Recycled Content and Virgin Fiber: Environmental, Economic and Technical Considerations for Magazine Publishers

Prepared for Magazine Publishers of America (MPA)

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Introduction

Most businesses today have a vested interest in minimizing their environmental impact, whether to lower operating costs, improve brand reputation or out of a sense of corporate social responsibility. In magazine publishing, "going green" often focuses on building an effective environmental strategy around forest-based resources such as paper. A key consideration in developing and implementing this strategy is the paper decision, and often the decision is framed as a choice between paper with recycled content or paper made with virgin fiber.

Many environmental, economic, and technical issues are relevant to determining the best use of recovered and virgin fiber for magazine paper. Choosing one fiber type over the other based on a single attribute (i.e. a pre-determined percentage of recycled content) can be misleading and have unintended negative environmental consequences. To make an informed and strategic decision it is necessary to examine the life cycle of a paper product—including fiber type—and evaluate the environmental and economic trade-offs that occur in every paper purchasing decision. This means a complete evaluation starting at the fiber source through the manufacturing process, to product use, recovery and disposal.

The purpose of this paper is to provide an overview of the best use of recovered and virgin fiber for magazine grade paper and answer the following questions:

Key Questions

1. What are the most relevant issues to determine the best use of recovered and virgin fiber for magazine paper?
2. What should magazine publishers consider in order to establish an optimal percentage of recycled content?
3. What issues are associated with the papermaking process—including global climate change—between recycled content and virgin fiber paper?
4. How do supply and demand dynamics of the recovered paper market determine best use?
5. Does recycled paper save trees?

Definitions

This paper uses definitions according to the U.S. Environmental Protection Agency (EPA) and U.S. Federal Trade Commission's (FTC) Guides for the Use of Environmental Marketing Claims. Paper fiber types are defined as either "virgin" or "recovered". "Recycled paper" refers to an end-product.

Virgin Fiber refers to cellulose fiber derived directly from trees and other plants that is newly pulped, previously unused.

Recovered Fiber refers to:

1) Post-consumer: paper, paperboard, and fibrous materials from retail stores, office buildings, homes, etc., after they have passed through their end-use as a consumer item; all paper, paperboard, and fibrous materials that enter and are collected from municipal solid waste; and,

2) Pre-consumer: materials generated in manufacturing and converting processes such as manufacturing scrap and trimmings and cuttings. This includes print overruns, overissue publications, and obsolete inventories. Magazines and newspapers that are not sold are defined by the federal government as pre-consumer recovered fiber.

Recycled Paper can be called "recycled" only if it contains 100 percent post-consumer recovered fiber. If the post-consumer content is less than 100 percent, the paper should be called "recycled-content" paper.

Understanding Trade-Offs

Because the paper supply chain is complex and resource-intensive, trade-offs are often a matter of debate. Table 1 on the following page illustrates where the scale might tip in favor of recovered or virgin fiber for environmental, economic and technical reasons.

Table 1: Trade-Offs between Recovered and Virgin Fiber

Life Cycle Stage	Recovered Fiber	Virgin Fiber
Source		
1. Fiber Source	**Collection / Separation / Transportation**	**Harvest / Forest Management / Transportation**
What level of collection and separation is needed to produce a certain grade of paper? Is the origin of fiber known? Does virgin fiber come from credibly certified sustainable forests?		
2. Transportation	**Distance to manufacturing facility**	**Distance to manufacturing facility**
How far must virgin fiber and recovered fiber travel to a manufacturing facility? Is recovered content in close proximity to the manufacturing facility? How is use of fossil fuels accounted for in terms of overall energy use?		
Manufacturing		
3. Energy	**Mostly fossil fuel energy**	**Kraft pulp mostly biomass energy / Groundwood pulp primarily fossil fuel**
What type and how much energy is used in manufacturing? Does the integrated mill utilize biomass and how efficiently? How much fossil fuel energy does a recycled paper mill purchase “off the grid”?		
4. Processing	**Re-pulp / clean / de-ink / bleach**	**Chip / pulp / bleach**
How much processing is needed to convert waste paper into recycled content? Is the level of processing appropriate for the product type?		
5. By-product	**More solid waste**	**Less solid waste**
How much solid waste is produced a result of the cleaning and de-inking required for recycled paper? Is solid waste used for energy? How much solid waste is kept from the landfill?		
Use		
6. Recovery	**Performance / Fiber yield**	**Performance / Fiber yield**
What is the best use of recovered and virgin fiber in terms of fiber yield? Is fiber returning to the supply chain and kept out of the landfill?		
7. Supply / Demand	**Price / Availability**	**Price / Availability**
Are economics favorable for producing a product with one fiber type over another? Is enough recovered fiber reliably available at an appropriate cost to produce a certain product type?		

