

## **Green Printing Guidance**

Developed by the VU Sustainability and Environmental Mgt Office (SEMO) in collaboration with VU Creative Services and VU Printing Services  
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### **Why is green printing important?**

The production of paper as well as the printing of publications both use large amounts of natural resources, such as wood, water, and energy, as well as potentially hazardous materials. Consider the environmental impacts associated solely with the manufacturing of 1 ton of virgin, uncoated paper (e.g., copy paper): 4 tons of wood; 30 million BTUs of energy; 5,882 pounds of CO<sub>2</sub>E of greenhouse gases; 22,219 gallons of water; and 1,909 pounds of solid waste<sup>1</sup>.

The printing process itself also involves numerous inks, solvents, acids, lacquers, dyes, driers, varnishes, shellacs, and many other solutions, that can be hazardous to both humans and the environment. Chlorine bleaching of paper can release chemicals and pollutants into the water. Bindings, adhesives, foils, and other items used in printed items can also make recycling of publications difficult<sup>2</sup>.

Fortunately, many green printing options are now available to the Vanderbilt community through the VU Printing Services and Creative Services. These include post consumer waste recycled-content papers, papers certified by the Forest Stewardship Council (FSC), vegetable-based inks, papers processed without chlorine, and products made with renewable energy. This document has been created by VU's Sustainability and Environmental Management Office, Printing Services, and Creative Services to inform customers of opportunities to reduce the environmental impact of their printing processes.

## **Green Printing Terms**

### **Recycled Content Papers**

Paper can be made from virgin wood, pre-consumer waste meaning waste from paper mills and manufacturing plants, or post-consumer waste meaning paper that has been collected during recycling programs or paper waste from printing processes, etc. The more post-consumer waste (PCW) recycled content there is in a sheet of paper, the less fresh pulp from trees, energy, and water was used to manufacture paper saving natural resources. Additionally, using post-consumer waste as feedstock for paper

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<sup>1</sup> Environmental impact estimates were made using the Environmental Defense Fund Paper Calculator. For more information visit <http://www.papercalculator.org>.

<sup>2</sup> Makower, Joel. "How green printing can make a good impression." 3 January 2006. Grist Magazine. <http://www.grist.org/article/printing/>.

production results in fewer greenhouse gases and solid waste generated during the paper manufacturing process. Making paper pulp from recycled fibers also requires less bleaching, a process with detrimental environmental effects, than producing virgin paper<sup>3</sup>. While 100% PCW recycled content is the most environmentally-friendly, 30% PCW recycled content is typically available at a price and quality identical to paper with no recycled content. Moreover, using paper with PCW content supports the paper recycling industry, lowering the price consumers pay for recycled content paper while improving the payments to Vanderbilt for the paper recycled from our campus.

Consider the environmental impacts associated with producing 10 tons of the following types of uncoated paper (e.g., copy paper)<sup>1</sup>:

	<b>0% recycled content</b> uncoated paper 10 tons	<b>30% recycled content</b> uncoated paper 10 tons	<b>50% recycled content</b> uncoated paper 10 tons	<b>100% recycled content</b> uncoated paper 10 tons
Wood Use	37 tons ≈ 259 trees	26 tons ≈ 181 trees	18 tons ≈ 130 trees	0 tons ≈ 0 trees
Net Energy	299 million BTUs (87,628 kWh) ≈ 3.3 homes/year <sup>4</sup>	274 million BTUs (80,301 kWh) ≈ 3.0 homes/year <sup>4</sup>	258 million BTUs (75,612 kWh) ≈ 2.8 homes/year <sup>4</sup>	217 million BTUs (63,596 kWh) ≈ 2.4 homes/year <sup>4</sup>
Greenhouse Gases	58,821 lbs CO <sub>2</sub> E ≈ 5.3 cars/year <sup>5</sup>	51,442 lbs CO <sub>2</sub> E ≈ 4.7 cars/year <sup>5</sup>	46,522 lbs CO <sub>2</sub> E ≈ 4.2 cars/year <sup>5</sup>	34,223 lbs CO <sub>2</sub> E ≈ 3.1 cars/year <sup>5</sup>
Wastewater	222,189 gallons ≈ 0.34 swimming pools <sup>6</sup>	186,647 gallons ≈ 0.28 swimming pools <sup>6</sup>	162,953 gallons ≈ 0.25 swimming pools <sup>6</sup>	103,717 gallons ≈ 0.16 swimming pools <sup>6</sup>
Solid Waste	19,087 lbs ≈ 0.68 full garbage trucks <sup>7</sup>	16,929 lbs ≈ 0.60 full garbage trucks <sup>7</sup>	15,491 lbs ≈ 0.55 full garbage trucks <sup>7</sup>	11,894 lbs ≈ 0.42 full garbage trucks <sup>7</sup>

