Recycling Improves USA

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Abstract: Changes are occurring in recycling that will improve the United States. There are significant improvements in the economy, environment and the health of Americans due to recycling efforts. Recycling will be shown as a superior option compared to landfill, incineration and virgin material processing. Many Case studies will be discussed that show how communities are making long-term decisions for recycling. The purpose of this study was to show the most important ways in which Americans currently benefit from recycling and how it will lead to further improvements in the future.

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Research was conducted to prove that recycling benefits Americans. The supporting data collected leads to many positive avenues relating to our economy, environment, and health. When these three factors are put together the results are overwhelmingly in favor of recycling.

In summarizing the past research and putting it in perspective with current events, it is obvious America's future will benefit from recycling. Many Case studies will be discussed that show how cities and communities are making long-term decisions for recycling plans. The main goals of the plans are to save residents money on recycling as well as provide environmental and health benefits. The purpose of this study was to show the most important ways in which Americans currently benefit from recycling and how it will lead to benefits in the future.

Recycling Improves the Economy

Recycling Creates Jobs

One benefit of recycling that is commonly overlooked is the jobs associated with it. In 2001 the National Recycling Coalition released a report that showed recycling does makes economic sense. This report showed that jobs in recycling in America totaled over 1.1 million ("National Recycling Coalition," n.d.). This is comparable to the auto and truck manufacturing industry. Wages in the recycling industry are higher than the national average wage for all industries. For the future, as the demand for recycling goes up, so will the demand for jobs in recycling. This is because the wages are competitive. This proves that recycling benefits America by not only creating jobs, but by creating well paying jobs.

Recycling Profits

Currently the most interesting benefit to recycling is the profits that have been generated in the last few years. While initial investment of new technology and implementation of new recycling systems may be high, profits for recycling can only increase in the long-term. The initial investments are only the short-term effects. For recycling the long-term effects should be considered since waste per person and recycled waste per person is on the rise ("U.S. Environmental," 2004). From the increase in both these areas it is clear that profits can easily increase.

In 2002 the city of Tucson, Arizona implemented a new residential recycling program. The new program was just under a year old when gross profits from the recycling program were estimated to be \$1.6 million for the 2003 fiscal year (Abeyta, 2004). Tucson area residents recycled newspapers the most, the recycled newspaper was turned into blank print and then sold back to Tucson Newspapers). The collected recycled glass was sold to Tucson Ready Mix INC (Abeyta, 2004). There it was ground and used to replace sand to make what the company called

"glassphalt" and was used in making parking lots, sidewalks and biking trails. Other items like plastic, aluminum and steel were sold to local businesses or were often sold to China to meet their resource needs.

Savings from Reduced Landfill Use

It would make sense that fewer landfills would lead to savings. The city of New York has realized these savings. Mayor Michael R. Bloomberg has made plans to invest in a large long-term recycling program. The city made a contract in September with the Hugo Neu Corporation that will save the city money by paying less in fees for its recyclable trash (Urbina, 2004). The key to the plan will be finding markets for the recycled materials. Before the contract the city paid \$51 per ton, under the new contract the city will pay \$48 per ton for the first 5 years. The city is hoping that within 5 years, markets for the recyclables will be established and savings will increase. Currently, if the city didn't recycle it would cost them about \$70 per ton to have it sent to a landfill (Urbina, 2004).

The advantage that recycling has over using landfills, in an economic sense, is that money can be made from recyclables. Not only is there little possibility to make profit from landfills, landfills also have associated management costs. They need to be managed because it has been found that ground water must be checked for contamination and leachate must be treated properly. These are unexpected economical costs that could lead to unexpected negative environmental and health costs down the road.

One of the simplest ways to save money from reduced landfills is to recycle food scraps and yard trimming by using a compost pile. It is estimated by the EPA that 23.6 percent of our municipal solid wastes can be composted ("U.S. Environmental," 2004). This includes 12.2 percent from yard trimmings and 11.4 percent from food scraps. That is nearly a quarter of what might be in our landfills. This saves by extending the life of a landfill and reducing the landfill fees Americans pay. Recycling food scraps and yard trimmings would have no associated costs if the compost pile method is used.

Recycling Benefits the Environment

Cleaner Backyard for America

A benefit to recycling that maybe realized too late is the savings from having fewer landfills. The fact is that no one wants to live by a landfill. This is from fear of water contamination, air pollution and just the smell of a landfill.