Source: Fiber Source and Transportation

Determining whether virgin fiber or recovered fiber is best for magazine paper is examined in this section by considering the environmental and economic cost associated with: 1) the origin of fiber, and 2) transportation to a manufacturing facility.

Table 2: Source and Transportation

Life Cycle Stage	Recovered Fiber	Virgin Fiber
Source		
1. Fiber Source	Collection / Separation / Transportation	Harvest / Forest Management / Transportation
2. Transportation	Distance to manufacturing facility	Distance to manufacturing facility

The Natural Forest

All wood fiber—virgin and recovered—initially comes from the forest. Forests provide ecological, economic and recreational benefits that support the health of the planet in many ways. Forests contain 70 percent of the world's biodiversity and provide vital ecosystem services such as flood control, soil protection and climate change mitigation. Forests also support the subsistence livelihoods of as many as 300 million people.[1]

Despite their value and enormous benefit, the world's forests and ecosystems remain increasingly threatened due, in large part, to deforestation and illegal logging. Though there are still cases of deforestation and illegal logging in economically developed countries, the majority of this deforestation and illegal logging occurs in less economically developed countries. In fact, over half of the world's net deforestation occurs in Brazil and Indonesia alone.[2]

According to the World Resources Institute (WRI), "a variety of factors lead to deforestation, many of which do not begin with the forestry sector. Agricultural expansion is a leading cause worldwide, with infrastructure development and wood extraction also major factors, although all three factors often occur simultaneously in a given forest."[3]

Magazine publishers should be aware that some pulp and paper companies do source fiber from South America and Southeast Asia, regions with high

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[1] http://earthtrends.wri.org/updates/node/303

[2] http://www.cifor.cgiar.org/Publications/Corporate/AnnualReports/.htm

[3] http://earthtrends.wri.org/updates/node/303

conservation value forests (HCVF). These are also areas where economics favor faster growing trees and lower labor costs. Sourcing paper from these regions—especially those identified as containing HCVF—may have severe environmental consequences, publishers should be certain of the source of their paper fiber in every purchasing decision—and especially if it is thought to originate in South America or Southeast Asia.[4]

Forest Management and Certification

Most paper companies in North America and Europe practice sustainable forest management on their lands or have systems in place for responsible fiber sourcing. The forest products industry has a strong economic incentive to keep land forested but to be certain virgin fiber is sourced responsibly, selecting fiber from credible, certified forest management systems is an effective strategy for magazine publishers to be.

To avoid contributing to deforestation or illegal logging, paper buyers should require that any paper containing virgin fiber be sourced from forests that have been managed for sustainability through credible certification systems such as the Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), Programme for Environmental Forest Certification (PEFC) and others that are actively evaluating, labeling and communicating the availability of fiber from well-managed forests.[5]

Recovered Fiber

Paper mills that are in close proximity to sustainably managed forests are generally better positioned to utilize virgin fiber rather than recycled. Conversely, mills that are in close proximity to recovered paper—usually in high-density population areas— are better positioned to collect and manufacture recycled paper. This is primarily due to the lower costs to collect and transport recovered material.

Many recycled paper mills have invested in equipment and process improvements to make it possible to use relatively higher levels of recycled content in the products they manufacture including magazine grade papers. Likewise, mills that are located near managed forests are, on the whole, intentionally designed and engineered to produce paper from virgin content. In many cases, the fiber source (managed forest or recovered fiber) and manufacturing process are closely linked because it makes the most economic sense.

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[4] For a list of paper procurement tools see the WRI/WBCSD “Sustainable Procurement of Wood and Paper-based Products”

[5] For more information visit Metafore’s Forest Certification Resource Center at www.certifiedwood.org

Transportation

The location of the paper mill relative to the fiber source is another factor in determining whether recovered or virgin fiber is the better environmental choice. Although transportation is only a part of the overall carbon footprint, understanding the energy needed to deliver a fiber source to the manufacturing facility is a significant component of environmental performance.

In terms of recovered fiber, it is not usually economically or environmentally viable to transport recovered material from urban areas to distant manufacturing facilities. Doing so incurs additional costs and has environmental impacts such as carbon dioxide (CO_2) from burning fossil fuel and other pollutants.

Virgin fiber is typically harvested near integrated paper manufacturing facilities for the same economic and environmental rationale as recovered fiber is near urban areas. There are, however, cases where fiber (i.e. kraft pulp) travels long distances to a manufacturing facility after it has been processed. The transportation required for pulp to travel to a paper mill should also be taken into consideration as a component of a paper product's carbon footprint.

It is important to note that carbon emissions at the mill almost always outweigh carbon emissions from transportation. Particular attention should be paid to the energy used in manufacturing when evaluating overall carbon footprint, which is explored further in the next section of this white paper.