The production of equivalent quantities of other types of papers, such as coated freesheet (e.g., high-end catalog) or coated groundwood (e.g., catalog or magazine), has similar environmental savings when using increasing amounts of recycled content.

### **FSC-Certified Papers and Printers**

The Forest Stewardship Council (FSC) certification system provides internationally-recognized standards in responsible forestry. In order to obtain certification, a product's entire supply chain must meet the FSC-certification process which serves the best interests of people, wildlife, and the environment. FSC-certification is globally recognized as being the most credible and stringent system for

<sup>3</sup> "Understanding Recycled Fiber." June 2007. Environmental Paper Network.

<http://www.environmentalpaper.org/documents/recycledfiberfactsheet2.pdf>.

<sup>4</sup> The average U.S. household uses 91 million BTUs of energy in a year according to the Environmental Defense Fund Paper Calculator.

<sup>5</sup> The average car emits 11,013 pounds of CO<sub>2</sub> in a year according to the Environmental Defense Fund Paper Calculator.

<sup>6</sup> An Olympic-sized swimming pool holds 660,430 gallons of water according to the Environmental Defense Fund Paper Calculator.

<sup>7</sup> A fully-loaded garbage truck weighs an average of 28,000 pounds (based on a rear-loader residential garbage truck) according to the Environmental Defense Fund Paper Calculator.

ensuring well-managed forests. If paper must be purchased that does not contain 100% recycled content, then the non-recycled wood content, or virgin wood, should be obtained from an FSC-certified forest and meet all FSC-requirements. Therefore, the consumer can request the use of FSC-certified papers although the FSC is very strict about who may print their logo on packaging. In order to use any FSC trademarks, including the FSC logo, initials "FSC", or phrase "Forest Stewardship Council" on a printed piece, the printer must have chain-of-custody certification. Without this certification, no claims can be printed regarding the FSC-certified content of the paper, although the consumer can still request the use of FSC-certified paper by VU Printing Services.



### **Processed Chlorine Free**

Chlorine-free, recycled-content paper is preferable to paper bleached with chlorine because of chlorine's harmful effects on the environment, particularly aquatic environments and water systems. Currently, chlorine and its derivatives are the most common bleaching agents used by the paper industry. Ask for recycled content paper marked "processed chlorine free" (PCF), indicating that no chlorine or chlorine compounds were used during the manufacturing process.



*Note: Processed chlorine free is reserved for recycled content paper. Totally chlorine free is reserved for virgin fiber papers, indicating that no chlorine or chlorine compounds were used during the manufacturing process, as verified through chain of custody certification.*

### **Paper Made with Renewable Energy**

Renewable energy is energy generated from resources which are replenished naturally, such as sunlight, wind, rain, tides, biomass and geothermal heat. In order for an entity to claim that their paper is produced with renewable energy, they must either purchase energy generated by a renewable resource such as TVA's Green Power Switch or they must generate the energy at their plant using on-site solar, wind, tide, biomass or geothermal heat sources. Paper manufacturers, such as Mohawk, will designate papers made from their mills that use renewable energy sources, and consumers can designate their printed product as "paper made with renewable energy".

### Printed with Environmentally-Friendly Inks

Printing with environmentally-friendly inks, including vegetable-based inks such as soy or flax ink, reduces the need to use petroleum based inks that are harmful to individuals and the environment and are difficult to recycle. The consumer can request the use of environmentally-friendly inks from VU Printing Services or an outside printing vendor and can designate their printed product as being printed with environmentally-friendly inks.

## Hierarchy of Green Printing Choices

