indicated Walker.

The Asian situation was fleshed out by BIR Paper Division president, Dominique Maguin. Asian demand for paper and board "exploded" by 33% between 1996 and 2000, making the region the world's number one paper and board consumer, he said. In 2000, Asia accounted for almost 58 million tonnes of the total 323 million tonnes of world paper and board consumption, placing it ahead of Europe (44 million) and North America (41 million).

All the signs indicate that Asia will outpace the pack still further in the coming years. Chinese consumers currently use just 25 kg of paper and board per person/yr (in India the rate is 5 kg) compared to 350 kg in the US. With a combined population of some 2.5 billion people, the potential for growth in India and China alone is staggering.

The Chinese government has further boosted the country's need for recovered fiber by slashing timber quotas in reaction to deforestation-related floods. The Chinese state has also committed to phase out the use of straw pulp in packaging production by 2004, due to toxic waste produced in the pulp-making process.

Today, China itself is already the world's third largest consumer of recovered fiber, behind the US and Japan. In 2000, the country imported 3.5 million tonnes of recovered fiber, but in 2001 the figure leapt up to 6.5 million tonnes. "China's consumption of recovered paper will continue to rise," said Maguin. "By 2006, China will import between 20 and 22.5 million tonnes of recovered paper each year," he added.

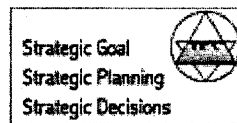
The result of these trends is that, "North America will have a rapidly growing surplus, but so will both western Europe and significantly Japan, which has moved from being a net importer to becoming a significant

exporter of recovered fiber," said Walker. The world's hungriest consumers will transform into the world's leading suppliers of waste-based raw materials.

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U.S. OCC prices rise a near-record \$36/ton from May's level

SAN FRANCISCO, June 12, 2002 (paperloop.com) - U.S. pricing for old corrugated containers (OCC) jumped at their highest rate since the infamous jumps in price that occurred in 1995, rising \$36/ton this month from May's level.



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Prices for OCC across the country were running at upwards of \$95-\$125/ton, f.o.b. seller's dock, with containerboard mills in some parts of the country scrambling to build inventory and secure tonnage not only for the coming week but also looking ahead for the Fourth of July holiday.

The last time the U.S. average price for OCC increased more than \$36/ton was in March 1995, when the price jumped \$35/ton, and in February 1995, when the price bumped up \$40/ton, according to the Pulp & Paper Week Price Watch.

Compared with last month's levels, OCC last week out of New York was up \$42/ton to \$100-\$105/ton; OCC out of Chicago was up \$40/ton to \$95-\$105/ton; OCC out of Atlanta was up \$35/ton at \$90-\$100/ton; OCC out of Texas increased \$32/ton to \$100-\$110/ton; and OCC out of California was up \$37/ton at \$120-\$125/ton.

In three months, the average price of U.S. OCC has increased \$67/ton, from \$37/ton in March to \$105/ton this month, its highest level in two years. The biggest jump was in California, where the price of OCC increased \$75-\$80/ton in three months. The smallest increase was in Atlanta, nearest to where most U.S. containerboard mills are located, where OCC prices increased \$57/ton in the last three months.

Two years in a row of negative U.S. box shipment growth and the worst two years of U.S. box performance in 26 years has left the supply line thin. When buyers in China, fearing a possible West Coast port strike, began buying aggressively the last two to three months, and five different U.S. containerboard mills ran low on OCC or had equipment problems that required more OCC than usual, prices rose first in April.

U.S. OCC exports to Mexico were at \$100-\$110/ton, while dock prices in the East for OCC to Asia was at \$125/ton, and at \$130-\$135/ton to Asia from California ports, contacts said at the end of last week.

Almost every buyer and seller contact, said the drive-up was mainly due to the increase in export demand, namely from China. This left U.S. mills, most without much inventory or those with just-in-time buying habits, to chase the export price for tonnage.

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The pressure up on pricing for the largest-volume U.S. recovered paper also impacted other grades, as 75% of the materials tracked across five U.S. regions increased in price this month, compared to last month.

The main price-up movers were mixed paper, sorted office paper (SOP), coated book stock (CBS), old newspapers No. 8, and hard white envelope cuttings (HWEK).