The Forest and Climate Change

Climate change has created a new imperative to protect forests, and tropical forests in particular. Because trees absorb and store carbon, forests are critical to mitigating climate change. Healthy forests also absorb more carbon than unhealthy forests. Sustainable forest management practices (including fire and disease prevention, better growing conditions, healthier trees, protection of water systems, and more efficient stand rotation) produce trees that help further reduce greenhouse gases. The Intergovernmental Panel on Climate Change (IPCC) estimates that deforestation contributes 15 to 20 percent of global greenhouse gas (GHG) emissions.[6]

Nevertheless, deforestation continues as existing and emerging economies demand more from the world's forests. This pressure is directly responsible for contributing to land conversion where forests are converted to other uses than sustainable forestry. According to the Food and Agriculture Organization of the United Nations, deforestation—mainly conversion of forests to agricultural land—continues at an alarming rate of approximately 13 million hectares per year (for the period 1990–2005).[7]

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[6] Intergovernmental Panel on Climate Change (IPCC). http://www.ipcc.ch/ipccreports/index.htm

[7] United Nations Framework Convention on Climate Change (UNFCC). http://unfccc.int/methods_and_science/lulucf/items/4123.php

Manufacturing: Energy, Processing, and Climate Change

Papermaking requires enormous inputs of water, energy, chemicals, and wood resources, and produces various wastes and emissions that must be controlled or treated. Papermaking is the fourth largest manufacturing source of GHGs after petroleum, cement and chemical products.[8] (Manufacturing overall is the third largest emissions category after electricity generation and transportation.)

This section examines the energy used to make pulp and paper; processing considerations related to the optimal percentage of recycled content in a product; and the by-products associated with each fiber type.

Table 3: Energy, Processing and By-products

Life Cycle Stage	Recovered Fiber	Virgin Fiber
Manufacturing		
3. Energy	Mostly fossil fuel energy	Kraft pulp mostly biomass energy / Groundwood pulp primarily fossil fuel
4. Processing	Re-pulp / clean / de-ink / bleach	Chip / pulp / bleach
5. By-products	Solid waste	Little solid waste

Energy

The total amount and type of energy used to produce recycled paper, versus paper made from virgin fiber, can be quite different. Integrated paper mills—mills that produce both pulp and paper—often rely on biomass (renewable organic matter) as a primary source of energy in the paper manufacturing process. Forest-derived biomass may originate directly from the forest or from processing mills. Another source of biomass fuels in the forest products industry includes pulp and paper residuals such as black liquor and wastewater treatment sludges.[9]

Utilizing biomass at these mills reduces the need to purchase energy off the grid, which is often generated by burning fossil fuels. Mills utilizing biomass have been able to operate with substantially lower carbon emissions.

Most integrated paper mills are located in or near the forest because they rely on the forest as a source of wood fiber. If such an integrated mill were to

[8] U.S. Department of Energy: "Energy and Environmental Profile of the U.S. Pulp and Paper Industry". December 2005.

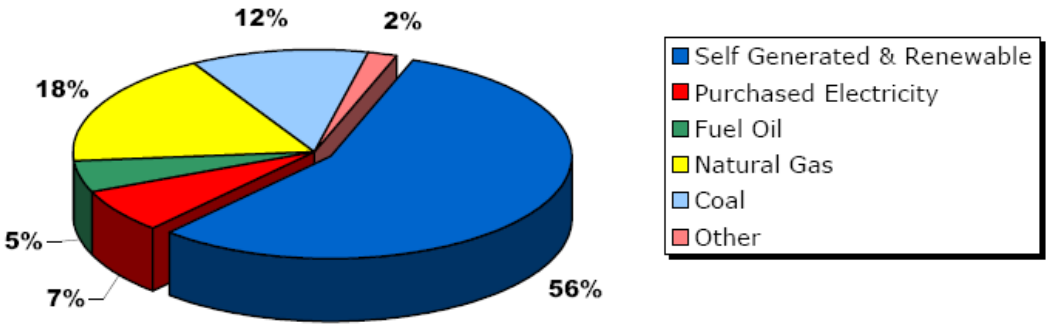
[9] U.S. Environmental Protection Agency: "Biomass - Forest Derived Biomass and Pulp and Paper Residues". December 2008.

increase its use of recovered fiber—or "maximize recycled content"—it would not have as much biomass available as an energy source as a result of processing less virgin fiber. In this scenario the integrated mill is forced to purchase energy off the grid instead of relying on its own biomass. Energy produced by burning fossil fuels—such as coal—will have greater environmental impact than energy from biomass.

Non-integrated facilities—those without on-site pulp mills—must often purchase energy off the grid because they do not have access to the biomass that integrated mills produce during the pulping process. In these cases, there is no environmental benefit lost because there is no biomass energy available for use as there would be at an integrated mill.

