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Puzzled About Recycling's Value?

Look Beyond the Bin

Printed on paper that contains at least 20 percent postconsumer fiber.

Seeing the Full Picture

IT'S NO PUZZLE—recycling makes sense. The concept is simple: recycling turns materials that would otherwise become waste into valuable resources. Collecting used bottles, cans, and newspapers and taking them to the curb or to a collection facility is just the first in a chain of events that generates a host of financial, environmental, and social returns (see below). Some of these benefits accrue locally as well as globally. As this booklet explains, when all the pieces of recycling are put together, the overwhelming conclusion is that recycling boosts the economy, conserves natural resources, and reduces solid waste.

THE BENEFITS OF RECYCLING

- Recycling protects and expands U.S. manufacturing jobs and increases U.S. competitiveness.
- Recycling reduces the need for landfilling and incineration.
- Recycling prevents pollution caused by the manufacturing of products from virgin materials.
- Recycling saves energy.
- Recycling decreases emissions of greenhouse gases that contribute to global climate change.
- Recycling conserves natural resources such as timber, water, and minerals.
- Recycling helps sustain the environment for future generations.

Broadening the Financial Focus

COST SAVINGS

IN SOME COMMUNITIES across the United States, recycling is a cost-effective way to manage municipal solid waste. The experience of Madison, Wisconsin (population 201,000), for example, illustrates the economic benefits curbside recycling can provide midsized U.S. cities. In 8 years, the city more than tripled its diversion of residential solid waste while also decreasing the net annual cost of solid waste services from $158 per household to $139. A recycling rate (including composting) of 49 percent reduced the number of garbage routes needed and helped hold landfill tipping fees in check.[1]

As solid waste managers take advantage of various cost-saving methods for collecting residential solid waste and recyclables, the business of municipal solid waste collection will become even more cost-effective. Successful strategies include changing collection frequency, introducing automated collection equipment, and improving routing design. Dozens of local governments and haulers across the country have demonstrated that these and other strategies can have dramatic impacts on the bottom line while improving the quality of service delivery.[2]

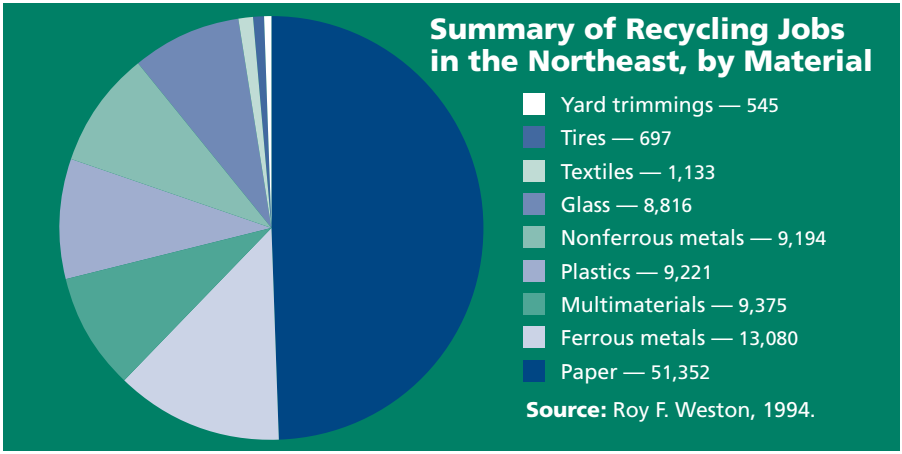
Mesa, Arizona (population 314,000), is one city that saved money by recycling. When the city integrated curbside recycling into its solid waste management system, it was able to reduce the number of garbage pick-ups from twice per week to just once. To reduce costs further, the city also upgraded its fleet of collection trucks (thus reducing labor and maintenance costs), streamlined collection routes, and initiated staff productivity

and cost tracking systems. Mesa's efforts resulted in a net annual cost savings of more than $650,000.[3] In a similar fashion, Loveland, Colorado (population 44,000), enjoyed an estimated net savings of $200,000 per year by purchasing specially designed dual-collection trucks that allow the collection of solid waste and recyclables in the same truck.[4]