Mixed paper was being picked up by some containerboard mills as a low-priced extender for the high-priced OCC, contacts said. Mixed paper in the U.S. was running as high as \$60/ton on spot deals last week in the East, but the standard mill pricing was between \$25-\$40/ton across the country.

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RISI VIEWPOINT

Analysis of global paper and forest products markets

OCC Prices: When Will the Ride End?

by David Clapp, Senior Economist, RISI

BEDFORD, Mass, June 20, 2002 (paperloop.com) - Prices for most recovered paper grades have climbed rapidly over the past three months; however, nowhere is price inflation more dramatic than for No. 11 OCC which is up 170% from last March's low of \$39 per ton ([see figure](#)). Now the question is, when will old corrugated prices begin to stabilize? The answer to this question depends upon several key factors, both economic and political. First, however, we need to know why old corrugated prices jumped.



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To set the stage, almost two years of low corrugated box shipments drastically reduced potential supplies of U.S. old corrugated in early 2002. At the same time, expectations of an extended economic downturn (reinforced by the events of September 11th) and low prices for old corrugated encouraged containerboard producers to hold down stocks. However, this most recent inventory reduction proved to be more widespread as the weight of low prices also caused many packers to also reduce their inventories. Consequently, both producers and suppliers maintained drum-tight inventories going into 2002; a year in which three million metric tons of new recovered paper-based containerboard capacity is scheduled to hit the market.

The old corrugated market began to heat up in February when export demand came in much stronger than most U.S. West Coast containerboard producers anticipated, setting off a scramble for old corrugated. However, with inventories stretched thin, packers were unable to fully respond to the increased demand. This provided the fuel to launch export prices skyward. Meanwhile, growing indications of an economic recovery caused producers, both in the U.S. and Europe, to worry that they would not have enough inventories to meet demand. This extended the rally in demand to the domestic market.

Labor and political factors have also played a role in driving up old corrugated prices. The uncertainty brought about by a potential work slowdown by the International Longshore and Warehouse Union (ILWU) and China's recent threat of a 24% duty on U.S. supplies of recovered paper in retaliation against U.S. tariffs on steel imports added fuel to the fire. Chinese producers, not knowing the final outcome of either event, but fearing the worst, attempted to build inventories, extending the rally into June.

Now, back to our original question, when will old corrugated prices begin to

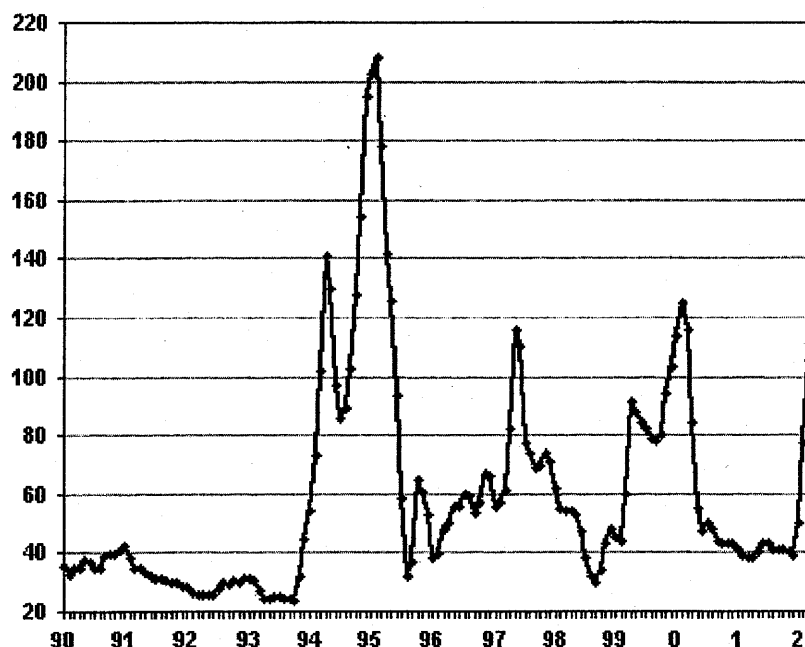
stabilize? While the current price levels are providing an incentive for opportunist suppliers to step up their collection efforts, sourcing efforts in the Northern Hemisphere will prove increasingly difficult as people begin to drift out of the metropolitan areas and to their vacation retreats during July and August. Still, adjustments are being made in response to higher old corrugated prices. Smaller producers in China appear to be backing out of the U.S. and European markets, turning their attention instead towards lower-cost Japanese OCC while stepping up domestic collection efforts. Still others are shifting to nonwood pulp, utilizing lower-quality recovered paper grades and running their integrated virgin pulp lines harder. Turning our attention to the containerboard sector in the U.S. and Europe, we are calling for a modest slowdown in containerboard production later this year as inventories shift back towards a neutral stance throughout the world economy.