Most paper manufacturers in the U.S. use self-generated and renewable energy for paper manufacturing (Figure 1-4). Some non-integrated mills with no access to self-generated, renewable energy on-site, are off-setting carbon emissions or purchasing renewable energy to power manufacturing.

Energy Use by Fuel for U.S. Paper Manufacturing (2000)



Energy: Recycled Paper and Climate Change

There is no longer any serious debate within the scientific community regarding the phenomenon of climate change and its likely consequences. Burning fossil fuels—coal, oil and natural gas—releases GHG, primarily carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) into the atmosphere. The accumulation of these gases is absorbing too much of the heat that is normally radiated into space by the earth. The IPCC has concluded that we are already experiencing some effects of the resulting increase in temperature. These conclusions have been well-documented and widely communicated.[10]

Though paper manufacturing is not the largest single source of GHGs in the U.S.—and 56% of the energy used to manufacture paper products comes from

[10] Intergovernmental Panel on Climate Change (IPCC). http://www.ipcc.ch/ipccreports/index.htm

tree-based biofuels—fiber collection, transport and mill energy are sources of GHG emissions that should be evaluated in any account of environmental impact.[11] Estimates regarding the energy savings of a paper mill that manufactures recycled content paper range from approximately 20 to 50 percent less energy used to make recycled content paper than virgin fiber paper.[12]

The type of energy used for manufacturing is an important consideration. For example, virgin chemical pulp production generates energy from burning recovered chemicals, a carbon-neutral process. Manufacturing recycled content paper generally relies on energy derived from fossil fuels which depletes non-renewable resources and releases greenhouse gases and air pollutants. Virgin fiber production using chemical pulping emits fewer GHGs than does production of recycled-content fiber that uses fossil fuel energy.[13]

There is another important factor to consider. Groundwood papers, the body stock of most magazines, typically use 60-70% groundwood and thermo-mechanical pulp (TMP) as their fiber mix. These types of pulp—especially TMP—typically require more fossil fuel energy in their manufacture than kraft pulp. In addition, most groundwood pulp is manufactured at non-integrated mills whose operations usually rely on purchased power. Moreover, many electrical providers in the United States, especially in the Midwest and the South, use a high percentage of coal. This means that groundwood papers produced at non-integrated mills will in many cases have a relatively significant carbon footprint. Coated freesheet, on the other hand, which is used for most covers and some body stock for high-end publications is made from purchased kraft pulp or manufactured at integrated mills that are often powered with a high percentage of bio-mass energy, resulting in a relatively small carbon footprint despite using virgin materials.

Processing: % Recycled Content in Magazine Paper

Many publishers have questions regarding the optimal percentage of recycled content for magazine papers, including the environmental benefits associated with using increasing amounts of recycled content. In answering this question it is important to determine: a) what the recovered fiber is being used for; and, b) the performance required of the paper product.

Converting waste paper into recycled content requires a level of processing the extent of which depends on the end product. Paper and paperboard products (such as newsprint, kraft bags and corrugated containers) do not usually require a high brightness; they use recovered fiber very efficiently. Less cleaning

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[11] U.S. Department of Energy: “Energy and Environmental Profile of the U.S. Pulp and Paper Industry”. December 2005.

[12] http://www.epa.gov/epawaste/conserve/rrr/rogo/index.htm

[13] Magazine Publishers of America (MPA) “2008 Environment Handbook”.

and bleaching is required to remove dirt and ink for these products than is generally required for fiber that is used for most magazine papers.

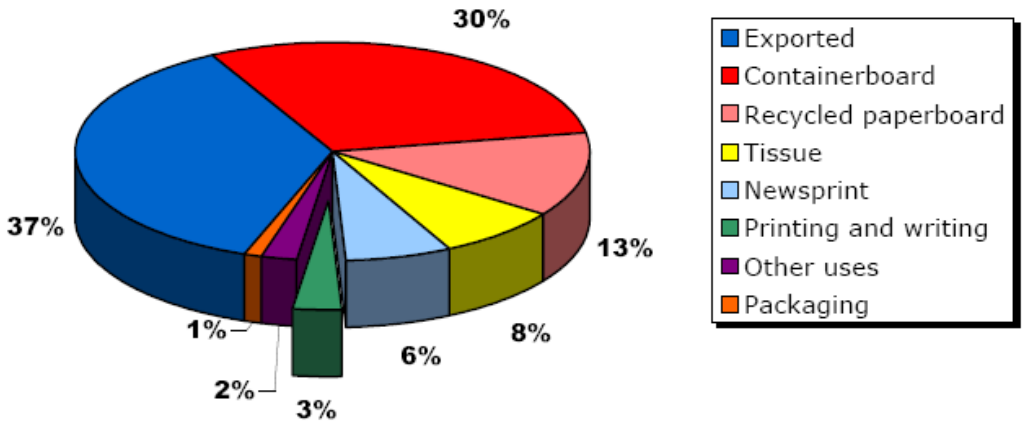
The recovered fiber needed to produce brighter paper grades, such as reprographic and laser print office papers, requires far more processing—often using more fossil-fuel energy—than lower brightness grades. Beyond a theoretical tipping point (probably somewhere between 30 to 50 percent post-consumer fiber content), using increasingly higher percentages of recovered fiber will result in diminishing environmental returns because the process required to reach higher levels of brightness is more fossil-fuel intensive with the potential to emit more GHGs than they avoid.