ECONOMIC DEVELOPMENT

Advances in the collection of solid waste and recyclables are only one piece of recycling's economic success. Recycling also has made a vital contribution to job creation and economic development. Recycling creates or expands businesses that collect, process, and broker recovered materials as well as companies that manufacture and distribute products made with recovered materials. Numerous studies have documented the billions of dollars invested and the thousands of jobs created by recycling. A 1995 recycling employment study for the state of North Carolina, for instance, documented that recycling activities support more than 8,800 jobs in the state, most of which are in the private sector. The study also found that recycling was a net job creator—for every 100 jobs created by recycling only an estimated 13 were lost in solid waste collection and disposal and virgin material extraction within the state.[5]

In addition, a study of 10 northeastern states found that processing and remanufacturing recyclable materials in the region added more than $7.2 billion to the value of the materials. According to the study, recycling employed more than 103,000 people, 25 percent in materials processing (i.e., sorting and intermediate processing facilities) and 75 percent in manufacturing (see graph below).[6] These studies show that thousands of communities are realizing benefits from recycling far beyond diverting materials from landfills and incinerators.



RECYCLING INDUSTRIES

Industries that use recovered materials are a vital and growing sector of our economy. Today's recycling programs provide manufacturers with many of the raw materials they need to operate more efficiently. Our growing supply of recyclables keeps manufacturing industries more competitive and more sustainable.

The increased use in recent years of "minimills" by steel producers illustrates the importance recovered materials hold for some industries. Steel minimills utilize a manufacturing process that requires virtually 100 percent recovered scrap steel as the raw material. Indeed, all steel products manufactured in the United States, including bridge components, road signs, and construction materials, are made from some recycled steel. Steel can recycling, in conjunction with the recycling of scrap automobiles and appliances, feeds these mills.[7]

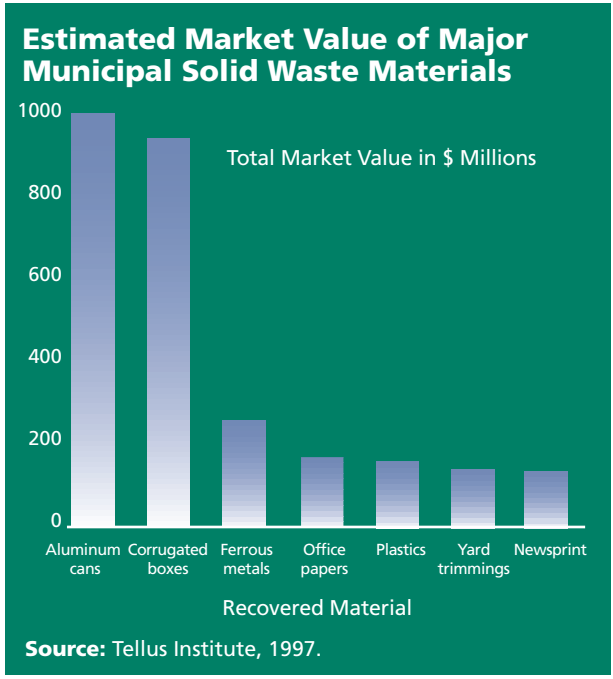
> The materials collected in recycling programs are not "garbage" or "waste"—they are valuable commodities.

The paper industry is another sector of the economy that depends on recovered materials. Currently, the supply of commercial timber in the United States cannot satisfy the current and projected fiber demands of paper mills. Consequently, the use of recovered paper at domestic mills is growing more than twice as fast as the use of virgin wood fiber.[8] In this decade alone, the U.S. paper industry will spend more than $10 billion on new or expanded recycled paper mills.[9] The industry will need recovered paper from both commercial and municipal recycling programs to supply these mills with raw materials. According to one industry expert, recovered paper will account for 47 percent of global papermaking fiber by 2010.[10]

RECYCLABLES AS COMMODITIES

In 1995, the United States recovered 56 million tons of materials from the municipal solid waste stream for recycling (including composting).[11] Based on average national price information for May 1996 to April 1997, these recovered materials have a total market value of approximately $3.6 bil-

lion.[12] As shown in the graph on the right, aluminum cans and corrugated boxes have the highest market values, at $1 billion and $940 million, respectively. As these numbers show, the materials collected in recycling programs are not "garbage" or "waste"—they are valuable commodities that represent an essential component of today's marketplace.