Our view is that adjustments in response to higher old corrugated prices will combine with the prospects of lower containerboard production to push old corrugated demand back in line with supply in the third quarter. This shift in the demand/supply balance will likely lead to downward pressure on prices; however, the short duration of the period of lower demand and new additions to the world recovered paper capacity base will work to support prices far above last winter's lows.

A wildcard for the old corrugated market centers upon the labor talks between the ILWU and the Pacific Maritime Association (PMA). If negotiations fails to yield a signed contract by July 1st, longshoremen will likely attempt work slowdowns that may result in a lockout if shipping lines and terminal operators maintain a hard-line stance. Under this scenario, we would likely encounter lower prices as supplies are backed-up along the U.S. West Coast.

Another important risk to the forecast is China's threat of a 24% duty on U.S. supplies of recovered paper. Currently, a WTO panel is being formed to review the legality of the U.S. steel tariff. While we will likely have to wait several months for a decision from the yet-to-be-formed panel, the U.S. Department of Commerce has begun to draw up a list of steel products that will be excluded from the tariff. This raises another question: will the list be long enough to appease the Chinese sufficiently to reduce (or even eliminate) the proposed duty on recovered paper?

U.S. No. 11 OCC
Dollars per Short Ton



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RISI VIEWPOINT

Analysis of global paper and forest products markets

Chinese Capacity Expansion: Boxboard Joins the Party

by Beth Snell, Vice President, RISI

BEDFORD, Mass, July 4, 2002 (paperloop.com) - Chinese paper and board capacity has been expanding rapidly over the last several years. This flood of expansion began in the graphic paper grades, and new machines are coming on line in droves this year in containerboard. The rapid increase in capacity is being driven by expectations of strong demand growth coupled with greater access to financing and a desire on the part of the government to increase China's self-sufficiency in paper and board. It really was only a matter of time before we would see a wave of boxboard capacity expansion in China. With the recent flurry of announcements-4 new machines with capacity totaling 1.3 million tonnes due in the second half of 2003-it seems that time has arrived.



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A review of the data underscores the huge increase in Chinese capacity that has occurred since 1998 across all major grades and the sharp drop in net import shares (see table below). For example, our data show a 570,000-tonne increase in newsprint capacity in 1999-2001, as seven machines were added during this time. Partly as a result of this expansion, newsprint's net import share of demand dropped from 19% in 1998 to 7% in 2001 (net imports also were affected by the sliding-scale tariff and anti-dumping duties implemented in 1998). Printing and writing paper capacity also expanded sharply during this period and the net import share of coated printing and writing paper plunged sharply, from 77% in 1998 to 38% in 2001. Uncoated woodfree paper imports also retreated and China became a net exporter of this grade in 2001. On the containerboard side, a wave of capacity investment began in 2000, but the real flood is set to hit in 2002-13 machines with 2.1 million tonnes of capacity are due to start over the course of this year (over half of these are already on line).

The expansion in Chinese boxboard capacity largely began in 2001 and is continuing this year. Last year five machines came on line adding 340,000 tonnes of capacity and this year another five with a total of 410,000 tonnes will start up. Many of these machines are relatively small (annual capacity of about 50,000 tonnes) and none of them were larger than 150,000 tonnes. Still, these increases have been contributing to the stabilization of Chinese boxboard net imports and a drop in its net import share. However, China currently is still fairly dependent on imports to meet its demand for boxboard, which might help to explain why this next round of expansion is being planned. Of note is the larger size of the machines coming on line next year.

One major implication of these capacity increases is that the situation does not look good for Asian boxboard exporters that depend on the Chinese market. First, we estimate that in 2001 about 45% of the boxboard exports from South Korea, Taiwan, and Indonesia went to China. Thus, loss of market share in China will hurt these producers and they will need to look for alternative destinations. Furthermore, there is already a problem with excess boxboard capacity in Asia. In fact, these producers have been taking downtime during the first half of the 2002 in an effort to better balance demand with supply. Non-Asian boxboard producers also will be affected if they produce boxboard grades that will directly compete with the output from the new capacity (niche markets requiring higher strength boards are less likely to be affected). A second important implication is that these boxboard expansions will further increase China's growing fiber needs.