Along with environmental costs, the economics of processing recovered fiber also depends on the end-use of a paper product. Using recycled paper for coated grades requires significantly higher capital and operational costs based on extra steps needed for cleaning and de-inking, lower yields, and the cost to collect, sort, and transport recovered fiber. These capital and operational costs help explain why there is currently little capacity for de-inking, bleaching, and pulping recovered fiber for higher paper grades such as magazine paper. Bill Moore, of Moore and Associates—a consulting firm specializing in the paper recycling industry—suggests that “the most un-economic use of recovered fiber is for coated paper”.

Some paper mills are located near adequate supplies of recovered fiber have the capacity to manufacture recovered waste paper into high-grade magazine papers—at a high volume and a competitive cost. These mills have invested in technology and processes that allow them to produce magazine quality paper grades from recovered fiber. But because of economic factors, mills that can produce 80% to 100% recycled magazine papers do not have nearly enough capacity at present to satisfy the demands of U.S. magazine publishers should the vast majority specify this percentage of recycled content.

The following chart represents the main uses of recovered paper in the U.S. Overall, the highest percentage of recovered paper collected in the U.S. is exported (37%), with containerboard (30%) and recycled paperboard (13%) representing another 43%. Only about 3% of recovered paper is used today for printing and writing grades.

Uses for Recovered Paper in U.S.
(of 54 million tons recovered, 2006)



Solid Waste

Solid waste—often referred to as sludge—is a by-product of every pulp and papermaking operation. As a result of de-inking and bleaching, recycled paper mills generally produce more solid waste than mills that use virgin fiber. Solid waste can be used as biomass for energy production and many recycled paper mills are increasingly using sludge for other purposes such as cement.[14] Paper purchasing decisions should consider how much of a mill's solid waste is diverted from the landfill for energy use or other purposes.

Also consider that recovering fiber and manufacturing recycled paper diverts paper from the waste stream. The sludge from manufacturing recycled paper has less environmental impact than paper that goes to landfill. The question is, "how do we keep recoverable paper out of the landfill and divert it to paper products where the fiber can be used most efficiently and with the least environmental impact?"

[14] Glen Johnson, Manager of Technical Services, Madison Paper Company - Alsip

Use: Recovery, Supply and Demand, and Saving Trees

Issues related to recovered and virgin fiber at the "Use" stage of the life cycle of paper includes fiber yield, paper performance and the supply and demand dynamics of each fiber source.

Table 4: Recovery, Supply and Demand

Life Cycle Stage	Recovered Fiber	Virgin Fiber
Use		
6. Recovery	Fiber yield and performance	Fiber yield and performance
7. Supply and Demand	Price / Availability	Price / Availability

Fiber Yield and Performance

Fiber yield is defined as the actual amount of usable fiber derived from the recovered paper. All fibers get shorter each time they are processed and when fibers become too short or brittle to bond with each another, the physical and performance characteristics of the sheet may be compromised.

Paper fibers can be reused from four to nine times depending on the new paper grade that is being produced.[15] Or—put another way—the fiber lost from using recovered paper varies from 10 to 30 percent depending on the type of paper that is being made (an egg carton versus a glossy magazine).[16] Factors that determine how many times fibers can be reused for each paper type include the ability of the collection system to recover paper, losses from the de-inking process and the decline in fiber strength with each use. In many cases, these losses result in poorer performance in some types of paper grades including grades used by magazine publishers.

To adjust for better performance more recovered fiber per sheet may be needed to produce recycled paper in higher grades. Because of the physical properties required for most magazine papers—including consistency, surface integrity, and porosity—the efficiency rate can be lower than in other grades of paper, and higher in those such as containerboard.[17] Using recovered fiber in magazine grades may result in lower yields depending on the manufacturing

[15] Metafore Paper Fiber Life Cycle study

[16] Metafore Paper Fiber Life Cycle study

[17] The efficiency rate is determined by the amount of recovered material needed for one product type versus another.

process and a valuable trade-off for magazine publishers to consider is whether it makes more sense to use higher levels of recovered fiber in grades that would suffer lower yield losses. Supply and demand also have an important role in determining where recovered fiber is used—and at present—the marketplace is not utilizing all the recovered fiber available giving fiber efficiency additional and important layer for consideration.