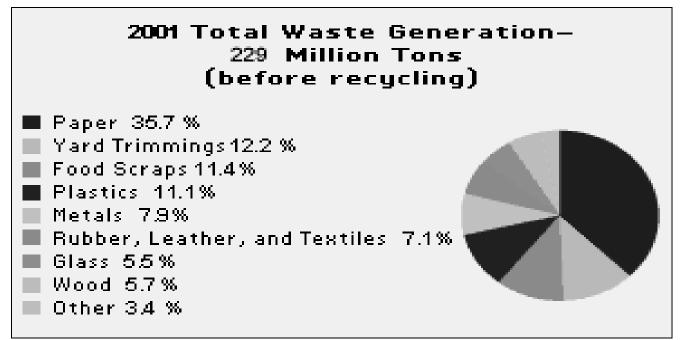


Figure 1. U.S. Environmental Protection Agency looks at the components of a landfill and the total waste generation ("U.S. Environmental," 2004).

As you can see most of our waste is easily recyclable. Adding up the paper, yard trimmings, food scraps, metals, glass, wood and some plastic show that over 80 percent of the United States' waste is recyclable. This percentage would greatly reduce the number of landfills and benefit the environment.

Recycling Conserves Resources

Americans can benefit from recycling by preserving our resources. It is hard to determine when our resources will run out. By recycling, America can extend the life of our resources. Recycling does use energy as a resource from the transportation and reprocessing operations but it takes more energy to extract and process virgin materials. These environmental benefits also lead to economic and health benefits (see Figure 2).

Material	Environmental Impact with Recycled vs. Virgin	Natural Resource Savings with Recycled vs. Virgin
Aluminum	Reduces pollution by 95%, (Reynolds Metal Co.)	4 lbs. of bauxite saved for every pound of aluminum recycled (Reynolds Metal Co.)
Glass	20% less air pollution; 50% less water pollution (NASA)	1 ton of glass made from 50% recycled materials saves 250 lbs. of mining waste (EPA)
Paper	95% less air pollution; each ton saves 60 lbs. of air pollution (Center for Ecological Technology)	Recycling of each ton of paper saves 17 trees and 7000 gallons of water (EPA)

Plastic		If we recycled every plastic bottle we used, we would keep 2 billion tons of plastic out of landfills (Penn State)
Steel	Every year we create 11.5 million tons of ferrous wastes (Steel Recycling Institute)	One ton of recycled steel saves 2,500 lbs. of ore, 1000 lbs. coal, and 40 lbs. limestone (Center for Ecological Technology)

Figure 2. Examines natural resource and environmental savings when chosen over virgin material manufacturing ("Environmental benefits," 1999).

Recycling Decreases Greenhouse Emissions

Scientists can prove that human activities have changed the composition of the earth atmosphere by releasing more than normal amounts of greenhouse gases ("U.S. Environmental," 2000). The effect that greenhouse gases have is they trap heat in the earth's atmosphere when increased levels of the gas are present. The two most prevalent greenhouse gases are carbon dioxide and methane. Recycling releases less of these two greenhouse gas compared to incineration, use of landfills and production of virgin materials.

Recycling produces less greenhouse gasses than the production of virgin materials because it takes a lot more energy to extract and process virgin materials than it takes to collect and reprocess recycled materials. The problem is the energy used has carbon dioxide as a by product.

Incineration also creates more greenhouse gases than recycling. The amount of carbon dioxide produced from incineration is substantially larger than that which is produced by recycling. The most widely recycled material is paper and if it is incinerated instead of recycled the negative effects are doubled. Trees will be cut down, so less carbon dioxide will be converted to oxygen, and the incineration of paper will create more carbon dioxide.

The second major cause of the greenhouse effect is methane emissions. Landfills are the largest source of methane gas (Energy Information, n.d.). Although this is changing because scientists have begun to harvest the methane gas from newer landfills and use it as a source of energy. Methane gas is not harvested at all landfills, especially old ones that are not set up for the operation. Landfills are still the single largest contribution to methane emissions. Methane gas is 20 times more effective at trapping heat in the earth's atmosphere than carbon dioxide (Energy Information, n.d.). This means that methane is an effective contributor to global warming, second to carbon dioxide.

Recycling Benefits Health

Recycling Decreases Water Contamination

The less Americans send to landfills would mean fewer landfills polluting our air and water. The main concern with water pollution from landfills is leachate. Leachate is the water that collects contaminants as it trickles through wastes. If leachate leaks from landfills it will cause toxic contamination of ground and surface water. If our drinking water is contaminated by leachate it can harm our health ("Hazardous Waste,"2004). To correct this, landfills must be designed with protective liners and collection systems. All of which are added economic expenses while our heath is compromised. Both of these would be greatly decreased if we were to recycle more and dispose less.