Chinese Capacity Increases and Net Import Shares by Grade

Capacity Increase

	1999-2001		2002-2004		Net Import Share of Demand		
	Tonnage	Percent	Tonnage	Percent	1998	2001	2004
Newsprint	566	46%	761	42%	19%	7%	3%
Coated P&W	1112	239%	1488	94%	77%	38%	14%
Uncoated P&W	1394	14%	519	5%	5%	-1%	1%
Containerboard	1542	23%	2575	31%	27%	21%	16%
Boxboard	775	33%	1920	62%	47%	35%	24%

Notes: Tonnage figures are in thousands of metric tons. Percent is the increase in capacity over the entire three-year period in percentage terms.



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Annexe J

Définition des termes

ONP	Old News Paper	Vieux journaux
OCC	Old Corrugated Containers	Vieux cartons
WP	Waste Papers	Papiers rebuts
MP	Mixed Papers	Papiers mélangés
OWP	Office Waste Paper	Papiers rebuts de bureaux
MOW	Mixed Office Waste	Papiers rebuts de bureaux mélangés
OMP	Office Mixed Paper	Papiers de bureaux mélangés
SOP	Sorted Office Paper	Papiers de bureaux triés

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093-2F16 (60et)



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Annexe K

Risi North American Graphic Paper Forecast

Table A2

Canadian Recovered Paper Demand Summary

12 septembre 2002

Table A2
Canadian Recovered Paper Demand Summary
 Thousand Short Tons

	Annual																
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TOTAL RECOVERED PAPER																	
Consumption at Paper & Board																	
Mills	5,695	5,475	5,810	6,129	6,360	6,508	6,438	6,536	6,760	7,071	7,382	7,248	7,467	7,816	8,171	8,360	8,157
%CH	1.4	-3.9	6.1	5.5	3.8	2.3	-1.1	1.5	3.4	4.6	4.4	-1.8	3.0	4.7	4.5	2.3	-2.4
Exports	696	603	729	797	833	829	780	779	839	948	974	911	881	932	1,047	1,071	1,022
%CH	25.6	-13.4	21.0	9.3	4.5	-0.4	-5.9	-0.1	7.7	12.9	2.8	-6.5	-3.3	5.7	12.3	2.3	-4.6
Imports	2,517	2,384	2,581	2,730	2,825	2,849	2,752	2,746	2,854	3,037	3,151	3,013	3,041	3,180	3,376	3,431	3,270
%CH	-0.4	-5.3	8.3	5.8	3.5	0.8	-3.4	-0.2	3.9	6.4	3.8	-4.4	0.9	4.6	6.2	1.6	-4.7
RECOVERED NEWSPAPER																	
Consumption at Paper & Board																	
Mills	2,208	2,085	2,173	2,223	2,265	2,268	2,176	2,131	2,165	2,225	2,282	2,154	2,195	2,272	2,346	2,331	2,191
%CH	4.3	-5.6	4.3	2.3	1.9	0.1	-4.1	-2.0	1.6	2.8	2.5	-5.6	1.9	3.5	3.2	-0.7	-6.0
