



## PSI FACT-SHEET: PRODUCT STEWARDSHIP AND GLOBAL WARMING

### Overview

Global warming is a looming international problem caused by the release of greenhouse gases into the atmosphere. These gases, such as carbon dioxide and methane, form a shield around the Earth that traps heat. As emissions of greenhouse gases rise so too does the earth's temperature. The temperature changes occur slowly over time, but even a modest increase could have disastrous effects, including rising sea levels, a diminished fresh water supply, and a loss of biodiversity.

Efforts to slow climate change are focused on reducing greenhouse gas emissions, as well as storing carbon in forests and soils. This process, known as carbon sequestration, locks the carbon away where it cannot impact the atmosphere for many, many years. (The carbon in a tree, for example, will only be released once it decomposes.)

Product stewardship can assist with all of these efforts by minimizing the amount of fossil fuels required to manage a product throughout its life-cycle and by encouraging carbon sequestration. Producers, retailers, government officials, consumers, and other stakeholders who are concerned about climate change can do their part by participating in a variety of product stewardship strategies.

Projected Impact on Greenhouse Gases (2015, Oregon)	
Activity	MMTCO2 Equivalents
Material Production	10.9
Landfilling (net)	1.4
Combustion (emissions)	0.3
Composting	-0.1
Combustion (energy recovery)	-0.6
Recycling (forest related offsets)	-2.1
Recycling (manufacturing)	-1.0

### Strategies

#### Source Reduction

The term source reduction refers to a change in the design or manufacture of a product, or the provision of a service, that reduces the amount of waste produced or minimizes the toxicity of that waste. It can also refer to changes in consumer behavior that result in a reduction of waste. A number of source reduction techniques have a positive impact on climate change. These include:

- 1) Using less material to manufacture a product;
- 2) Using less virgin material to manufacture a product;
- 3) Providing services instead of products;
- 4) Efficient purchasing;
- 5) Reducing packaging;
- 6) Eliminating toxins from products;
- 7) Reusing products.

No matter the technique, fundamentally, source reduction is about reducing consumption. The less we consume, the more we reduce greenhouse gas emissions. Changes to manufacturing processes are particularly important because they are thought to have the biggest impact on emissions.<sup>1</sup> Many products can be designed and manufactured in a way that minimizes the amount of material inputs required. Reducing manufacturing materials results in less energy used procuring, transporting and manufacturing products. The less fossil fuel required to power the process, the lower the carbon dioxide emissions.

Some products can be designed so that they require less material inputs for servicing, too. Some types of carpeting, for example, are made up of interchangeable squares. This approach ensures that if a part of a carpet is worn out, the whole thing doesn't have to be

### Product Stewardship

Product stewardship efforts aim to encourage manufacturers and retailers to take increasing responsibility to reduce the life-cycle impacts of a product and its packaging – energy and materials consumption, air and water emissions, the amount of toxics in the product, worker safety, and waste disposal – in product design and in the end-of-life management of the products they produce.

### PSI

The Product Stewardship Institute (PSI) is a national non-profit membership-based organization that works with state and local government agencies, manufacturers, retailers, environmental groups, federal agencies, and other key stakeholders to reduce the health and environmental impacts of consumer products. PSI takes a unique product stewardship approach to solving waste management problems by encouraging product design changes and mediating stakeholder dialogues.

replaced. Source reduction can also be achieved through good consumer planning. Buying only the paint you need saves money and spares the environment, too.

When paper products are involved in the equation, source reduction has an even bigger impact because reducing the amount of paper required to make or package a product results in less logging. Forests are an important resource to consider in the fight against climate change because carbon is sequestered in the trees and forests. Eliminating 500 tons of paper is equivalent to taking 307 cars off the road for one year.<sup>ii</sup>

Source reduction also translates into less waste destined for the landfill. While landfills can act as 'carbon sinks', storing carbon in the ground that might otherwise be released into the atmosphere, they emit a lot of methane gas as the waste decomposes. In fact, landfills are thought to be responsible for 10 percent of greenhouse gas emissions in the U.S.

Eliminating toxins from products can also have a positive impact on greenhouse gas emissions because items free of toxins require fewer treatments for safe end-of-life reuse, recycling, or disposal. By simplifying the waste stream, the amount of energy required to properly manage that product is reduced.

### Recycling

Recycling represents another opportunity to reduce greenhouse gas emissions. Despite the fact that recycling itself requires energy, for many common products the process is better for the environment than using new resources. For example, for every metric ton of aluminum recycled, 6.51 metric tons of carbon dioxide equivalents are avoided.<sup>iii</sup> The chart on the right shows how recycling different materials can reduce carbon dioxide emissions. Recycling paper offers particular benefits because it decreases the need for logging. The more trees that remain in the forest, the more carbon is sequestered there. Manufacturers concerned about climate change should consider the benefits of using recycled materials as inputs or creating recyclable products and packaging.

Recycled Material	MMTCO2 equivalents
Newsprint	(1.53)
Fine paper	(4.38)
Cardboard	(3.54)
Aluminum	(6.51)
Steel	(1.20)
Copper wire	(4.11)
Glass	(0.12)
HDPE	(2.29)
PET	(3.64)
White goods	(1.48)
Personal computers	(1.61)

### Composting

Given the right mix of soil, oxygen, water and microorganisms, certain kinds of biological waste can be broken down in a controlled process known as composting. When done properly, composting also releases very little, if any, methane into the atmosphere. While composting isn't suitable for most waste, it can still lighten the load on landfills. According to the EPA, composting some discarded foods results in lower greenhouse gas emissions overall than if the same waste had been put in a landfill.

## Tools

There are several ways to calculate the impact of product stewardship programs on climate change. The EPA's Recycled Content (ReCon) tool can help manufacturers calculate the impact of using recycled materials to make products. The Waste Reduction Model (WARM), in contrast, performs calculations related to a product's end of life. WARM is designed to track and report greenhouse gas emissions related to different solid waste disposal methods. Currently, the WARM model can be used to estimate emissions associated with 34 kinds of waste. Both tools can be accessed online or used with Microsoft Excel.

## Challenges

While these models can often provide guidance for product stewardship programs, they do not incorporate the unique qualities of each state, such as the typical travel time involved in getting waste to a recycling plant or landfill. The current toolset also does not incorporate other important factors in planning product stewardship programs, such as cost or the impact a project might have on other environmental issues. The more these tools are refined, the better equipped decision makers will be to combat global warming.

## Contact Information

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<sup>i</sup> Allaway, David (2008) *Materials Management, Climate and Waste: Making the Connections*. Oregon Department of Environmental Quality.

<sup>ii</sup> Environmental Protection Agency. (September, 2002) *WasteWise Update: Global Warming... is a Waste*. Available from: <http://www.epa.gov/wastewise/pubs/wwupdate18.pdf> (Accessed: March 1 2008).

<sup>iii</sup> ICF Consulting (2005) *Determination of the Impact of Waste Management Activities on Greenhouse Gas Emissions: 2005 Update Final Report*, Contract No. K2216-04-0006, Environment Canada and Action Plan 200 (Natural Resources Canada), Ex. 8-3, p. 91.