Less Pollution from Virgin Material Manufacturing

In many cases, less pollution is generated when materials are made from recyclables as opposed to virgin materials. To get raw materials from virgin materials we must use extraction and processing techniques. These first two stages of material development pollute our air, land and

water. They use a large amount of energy when compared with the amount of energy that is required to collect and reprocess recyclables ("U.S. Environmental," 1998). The creation of this energy creates more air pollution from the use of fossil fuels. The extraction stage can pollute our ground water when mine drainage occurs. Both stages put our health at risk from the lower quality of air and water.

An example of a material that is extremely economical to recycle is aluminum. Aluminum is actually the most recyclable material we use. Recycling of aluminum only takes 5 percent of the energy that is used to make aluminum from the virgin material bauxite (Hamilton, 2002). Once aluminum has been created it can be used over and over again without deteriorating (2002). With aluminum recycling using only one-twentieth the amount of energy of producing virgin aluminum, we can achieve a better quality of air and water for healthier living.

Negative Aspects of Recycling Analyzed

Economies of Scale

One problem with recycling is that there needs to be a sufficient volume of recyclable materials in an area to make it a profitable venture. Because of this, many low populated counties around America are prevented from recycling participation. One solution would be to reduce the costs associated with a small operation in many different areas and have one large-scale operation in a centralized location covering a few areas. One example of this method is a current situation going on in three Wisconsin counties. In 2002, Brown, Outagamie and Winnebago counties formed a tri-county cooperative agreement to reduce recycling and landfill costs and pass the savings on to the residents ("Brown, Outagamie," 2002). The counties plan to collaborate their assets and "increase economies of scale, maximize existing assets, and obtain operational savingS" ("Brown, Outagamie," 2002, ¶ 4). To achieve this, each county played a role in selecting the locations for materials recovery facilities and landfills based on hauling costs for maximum efficiency. Once everything was in place the counties felt confident that the new system was cost-effective. The tri-county cooperative agreement recycling and solid waste plan is estimated to save the three counties \$35 million in disposal cost over a 25-year period and \$8 million in recycling costs over a 12 year period (2002).

Large Initial Investment Costs

The problem is that landfills are a better short-term solution and recycling is a better long-term solution, economically. Landfills are a reactive solution and recycling is a proactive solution. Figure 3 shows a rough estimate for which landfills are an easier short-term solution and reasons to support long-term recycling plans. The bottom line is that in the long run recycling has the potential of paying for itself whereas landfills do not.

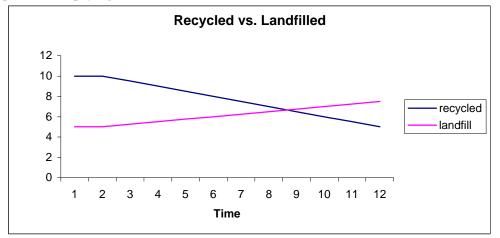


Figure 3. Recycling plans versus Landfills. ("U.S. Environmental," 1998)

Recycling Reduces Transportation Costs

A concern with the most popular recycling method, curbside recycling, is the associated transportation costs. Most people assume another recycling truck needs to be purchased and the pick up route will be covered twice. This, however, is not the case. Dual-collection and co-collection options are available (De Roze, 1996). With co-collection a trailer is attached to the traditional packer. With dual-collection a modified, or new, packer body is needed. In either case, an initial cost for truck improvement is necessary, but routes will not have to be run twice. The additional costs of the labor and transportation will be absorbed by the profit from the sold recyclables and the lower landfill fees. Now the possibility to break even or make a profit is possible.

Conclusion

Americans will benefit economically as well as environmentally and will be able to live healthier when recycling is chosen over other alternatives. The most important factor to most Americans is whether or not recycling is economically viable. The answer is yes, it is; in the long run. It is difficult to put a monetary value on the environmental and health benefits because they are weighted differently by different people. However, if an individual cares even a little about the environment and their health, the total benefits still out weigh the alternatives.

Because landfill tipping fees are on the rise, recycling is getting even more economical. The main reason tipping fees are increasing is because it has been discovered that the air and water around landfills needs to be managed and this costs money. Setting aside monetary issues, Americans are starting to care more about the environment and their health. Right now the benefits of recycling are paying for themselves and them some. The outlook for the future of recycling is only getting better. The fact of the mater is that America is improving from recycling.

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