As with any business, recycling is subject to the cyclical highs and lows of free market supply and demand. While there have been periods when prices for recyclables were relatively low, they have been consistent with historical trends for both virgin and recovered materials. In fact, for all markets, prices are normally unstable during the early stages of development. Some recovered material markets, such as plastics, are relatively young and will continue to mature and stabilize with the expanded use of recovered materials in manufacturing and increased purchases of products with recycled content.

An innovative mechanism for buying and selling recovered materials that is intended to stabilize markets is the Chicago Board of Trade Recyclables Exchange <www.cbot-recycle.com>. Recycling made headlines and moved into the league of soybeans and porkbellies with the launch of this Internet-based system in 1995. EPA helped establish the Recyclables Exchange in conjunction with a group of partners from around the country. This centralized marketplace is designed to bring the same level of price stability and quality standards to recovered materials that has occurred with other long-standing commodities traded every day on the floor of other Chicago Board of Trade exchanges.

Expanding the Environmental View

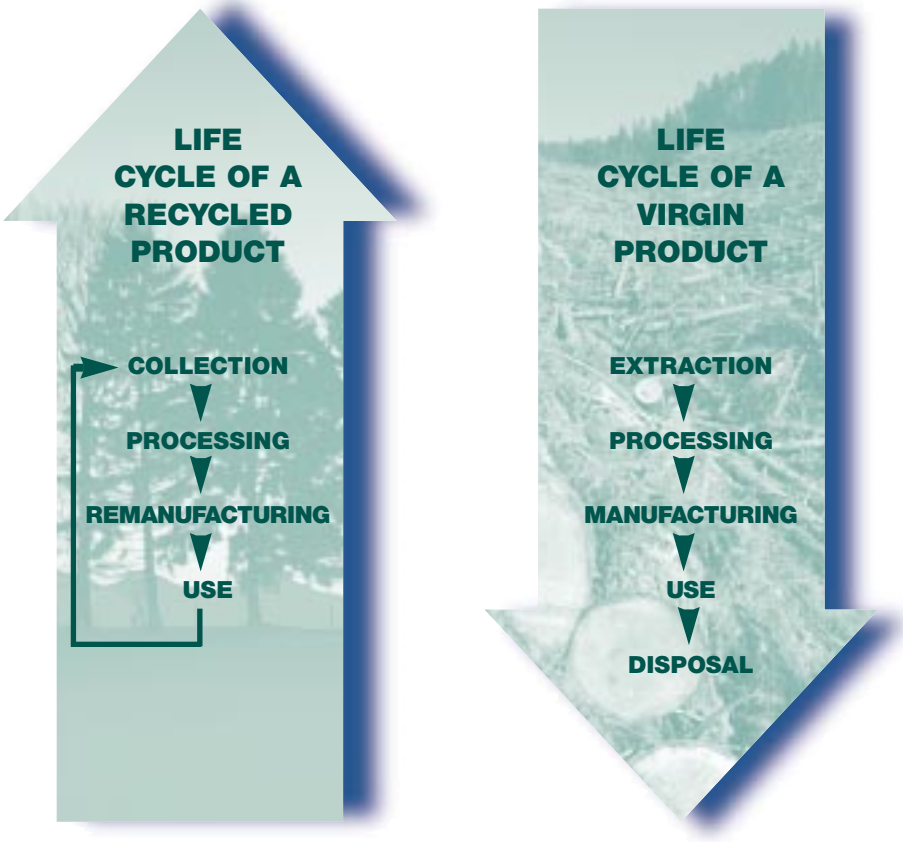
IN ADDITION to providing economic benefits, recycling offers environmental benefits. By reducing our reliance on virgin materials, recycling reduces pollution, saves energy, mitigates global climate change, and reduces pressures on biodiversity. Recycling's environmental benefits are found at every stage of the life cycle of a consumer product, from the mining of the raw materials through use and final disposal.

