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LB492

Paper Recycling

Paper is one of the most important resources on our earth; it is the sole source that connects us to the past, present and future. It can come in the form of literature, photographs, currency, and even certificates that document each and every moment in our history. These works can continue to teach, inspire, and remind, centuries after being recorded. For being such a treasured element, the wasting of paper is still extremely high. In the US paper makes up 29% of waste, this is higher than any other material disposed of by Americans, but recycling efforts have helped put 63% of used paper back in circulation to be refurnished into new paper.[[1]](#footnote-1) Recycling has helped increase environmental conditions in the US for the past 30 years. It has helped reduce waste and pollution and increase knowledge about being environmental friendly. Paper recycling in specific has drastically changed over the past few decades, getting more and more efficient each year. Looking through the history, environmental and economic factors of paper recycling, suggests it is overall beneficial to the environment and the economy, and it is important to continue efforts that support it.

The use of paper has been around for centuries, starting in China in the year 105 different materials such as cotton, linen, bark, straw and wood were used as paper like products. The use of wood as a means for paper did not start until about a century ago when education began to become widespread in both Europe and South America. As the expansion continued printed products became more popular and there was a much higher demand for them. Wood as a means to make paper became very popular because this material unlike others could produce fibers that allowed for the production of materials such as newspapers, books, and journals. The paper industry took off and started making a variety of products that strayed from just books and newspapers to packaging and labels. With virgin materials producing such high quality products there was no need to recycle paper. It wasn’t until the 1970s when waste disposal started to become a big issue. With an increase in packaged goods, there also came an increase in waste. At this time resource consumption gained a lot of attention, paper product recycling earning the most criticism. Although criticism continued for almost a decade no action was taken until the 1980s when information became readily available about how much solid waste was actually paper. It was at this point when there was a strong emphasis on recycling paper to try and help reduce the extremely high volumes of wastepaper. [[2]](#footnote-2)

A great deal of progress has been made in the past 30 years regarding this issue. Today various organizations such as the American Forest and Paper Association along side with the EPA (Environmental Protection Agency) have put forth efforts to try and prevent as much paper as possible from entering landfills, and their work has paid off, “more paper is recovered in America for recycling than all other materials combined”.[[3]](#footnote-3) Currently “More than one third (37 percent) of the raw material fiber US papermakers use comes from recovered paper”, and by 2012 60% of paper consumed in the US is being recovered.[[4]](#footnote-4) The paper recycling industry got off to a slow start but by the early 1990s a significant increase occurred, and since then “more paper has been recovered in America than landfilled”.[[5]](#footnote-5) The recycling market today is at the highest it’s been in history and seems to be making a huge positive impact both economically and environmentally.

In order to better understand the benefits of paper recycling, it is important to understand the process that paper goes through, as it is recycled. Paper recycling can be a long process, but the end product is more environmentally friendly then landfilling paper or starting from virgin materials. The first step in recycling paper is collection. Paper can either be taken to a local recycling center or bin, or it may be picked up curbside along with other recyclable materials. Once paper is at an appropriate recycling center it is sorted and tightly wrapped into bales and transported to a paper mill where it can be made into new paper. Once paper arrives at the paper mill it is stored in various warehouses until it is needed to produce different paper products. When the paper is needed it is taken out of storage and conveyed to a pulper. The pulper contains water and chemicals and of course the recycled paper, it breaks down the recovered paper into small pieces. The mixture is then heated which helps break down the paper even more into small fibrous strands, once broken down into a slushy mixture it is called pulp. The resultant mixture is then passed through a series of screens to help remove contaminants such as dirt, plastics, glue and clay. The next step in recycling paper is cleaning; although the large contaminants were removed there are still many smaller contaminants to be extracted from the mixture. The pulp is pushed through large cylinders, which push the heavy contaminants toward the outside of the cylinder; the pulp is then free to move through to the next step. For most pulp the next step is de-inking, this process removes printing ink as well as adhesive materials such as glue. There are two different types of de-inking, the first uses water in a process called washing to help remove small ink particles from the pulp mixture, and the second uses air bubbles to remove larger particles and adhesive materials in a process called floatation. Floatation requires soap like chemicals called surfactants to be injected into the pulp; this loosens the ink from the pulp and causes it to stick to the air bubbles. The air bubbles then accumulate on the surface and can be easily removed from the remaining mixture. Now that the pulp mixture is clean it is almost ready to be remade into paper. Refining is used to help separate large bundles of fibers that may have swelled together during the cleaning process. In addition, when making white paper, the pulp is bleached with a variety of chemicals to give the paper its white appearance. The pulp is now finally ready to be remade into paper, the now clean mixture is poured onto heated rollers which squeeze out excess water and help dry the paper. Once dried the paper is cut into appropriate sizes and shipped off to designated locations. [[6]](#footnote-6)

