

**Pulp Friction: A case study on paper and print practices.**

**The following case is included in the Good Planets are Hard to Buy seminar. What would your decision be?**

Ben Greene is the director of supply management for Stellar Property Management - a large corporation which does business on a global scale. Stellar recently introduced a business model which included corporate social responsibility to support more sustainable business practices. Ben was trying to affect change in Stellar's sourcing strategies.

One of his current issues was which type of copy paper should Stellar be buying? They had been buying virgin copy paper at competitive prices for decades using competitive bids, which was a best practice. Now staff and customers were asking if Stellar would consider buying 100% post-consumer waste (pcw) copy paper.

The price of virgin 8 ½ x 11", 20# bond paper was \$ 6.80 per 1000 sheets. The 100% pcw was \$10.25 per 1000 sheets. He heard that 30% pcw was available at \$8.06 per 1000 sheets. Based on the annual volume of 179 million sheets of paper that Stellar required he was uncertain as to which standard of paper was the best. Pricing is shown in Table I below.

Table I

Paper type	Price	unit of measure
virgin paper 0% pcw	\$6.80	5000 sheets/ctn
30% pcw	\$8.06	5000 sheets/ctn
100% pcw	\$10.25	5000 sheets/ctn

Ben had been asked to make a recommendation to his senior management group next week as to what his decision would be. Business had been tight during this economic down turn and the company was faced with many economic challenges.

**If you were Ben – what decision would you make? What would be your rationale? What other strategies might Ben consider?**

**Given data:**

**Green house gas (GHG) emission factors:**

- Virgin paper = 2.87 tonnes CO2 per tonne<sup>1</sup> paper
- 30% pcw paper = 2.56 tonnes CO2 per tonne paper
- 100% pcw paper = 1.83 tonnes CO2 per tonne paper
- 1 package of paper weighs ~ 2.28 kgs per 500 sheets of paper
- 1 carton contains 5000 sheets of paper
- CO2 emissions market value = \$25.00 per tonne

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<sup>1</sup> 1000 kgs per metric tonne

## Information on recycled paper<sup>2</sup>:

Recycling of fibre is classified into three categories: internal mill waste, pre-consumer waste, and post-consumer waste. Internal mill waste utilizes substandard or defective paper products made within the paper mill and reintroducing them back into the manufacturing system. Pre-consumer waste consists of processing waste, which is generated outside the pulp mill and is recycled before it is used by a consumer. Post-consumer waste (pcw) is fibre from used paper which includes newsprint, office waste, and magazines.

Virgin or 0% pcw paper mainly uses wood as a source of fibre. A tonne of paper, consisting of ~200,000 sheets, typically requires about 24 trees<sup>3</sup>. A tonne of 30% pcw paper uses approximately 17 trees and 100% post-consumer waste paper doesn't use any trees.

Pulping produces long pulp fibre lengths, which improves paper quality. In this process, the wood chips are "cooked" in a solution of sodium hydroxide and sodium sulphide. This process is highly efficient in removing lignins and resins in softwoods. More than 95% of the chemicals used for pulping are recovered for re-use.

In spite of the processes of high chemical recovery and efficiency in producing high quality pulp, the release of hydrogen sulphide and the mercaptan family of sulphides is always present. Hydrogen sulphide is highly toxic and may be fatal since it will cause asphyxiate and mercaptan may cause "anemia and coma". In addition, cellulose fibres that are lost during the chemical pulping can be discharged with the wastewater and may cause a build up of fibre beds around wastewater pipes. This fibre build up may cause environmental problems. Overall, this manufacturing step will be required for all three types of paper, and the amount of chemical solutions utilized at this step will be the same.

Bleaching is considered one of the most important steps to paper manufacturing. Bleaching is used to purify and clean up the pulp by removing the lignin which affects fibre purity. Chemical pulp mills typically use chlorine gas and chlorine dioxide as bleaching agents. These chemicals are highly toxic and pose a severe health risk by acting as a mutagen and carcinogen. The alternative to chemical processing is mechanical processing which uses peroxide to achieve the same results.

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Angie Tai, Charles Borromeo, Opttie Tsoi. CHBE 484 Life Cycle Analyses of 30%, 100% Post-consumer Waste and Virgin Paper  
The University of British Columbia, 2008

<sup>3</sup> Uncoated virgin printing and office paper basis

## Courtesy of Presentations Plus

There is paper process that excludes this stage which aids in reducing the “organochlorine compounds to the sludge”.

Based on superiority of each paper type and the step stages in the process to produce paper we have included a table that shows the results of how each paper compared in an environmental manufacturing analysis. See Table II below.

Table II<sup>4</sup>

<b>Processing activity</b>	<b>Virgin</b>	<b>30% pcw</b>	<b>100% pcw</b>
Debarking	1	2	3
Chipping	1	2	3
Chemical Pulping	1	1	1
Bleaching/De-inking	3	2	1
Paper Machine	1	1	1
<b>Total</b>	<b>7</b>	<b>8</b>	<b>9</b>

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<sup>4</sup> Table II is based on industry research. The scale rates the paper processing activities from 1 to 3, with 3 being more favourable in terms of environmental benefits.