REDUCING POLLUTION

By decreasing the need to extract and process virgin materials, recycling helps reduce or eliminate the pollution associated with the first two stages of a product's development: material extraction and processing. Mineral extracting and processing often pollute air, land, and water with toxic materials. In addition, both mining and processing operations require energy—that is, the burning of fuels such as coal, oil, and natural gas. When burned, these fuels release pollutants, such as sulfur dioxide, nitrogen oxide, and carbon monoxide, into the air.[13]

When products are made using recovered rather than virgin materials, less energy is used during manufacturing and, consequently, fewer pollutants are emitted. Studies show that less energy is needed to manufacture products from recovered materials than from virgin materials. As shown in the graph on page 9, manufacturing products from recovered materials can reduce the amount of energy needed by as much as 94 percent.[14]

A recent analysis of several studies concluded that the environmental impacts of recycled-content products are less than those of virgin products when the two are compared *over their entire life cycles.* The analysis found that when compared to a system based on the use of virgin materials and landfilling or incineration, recycling and manufacturing products from recovered materials results in a net reduction in 10 major categories of air pollutants (aldehydes, ammonia, carbon dioxide, carbon monoxide, hydrocarbons, methane, nitrogen oxides, other organics, particulates, and sulfur oxides) and 8 major categories of water quality indicators and water pollutants (biochemical oxygen demand, chemical oxygen demand, dissolved solids, iron, metal ions, oil, sulfuric acid, and suspended solids). Using recovered materials also generates less solid waste, whether measured by weight or volume.[15]



MITIGATING GLOBAL CLIMATE CHANGE

In reducing air and water pollution and saving energy, recycling offers an important environmental benefit: it reduces emissions of the greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons, that contribute to global climate change. There is a growing international consensus that a link exists between these gases and a rise in average global temperatures. A rise in global temperatures will increase the frequency and severity of extreme weather events. In the United States alone, the number of blizzards and heavy rainstorms has jumped 20 percent since 1900, making events that once occurred an average of once every 100 years much more frequent. Globally, economic damages from weather-related disasters during the 1990s have exceeded $200 billion—four times the total losses reported during the 1980s.[16]

The manufacture and distribution of products, and the subsequent management of the solid waste they create, contribute to the emission of greenhouse gases. Recycling (including composting) helps reduce greenhouse gas emissions by (1) decreasing the energy needed to make products from virgin materials (and thereby reducing the burning of fossil fuels), (2) reducing emissions from incinerators and landfills, which are the major source of methane

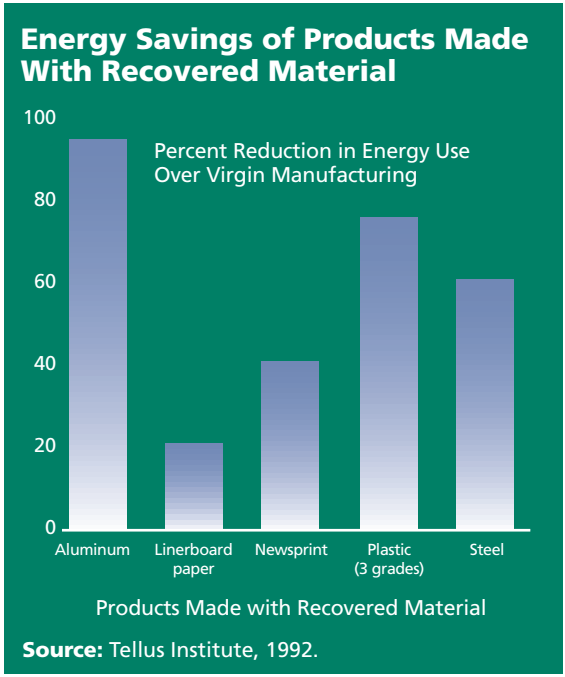
HOW RECYCLING STACKS UP

Buying recycled office paper—and recycling it—has never been easier. Even actions this simple can make a real difference in a product's environmental impacts. When compared to manufacturing and disposing of a ton of virgin office paper, manufacturing and recycling a ton of recycled paper reduces solid waste, energy use, pollution, and greenhouse gas emissions.[17] Specifically, manufacturing and recycling a ton of recycled office paper:

- Reduces solid waste by 49 percent.
- Reduces total energy consumption by 43 percent.
- Reduces net greenhouse gas emissions by 70 percent of carbon dioxide equivalents.
- Reduces hazardous air pollutant emissions by 90 percent and particulate emissions by 40 percent.
- Reduces absorbable organic halogen emissions to water by 100 percent and suspended solids by 30 percent.