Exports	75	64	72	77	80	79	73	72	77	84	85	79	77	80	87	88	83
%CH	41.8	-14.0	11.9	7.1	2.9	-1.2	-6.6	-1.3	5.8	9.8	1.1	-6.7	-3.4	3.8	9.4	0.9	-5.7
Imports	1,237	1,175	1,257	1,300	1,326	1,315	1,240	1,204	1,234	1,295	1,326	1,230	1,231	1,277	1,344	1,334	1,234
%CH	-1.6	-5.0	6.9	3.4	2.0	-0.9	-5.7	-2.9	2.5	5.0	2.4	-7.3	0.1	3.7	5.2	-0.8	-7.5
RECOVERED CORRUGATED																	
Consumption at Paper & Board																	
Mills	1,931	1,850	1,984	2,129	2,239	2,315	2,332	2,426	2,526	2,659	2,798	2,817	2,910	3,054	3,211	3,343	3,324
%CH	-1.1	-4.2	7.2	7.3	5.2	3.4	0.7	4.0	4.1	5.3	5.2	0.7	3.3	5.0	5.1	4.1	-0.6
Exports	231	199	255	276	289	287	269	269	289	326	335	313	301	319	359	367	348
%CH	4.6	-13.8	27.7	8.6	4.4	-0.6	-6.2	-0.1	7.4	12.9	2.9	-6.8	-3.7	5.8	12.6	2.2	-5.0
Imports	542	488	535	577	607	620	611	628	658	705	738	727	735	771	823	856	832
%CH	5.5	-9.8	9.6	7.8	5.3	2.0	-1.3	2.8	4.7	7.2	4.7	-1.5	1.2	4.8	6.8	4.0	-2.8
PULP SUBSTITUTES AND HIGH-GRADE DEINKING																	
Consumption at Paper & Board																	
Mills	816	808	852	894	932	959	962	980	1,018	1,064	1,101	1,096	1,127	1,175	1,224	1,260	1,250
%CH	-1.3	-0.9	5.4	4.9	4.2	3.0	0.3	1.9	3.9	4.5	3.5	-0.5	2.9	4.3	4.2	2.9	-0.7
Exports	81	70	78	85	88	87	82	82	88	99	101	95	91	96	108	110	105
%CH	71.2	-13.3	11.5	8.9	4.0	-1.3	-6.1	-0.4	7.7	12.9	2.1	-6.6	-3.7	5.6	12.2	2.2	-5.1
Imports	460	447	482	511	533	543	536	541	567	604	624	610	616	643	683	701	685
%CH	-3.7	-2.9	8.0	6.0	4.3	1.9	-1.5	0.9	4.8	6.7	3.3	-2.3	1.0	4.4	6.1	2.8	-2.4
MIXED PAPERS																	
Consumption at Paper & Board																	
Mills	739	732	801	883	924	966	968	998	1,051	1,122	1,201	1,181	1,235	1,314	1,389	1,426	1,392
%CH	2.8	-1.0	9.3	10.3	4.7	4.5	0.2	3.1	5.2	6.8	7.0	-1.6	4.5	6.5	5.7	2.7	-2.4
Exports	310	269	325	358	376	376	355	356	386	439	452	425	412	437	493	506	486
%CH	32.5	-13.1	20.6	10.3	5.1	0.0	-5.6	0.3	8.4	13.6	3.1	-6.1	-2.9	6.1	12.7	2.6	-4.0
Imports	279	273	307	342	358	371	365	373	396	432	462	446	458	489	527	540	519
%CH	-0.8	-1.9	12.1	11.5	4.8	3.5	-1.5	2.2	6.2	9.1	6.9	-3.4	2.7	6.7	7.7	2.6	-3.9

Consumption data includes CPPA estimates of non-reporting companies.
 Import data is sourced from the CPPA while export data is sourced from
 Statistics Canada.