The paper recycling process is definitely long and resource intensive, and although the finished product helps keep the environment green it is not a foolproof process. There are a few drawbacks of paper recycling that are important and need to be addressed. First of all the process of recycling paper is not completely environmentally friendly. It also uses resources that can have harmful effects on the environment. As we saw previously recycled materials need to be transported from the recycling center to the paper and to its final destination, all of this traveling requires fuel and therefore a consumption of resources. The machinery that preforms the actual recycling process runs on oil and electricity as a source of power and is not an entirely environmentally friendly process. Another major downfall of the recycling process is the amount of wastewater it produces. Clean water is used for multiple steps in the process and each time, that water is discarded and fresh water is used. The discarded water often times contains many contaminants and toxins such as chlorine dioxide, hydrogen peroxide, along with soaps and residue washed off the paper. One study suggested that by recycling one ton of paper, anywhere from 5,000-10,000 gallons of wastewater is produced.[[7]](#footnote-7) Many times, this excess of wastewater can result in a build up of harmful toxins in the water supply surrounding the mills, which can be dangerous for nearby lakes and rivers as well as the animals and humans living in that area. An additional drawback of paper recycling is the fact that paper fibers cannot be endlessly recycled. On average “It is generally accepted that a fiber can be used five to seven times before it becomes too short to be useable in new paper products”.[[8]](#footnote-8) This means that there can never be an earth where all paper is continually recycled which means that trees must still be cut down and the virgin materials process will still occur, which actually uses much more energy and resources than the recycling process. Also paper that has long fibers can be broken down to make materials with either short or long fibers, but once recycled the fibers shorten and can then only be produced to make short fiber products such as newspaper. This is a drawback because once paper is recycled a few times it can only be used for the purpose of short fibers, which leaves long fibers more scarce and therefore at a much higher value. Many more products are made from long fibers than from short fibers so this is not very economically friendly in the long run. Paper recycling has never been a very economically beneficial process though. An article published in The New York Times titled “Recycling is Garbage” stated that “Recycling may be the most wasteful activity in modern America: a waste of time and money, a waste of human and natural resources.”[[9]](#footnote-9) This article initially had a bias argument against recycling, but some of the points it presented against recycling were valid. In many states the supply of recycled paper is not in synch with the demand. This leaves many companies stuck with excess amounts of wastepaper that no one wants to buy. Most of the time these companies end up having to pay to get rid of this extra paper and often times it ends up in a landfill. Although some states have tried to pass regulatory bills to try and increase the amount of recycled paper that must be bought by government agencies, most have not passed. So companies are still left with an overflow of paper that they are unable to profit off of.[[10]](#footnote-10) It is clear to see that there are some pretty detrimental drawbacks of paper recycling that leave some people questioning their decision on whether to recycle it or not.