Historical Supply of Recovered Fiber

The cost to manufacture paper, like any product, depends upon the costs of raw materials and production. Virgin fiber paper production will depend, in part, on the cost of timber, transportation, processing, and waste disposal. The manufacturing cost of recycled content paper will depend, in part, on the cost to recover and transport the paper fiber, the yield (the actual amount of usable fiber derived from the recovered paper), and the cost of processing and disposing of waste.

Until very recently, there was a shortage of recovered fiber, all available recovered fiber was utilized in products such as paperboard, tissue, and newsprint.[18] The main contribution of magazines in a recycled fiber shortage has been their suitability for recovery. Increasing the recovery of old magazines (OMG) returns high-grade fiber to the manufacturing stream. OMG is an important source of fiber, and an effective way to take pressure off the forest and the landfill.

Current Supply of Recovered Fiber

The supply of recovered paper has recently deviated from its trend. Lately, there is an over-supply of recovered fiber and the price has dropped precipitously. According to the New York Times, the price for recovered paper fell from $50.00 USD per ton to $5.00 USD per ton between October and December 2008.[19] Experts suggest that the credit crises, along with the steep drop in Chinese demand and the global market downturn, have had a dramatic effect on the world's recovered paper business including the volume of recovered fiber that is not returning to the paper life cycle and reused in other products.

The current market price for recovered fiber is not sufficient to cover the cost of collecting and transporting recovered fiber to a mill. As a result, some paper mills that are engineered specifically to process recycled paper products with high levels of recovered fiber content are operating at reduced capacity—which over the long-term—is not an economically viable scenario.

Along with a significantly lower market price, recycled pulp and paper mills also deal with variability in the costs of buying recovered fiber. Lower price—along with price variability—works together as a major impediment to increasing the

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[18] Bill Moore, Moore and Associates "Quarterly Report – First Quarter 2009".

[19] "Back at Junk Value, Recyclables are Piling Up". New York Times. December 7, 2008.

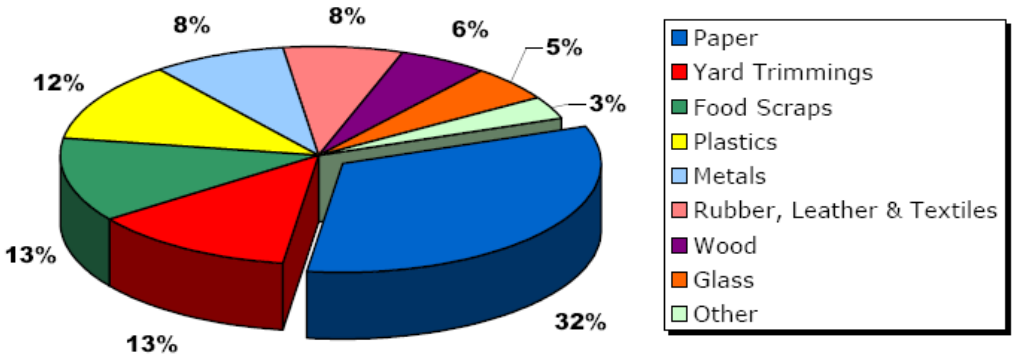
utilization of recovered fiber. Pulp and paper mills that utilize virgin fiber—in contrast—generally have more control or better knowledge of the virgin fiber supply chain.

In the current marketplace, steps—including government-mandated minimum recycled content and extended producer responsibility—may be considered to reduce the paper waste that is going to the landfill. With the prospect of a recovering global economy however, experts expect prices for recovered paper to begin returning to past levels by the third quarter of 2009.[20] A healthy recovered paper market where all the available recovered fiber is reused is important because a marketplace with an oversupply of recovered fiber—our current situation now—faces serious environmental consequences as explained in the next section.

Increasing Recovery of a Valuable Resource

Paper is by far the largest component of solid waste in landfills. Most of this paper can be recovered and re-used for recycled paper products and other uses. According to the U.S. Environmental Protection Agency (EPA), of the 254 million tons of municipal solid waste (MSW) generated in the United States in 2007, 32% was paper.[21] In the United States alone, each of us is, on average, responsible for over 83 tons of paper waste every year. Paper fiber that can be recovered—but is not—has high economic and environmental costs. Recovering all paper product types—including office paper, newsprint, magazines, packaging, etc.—could be much higher. Recycling rates in the U.S. have recently improved to over 54%, but more needs to be done to increase recovery to return used paper and paperboard to productive and efficient use.