Source: Environmental Defense Fund, 1995.

gas emissions in the United States, and (3) slowing the harvest of trees, thereby maintaining the carbon dioxide storage benefit provided by forests.



PROTECTING BIODIVERSITY

Extracting fewer virgin materials not only decreases greenhouse gas emissions, it also prevents the disruption of land areas that are home to a wide variety of plant and animal species. As a result of human activities, including the acquisition of virgin materials, species of plants and animals are now vanishing 100 to 1,000 times faster than would be expected in the absence of such activities.[18] Such diminution of the earth's biodiversity has a substantial human cost because wild species and natural ecosystems provide numerous benefits to people. Some economists, for example, estimate that the lost pharmaceutical value from plant species extinctions in the United States alone is almost $12 billion.[19] By reducing the land disturbance and pollution associated with virgin materials extraction, recycling helps stop the degradation of the earth's ecosystems.

VALUING NATURAL RESOURCES

Paper recycling has a direct impact on the protection of biodiversity in forests. A case in point is the decline of the longleaf pine forests that once covered 60 to 90 million acres in the southern United States. Due in large part to the harvesting of mature longleaf pine for the production of wood, paper, and other products, less than 5 percent of the original longleaf ecosystem, home to over 20 endangered species, remains today. [20] The recycling of paper products lowers demand for wood, consequently reducing pressure to harvest the remaining longleaf pine trees.

Sketching the Social Landscape

THE ECONOMIC AND ENVIRONMENTAL BENEFITS of recycling have positive societal impacts both today and in the future. Job creation, pollution reduction, and energy conservation all serve to improve the quality of life in our communities. If we do not recycle, the repercussions will fall on future generations. Our children and grandchildren will inherit the legacy of virgin production and throw-away consumption. Instead of leaving future generations a depleted natural resource base and more waste in landfills—landfills that incur ongoing costs for monitoring and maintenance—we can leave a stronger economy, greater biodiversity, and less global warming by recognizing the value of recycling and passing this knowledge on to our children.

PUTTING THESE PRINCIPLES INTO PRACTICE

Given that recycling has numerous economic, environmental, and social benefits, is there a way to factor in all these benefits when making decisions about solid waste management? The province of Alberta, Canada, recently developed a methodology that goes beyond monetary costs and allows communities to take into account the environmental, health, and social costs associated with solid waste management options (see below). Even though these considerations cannot be measured in monetary terms, they represent real costs to a community. With this methodology, communities can use a ranking system to estimate the nonmonetary impact of their programs on the natural environment, human health, and society and then incorporate these impacts into the analysis along with the monetary costs of their operations. This approach provides decision-makers with full disclosure of all of the benefits and costs of a particular project or service.[21]

BROOKS SEES THE FULL PICTURE

The town of Brooks in Alberta, Canada, used a step-by-step methodology to evaluate its composting program and justify an expansion to source-separated composting. First, the town itemized and calculated all the monetary costs of the project. Officials then used an environmental advisory group to help identify and rank the project's environmental, health, and societal impacts. The group used a scale of 1 to 5 ("unfavorable" to "outstanding") to rank such considerations as air and water quality, environmental sustainability, illegal dumping potential, and noise and odor effects. After ranking each factor separately, the group arrived at an average ranking for all the factors, placing more importance on some factors than others. The project received an overall ranking of 4, or "very favorable."

Using the results of the complete analysis—the project's nonmonetary ranking plus the total monetary cost—officials were able to demonstrate the community benefits and long-term viability of the expanded composting program to the town council, interested citizens, and other key stakeholders. The composting program currently diverts 1,000 tons of yard trimmings annually from the local landfill. The town is now planning to evaluate the full costs of its recycling program using the same methodology.

Notes

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