Paper recycling does bring a few drawbacks to the table but the environmental benefits that it produces outweigh the costs. One of the major reasons recycling is so beneficial is the amount of energy it uses compared to making materials from scratch. Recycling paper uses about 40% less energy then producing it from scratch.[[11]](#footnote-11) When making paper from virgin materials about 4,000 kilowatt hours of electricity are used, whereas recycling paper only uses about 1,600 kilowatt hours of electricity per ton, so “by recycling one ton of paper, enough energy is saved to power the average American household for six months”[[12]](#footnote-12) According to another source “Recycling one ton of paper can save 17 trees, 7000 gallons of water, 380 gallons of oil, 3.3 cubic yards of landfill space, and reduce greenhouse gas emission by one metric ton of carbon equivalent.”[[13]](#footnote-13) Paper recycling has many benefits when it comes to the amount of natural resources it consumes, but there are other positive factors about paper recycling. One very important aspect that paper recycling allows is the saving of landfill space. One of the main reasons recycling even began was to help reduce the amount of space that was being consumed by landfills. Today Americans dump around 100 million tons of waste into landfills each year and about 41% of that waste is paper and cardboard[[14]](#footnote-14), although this number is still very high, it has been drastically reduced from past numbers. Recycling efforts currently divert “more than 60 million tons of garbage from ending up in landfills every year.”[[15]](#footnote-15) By reducing the amount of waste that is entering the landfill it also reduces the pollution that landfills give off as the materials within them begin to break down. If we are able to reduce landfill pollution then that means Carbon dioxide and methane gas emissions are also being reduced. This means less greenhouses gases that are slowly deteriorating our atmosphere, which in the long run will be very beneficial. Pollution is also avoided when comparing the recycling process to the process of making paper from virgin sources. According to the EPA “recycling causes 35% less water pollution and 74% less air pollution then making paper from virgin materials”.[[16]](#footnote-16) By reducing the amount of resources being used, this in turn allows for a substantial decrease in the amount of pollution being produced. In addition to a decrease in harmful pollutants, cutting down less tress for production of virgin materials may also reduce the emission of greenhouse gases. Each Year the average American uses seven tress worth of paper products, this amounts to about 2 billion trees per year in the US alone. Of these 2 billion trees about half of the products produced from them are thrown away; this waste generates enough energy to heat 50,000,000 homes for twenty years.[[17]](#footnote-17) If all of this waste paper were recycled, not only trees would be saved but also a substantial amount of energy and resources as well. Besides standard paper products that are used by consumers each day, newspaper is one of the most wasted paper resources in the US. To produce Sunday newspaper each week, 500,000 trees are cut down, a single run of The New York Times alone uses 75,000 trees. If all of this newspaper was recycled, 250,000,000 trees could be saved each year.[[18]](#footnote-18) This amounts to a saving of about 250 trillion acres of forest. If this many trees could be saved each year over 3 billion pounds of carbon dioxide would be absorbed from the atmosphere. This could drastically reduce the amount of greenhouses gases currently present in our atmosphere. It is clear to see that paper recycling has many benefits, and it has helped in multiple ways to help improve the current standing of our earth in terms of the environment.

Recycling has been one of the biggest environmental movements in our history, and it has slowly decreased the amount of waste being put into our earth. Although the process brings about a few downfalls that take away from its environmental benefit, overall it is exceptionally helpful in reducing the amount of resources used as well as the amount of waste produced. Paper recycling in specific has greatly helped reduce the amount of trees, pollution and greenhouse gas emission being used to create paper from virgin materials. Overall the recycling of paper yields a net benefit to the environment and efforts should be made by each individual to support this process to try and increase recycling numbers to their maximum potential.

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2. R. McKinney, *Technology of Paper Recycling* (Springer 1995), 2. [↑](#footnote-ref-2)
3. United States. Environmental Protection Agency. *Paper Recycling*. Washington DC: , 2012. Print. [↑](#footnote-ref-3)
4. Ibid. [↑](#footnote-ref-4)
5. United States. Environmental Protection Agency. *Paper Recycling*. Washington DC: , 2012. Print. [↑](#footnote-ref-5)
6. Earth Answers, The Leading Technical Association for the Worldwide Pulp, Paper and Converting Industry, 2001. [↑](#footnote-ref-6)
7. Pratima Bajpai and Pramod K. Bajpai, 1994. Biological colour removal of pulp and paper mill wastewaters. Journal of Biotechnology, 33 (211-220). [↑](#footnote-ref-7)
8. United States. Environmental Protection Agency. *Paper Recycling*. Washington DC: , 2012. Print. [↑](#footnote-ref-8)
9. Tierney, John. "Recycling Is Garbage." *New York Times* [New York City] 30 Jun 1996, pp. 1-8. Print. [↑](#footnote-ref-9)
10. Ibid. [↑](#footnote-ref-10)
11. United States. Environmental Protection Agency. *Paper Recycling*. Washington DC: , 2012. Print. [↑](#footnote-ref-11)
12. Berry, Jennifer . "The Economics of Paper Recycling " *Earth 911*. 28 2008: n. Print. [↑](#footnote-ref-12)
13. United States. Environmental Protection Agency. *Paper Recycling*. Washington DC: , 2012. Print. [↑](#footnote-ref-13)
14. United States . Annenberg Foundation . *Shrinking a Landfill* . Washington DC:, 2012. Print. [↑](#footnote-ref-14)
15. United States. Environmental Protection Agency. *Paper Recycling*. Washington DC: , 2012. Print. [↑](#footnote-ref-15)
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17. United States. The National Recycling Coalition Inc. *Paper Recycling: Benefits*. Washington DC:, 2012. Print. [↑](#footnote-ref-17)
18. Ibid. [↑](#footnote-ref-18)