Total Municipal Solid Waste in U.S. (by material), 2007
254 Million Tons (before recycling)



[20] Bill Moore, Moore and Associates

[21] U.S. Environmental Protection Agency. "Municipal Solid Waste Fact Sheet 2007".

Disposing of paper in landfills has a high environmental cost because as it decomposes in the landfill paper generates methane. Methane is a GHG that is 21 times more potent than carbon dioxide.[22] Landfills are the largest human-related source of methane in the U.S., accounting for 34% of all methane emissions.[23]

The benefits—and necessity—of diverting used paper from the landfill are obvious. Producing recycled content paper products from recovered fiber is critical to reducing paper-generated GHGs. Studies show that every ton of paper diverted from the landfill saves 1.2 tons of GHG.[24]

In any economy, recovery of magazines is an important component of fiber supply. Old magazines (OMG), in particular, are a highly desirable fiber for producing certain paper grades such as tissue and boxboard and, in the right situations, magazine papers. As demand for forest resources increases worldwide—especially for energy production—it becomes even more imperative to recover paper.

Does Recycled Paper Save Trees?

There are many points of view on whether recycled paper saves trees. Arguments regarding the question will likely continue—in many ways—simply as a result of how the question is posed and the various definitions of what exactly is meant by "saving trees".

Recovering paper fiber has many important economic and environmental benefits, chief among these is to take pressure off the world's forests. As forests are threatened by a developing world economy that is choosing to use forest fiber as a source of energy, it is important to ensure that all recoverable paper is collected, separated and returned to the paper fiber life cycle for the most efficient uses possible.

The forest products industry has a vested interest in ensuring an uninterrupted supply of wood fiber and responsible manufacturers understand that their economic well-being depends on effective forest management. The forest products industry cultivates trees as a crop to supply wood for the manufacture of paper, and replants trees to replace those that have been harvested. Wood fiber is truly a renewable resource. A calculation more relevant to long-term sustainability goals than the number of trees saved is the determination of the best use of recovered and virgin fiber.

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[22] http://www.epa.gov/methane/qanda.html

[23] http://www.epa.gov/methane/sources.html

[24] For more information about the benefits of recycling magazines to avoid methane emissions, see the ReMix (Recycling Magazines is Excellent) campaign, available at www. nrc-recycle.org

Summary

Best Use of Recovered and Virgin Fiber

Maximizing the use of recovered fiber—versus virgin fiber—in appropriate paper grades and under appropriate circumstances can be economically beneficial and significantly reduce environmental impacts. Maximizing recycled content for its own sake without regard to the product type, mill performance or mill location, however, may produce much more serious—if unintended—negative environmental impacts and no economic rationale

Determining the best use of recovered and virgin fiber for any paper type—including magazine grades—requires a life cycle perspective with an evaluation of the environmental, economic and technical considerations along the entire supply chain. This includes understanding where fiber is coming from (source), how the paper is made (manufacturing), and how effectively fiber can be utilized depending on the paper type (use).

Operating Principles

Papermaking, like most manufacturing processes, involves a complex supply chain. Evaluations based on a single environmental performance criterion have limited utility and may be counter-productive. However, there are fundamental principles that any buyer concerned with making environmentally-informed purchasing decisions can adopt.

1. Use a **life cycle perspective.** Require that your purchasing people understand and measure the environmental impact of the paper they specify and purchase throughout the life cycle of the product.[25]
2. Actively **engage with your paper supply chain** to set goals and benchmarks that have the power to move the marketplace toward improved environmental performance without sacrificing product performance.
3. **Use science as the foundation** of environmental decision-making. If you are not setting goals and measuring progress with data, you risk making unsupportable claims.
4. **Support paper recovery** to reduce waste and, ultimately, improve the economic incentives for using recovered fiber.
5. When virgin fiber is necessary, **select fiber from sustainably managed forests**.

[25] For a list of paper procurement tools see the WRI/WBCSD "Sustainable Procurement of Wood and Paper-based Products" including the Environmental Paper Assessment Tool® (EPAT) available at www.epat.org

Glossary

Chemical pulp: Pulp produced from wood that has been cooked with various chemicals; used to produce many grades of printing papers and some paperboard.

Fiber yield: Actual amount of usable fiber derived from the recovered paper.

Freesheet: Paper manufactured with no more than 10% mechanical (groundwood) pulp. Most free sheet paper is completely free of mechanical pulp. Freesheet paper is made from the chemical process that breaks apart the fibers and dissolves impurities.

Groundwood: Paper containing more than 10% mechanical pulp (mostly stone groundwood and/or refiner). Groundwood paper is mechanically pulped (rather than chemically pulped).