Table A1
U.S. Recovered Paper Demand and Price Summary
 Thousand Short Tons

Annual

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
RECOVERED PAPER DEMAND (THOUSAND SHORT TONS)																	
TOTAL RECOVERED PAPER																	
Consumption at Paper & Board																	
Mills	36,775	35,867	36,887	38,097	39,364	40,349	40,482	41,524	42,833	44,185	45,354	44,882	46,000	47,641	49,236	50,243	49,590
%CH	-0.7	-2.5	2.8	3.3	3.3	2.5	0.3	2.6	3.2	3.2	2.6	-1.0	2.5	3.6	3.3	2.0	-1.3
Exports	10,689	10,706	11,931	13,156	13,828	13,801	13,020	13,033	14,028	15,762	16,399	15,372	14,881	15,769	17,784	18,299	17,457
%CH	29.0	0.2	11.4	10.3	5.1	-0.2	-5.7	0.1	7.6	12.4	4.0	-6.3	-3.2	6.0	12.8	2.9	-4.6
RECOVERED NEWSPAPER																	
Consumption at Paper & Board																	
Mills	6,019	5,717	5,779	5,773	5,863	5,916	5,880	5,883	5,935	5,954	5,960	5,766	5,819	5,870	5,906	5,892	5,696
%CH	8.7	-5.0	1.1	-0.1	1.6	0.9	-0.6	0.0	0.9	0.3	0.1	-3.2	0.9	0.9	0.6	-0.2	-3.3
Exports	2,748	2,556	2,810	2,942	3,013	2,987	2,830	2,790	2,901	3,106	3,112	2,938	2,855	2,924	3,121	3,133	2,982
%CH	14.7	-7.0	9.9	4.7	2.4	-0.9	-5.3	-1.4	4.0	7.1	0.2	-5.6	-2.8	2.4	6.8	0.4	-4.8
RECOVERED CORRUGATED																	
Consumption at Paper & Board																	
Mills	19,709	19,248	19,850	20,613	21,313	21,884	21,956	22,586	23,394	24,193	24,973	24,729	25,376	26,365	27,381	28,017	27,571
%CH	-3.7	-2.3	3.1	3.8	3.4	2.7	0.3	2.9	3.6	3.4	3.2	-1.0	2.6	3.9	3.9	2.3	-1.6
Exports	2,916	3,235	3,779	4,110	4,306	4,291	4,029	4,030	4,331	4,893	5,126	4,757	4,552	4,885	5,661	5,887	5,559
%CH	23.8	10.9	16.8	8.8	4.8	-0.3	-6.1	0.0	7.5	13.0	4.8	-7.2	-4.3	7.3	15.9	4.0	-5.6
PULP SUBSTITUTES																	
Consumption at Paper & Board																	
Mills	2,404	2,262	2,286	2,331	2,395	2,420	2,392	2,423	2,473	2,532	2,554	2,505	2,535	2,605	2,666	2,707	2,662
%CH	-1.2	-5.9	1.0	2.0	2.7	1.0	-1.1	1.3	2.0	2.4	0.8	-1.9	1.2	2.8	2.3	1.5	-1.6
Exports	692	679	780	840	865	848	793	790	853	958	977	911	886	942	1,060	1,087	1,028
%CH	17.4	-1.9	14.8	7.7	3.0	-1.9	-6.6	-0.3	7.9	12.3	2.1	-6.8	-2.7	6.4	12.5	2.6	-5.4
HIGH-GRADE DEINKING																	
Consumption at Paper & Board																	
Mills	3,009	3,001	3,116	3,260	3,443	3,554	3,603	3,709	3,845	4,025	4,130	4,131	4,215	4,379	4,546	4,687	4,701
%CH	0.2	-0.3	3.8	4.6	5.6	3.2	1.4	2.9	3.7	4.7	2.6	0.0	2.0	3.9	3.8	3.1	0.3
Exports	1,171	1,046	1,138	1,252	1,320	1,318	1,257	1,269	1,386	1,585	1,639	1,551	1,514	1,622	1,844	1,913	1,838
%CH	66.0	-10.8	8.8	10.0	5.4	-0.1	-4.6	0.9	9.2	14.4	3.4	-5.4	-2.3	7.1	13.7	3.7	-3.9
MIXED PAPERS																	
Consumption at Paper & Board																	
Mills	5,635	5,639	5,856	6,120	6,350	6,576	6,652	6,923	7,186	7,480	7,737	7,751	8,055	8,422	8,737	8,939	8,961
%CH	0.8	0.1	3.8	4.5	3.7	3.6	1.1	4.1	3.8	4.1	3.4	0.2	3.9	4.6	3.7	2.3	0.2
Exports	3,162	3,191	3,425	4,013	4,325	4,357	4,111	4,154	4,557	5,221	5,544	5,215	5,074	5,396	6,098	6,278	6,049
%CH	41.1	0.9	7.4	17.1	7.8	0.7	-5.6	1.0	9.7	14.6	6.2	-5.9	-2.7	6.3	13.0	3.0	-3.7
RECOVERED PAPER PRICES (\$US PER SHORT TON)																	
OCC (11)	80	48	72	91	99	92	69	66	82	114	117	92	77	89	121	125	101
ONP (8)	83	53	64	80	89	86	69	67	81	108	111	91	79	90	119	123	100
Mixed Papers (1)	50	22	26	35	40	32	28	25	36	61	65	46	35	45	68	71	52
Man. White Ledger (41)	217	149	163	193	227	226	189	179	208	257	281	245	210	221	276	313	280
Unprinted Bl. Kraft (47)	332	215	252	304	363	363	314	300	335	392	430	391	345	354	420	479	440

Consumption at paper and board mills includes building paper and board and molded pulp.
 Recovered paper prices represent an average of all U.S. regions and are reported on the basis of (FOB) sellers's dock.