High-conservation value forests (HCVF): Forests of outstanding and critical importance due to environmental, socio-economic, biodiversity or landscape values

Integrated mill: A mill that has facilities for producing both pulp and paper

Life Cycle Analysis (LCA): The investigation and valuation of the environmental, economic and social impacts of a product or service. A product's life cycle starts when the raw materials are extracted from the earth and continues through processing, transport, use, reuse, recycling or disposal. For each of these stages, the impact is measured in terms of the resources used and the resulting environmental impacts.

Mechanical pulp: Pulp produced by shredding pulpwood logs and chips using mechanical energy via grindstones (groundwood pulp) or refiners.

Non-integrated mill: A pulp mill without an on-site paper mill, or a paper mill without an on-site pulp mill. A non-integrated pulp mill will sell all the pulp it produces. A non-integrated paper mill will purchase all the pulp it requires.

Paper Fiber Life Cycle: The paper fiber life cycle is defined as the interaction of fresh and recycled fiber in maintaining the production of paper including the source, manufacturing, end-use and recovery/disposal including environmental, economic, and technical considerations.

Pre-consumer content: A measure of how efficient papermakers are at capturing and using fiber byproducts of the papermaking process. It includes fiber that has not met its intended end use.

Post-consumer content (PCW): Fiber that is recovered for reuse from paper products that have passed through their intended end usage as a consumer item.

Recycled Paper: According to the Federal Trade Commission's (FTC) Guides for Environmental Marketing Claims, paper can be called "recycled" only if it contains 100 percent post-consumer recovered fiber. Post-consumer content less than 100 percent, is referred to as "recycled-content" paper.

Virgin Fiber: Refers to cellulose fiber derived directly from trees and other plants that is newly pulped, previously unused.

Works Cited and Contributors

Center for International Forestry Research (CIFOR). Understanding illegal logging. http://www.cifor.cgiar.org/Publications/Corporate/AnnualReports/English2007/illegal_logging.htm

Chamberlain, Michael, Martin Kay, John Birkenshaw, and PIRA International. 2007. Using recycled content paper in magazines: Phase 2. Waste & Resources Actions Programme (WRAP). Banbury.

Confederation of European Paper Industries (CEPI). 2006. Responsible management of recovered paper: Guidelines on responsible sourcing and quality control. Brussels.

Environmental Defense. 2003. Q&A on the environmental benefits of recycled paper. New York.

Forest Products Association of Canada and PriceWaterhouseCoopers LLC. 2008. A buyers' guide to Canada's sustainable forest products. Ottawa.

Intergovernmental Panel on Climate Change (IPCC). IPCC reports. http://www.ipcc.ch/ipccreports/index.htm.

Magazine Publishers of America (MPA). 2008. 2008 Environment handbook: Your source to understanding magazines and the environment. New York.

Metafore and the Gagliardi Group. 2008. The paper consumer's guide to climate change: How to reduce greenhouse gases with smarter paper choices. Portland.

Metafore. 2006. The fiber cycle technical document: Metafore summary report. Portland.

Metafore. Forest Certification Resource Center. Http://www.certifiedwood.org.

Moore and Associates. 2008. Quarterly report: ForesightSM forecasts for sorted office papers and coated book stock market, First Quarter 2009. December 18. Atlanta.

Paper Industry Association Council. Http://www.paperrecycles.org.

Paper Industry Association Council. U.S. paper recovery statistics. http://www.paperrecycles.org/stat_pages/stat_intro.html

Resource Recycling Editorial Staff. 2007. Keeping pace with China. Resource Recycling. February 2007 issue.

Richtel, Matt, and Kate Galbraith. 2008. Back at junk value, recyclables are piling up. New York Times, December 7. Business section.

U.S. Department of Energy, Industrial Technologies Program. 2005. Energy and environmental profile of the U.S. pulp and paper industry. Washington, DC.

U.S. Environmental Protection Agency. 2007. Municipal solid waste generation, recycling, and disposal in the United States: Facts and figures for 2007. Washington, DC.

U.S. Environmental Protection Agency. 2008. Materials characterization paper in support of the advanced notice of proposed rulemaking – Identification of nonhazardous materials that are solid waste biomass - Forest derived biomass and pulp and paper residues. Washington, DC.

U.S. Environmental Protection Agency. Recycle on the go. http://www.epa.gov/epawaste/conserve/rrr/rogo/index.htm

Waste & Resources Action Programme (WRAP) and PIRA International. 2006. Review of opportunities and potential barriers to using recycled content magazine paper. Banbury.

World Resources Institute – Earth Trends. Protecting Forests to Save the Climate: REDD Challenges and Opportunities. http://earthtrends.wri.org/updates/node/303.

World Resources Institute and A.T. Kearney. 2008. Rattling supply chains: The effect of environmental trends on input costs for the fast-moving consumer goods industry. Washington, DC.

World Resources Institute. Recycling and environmental impacts. Http://www.sustainableforestprods.org/book/export/html/29.

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