



Preserving Resources,
Preventing Waste



The Economic Benefits of Recycling and Waste Reduction - WasteWise Case Studies from the Private and Public Sectors

New Jersey WasteWise Business Network - 2013 (Updated 2015)



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Executive Summary

Recycling is well-known for its environmental benefits, which include resource conservation, energy conservation and reductions in water and air pollution, including reductions in greenhouse gas generation, however, it also has significant economic benefits, many of which are often overlooked. Recycling is an important segment of the national and state economy, creates jobs and saves money for generators of waste. The businesses, institutions and local government entities highlighted in this report all understand that recycling makes both environmental sense and economic sense. Since the environmental benefits of recycling are more often the focus of much of the recycling discussion, this report will focus on the economic side of the recycling story and will demonstrate that recycling makes economic sense for New Jersey's commercial, institutional and governmental sectors.

The **New Jersey WasteWise Business Network** promotes waste reduction, recycling and the procurement of recycled products and is a great resource for companies and organizations looking to manage their waste in a more environmentally-friendly, economical and sustainable manner. Visit the New Jersey WasteWise Business Network online at <http://www.nj.gov/dep/dshw/recycling/wastewise/brbn03.htm>.

A Brief Look at the Economics of Recycling

While mandatory recycling has been the law in New Jersey since 1987 there are still some businesses and organizations that are not yet onboard with recycling and do not realize that recycling not only makes environmental sense, but also economic sense. On a national scale, recycling has encouraged the growth of an industry and created jobs. In New Jersey, recycling is an important segment of the state's economy and one that employs approximately 27,000 people. What is even more important to the generators of waste, however, are the dollar savings that can be realized through recycling. Such savings are realized when the avoided cost of disposal, reductions in needed solid waste services and potential revenue from the sale of recyclables are factored into the overall equation. Of course, there are some costs associated with recycling, as there are with all other day-to-day operations overseen by companies and organizations, however, generators of waste will see the economic benefits of a well-run and successful recycling program over time.

The avoided cost of disposal is the amount of money that is saved by not having to send waste to a landfill, incinerator or transfer station for disposal. It will vary depending upon the fee charged for garbage disposal at the facility in your area, but in New Jersey with such disposal fees averaging over \$80 per ton, the avoided cost of disposal can be significant. A successful recycling program will divert many tons of material away from disposal and thus the avoided cost of disposal must not be overlooked when considering the economic impact of your recycling program. The establishment of a well-run recycling program may also enable businesses and other organizations to utilize smaller solid waste dumpsters and to reduce the number of solid waste pick-ups (often referred to as "pulls") made at their locale. Negotiating such changes in the level of solid waste service received with the solid waste hauler servicing your company or organization can also result in considerable cost savings. In addition, businesses and organizations can realize economic benefits as a result of the sale of their recyclable materials. While prices for recyclable material commodities fluctuate as they do for other market commodities, generators may earn revenue from the sale of recyclable material depending upon the specific material, the extent to which it needs to be processed to make it market-ready and worldwide economic conditions.



Case Study - Lockheed Martin Mission Systems and Training, Moorestown, NJ



Lockheed Martin Maritime Systems and Sensors of Moorestown, NJ not only has an office recycling program in place wherein paper, commingled bottles and cans and corrugated cardboard are separated and recycled, but also a recycling program for various components of the construction and demolition waste stream. The latter program was implemented in order to handle the waste generated by the company’s recent large-scale construction projects and enabled Lockheed Martin to control and minimize construction project-related waste disposal costs. Lockheed Martin also initiated a food waste composting program in the 2nd quarter of 2011, however, the financial data for this initiative is not yet available. In addition, the company is looking into implementing a projector lamp recycling program in early 2013.

Lockheed Martin’s recycling data focuses on the avoided cost of disposal that it realized thanks to their recycling efforts. In 2011, the company realized **\$145,562.57** in savings as a result of material being recycled rather than disposed, as follows:

<u>Recycled Material</u>	<u>Quantity Recycled</u>	<u>Recycling Cost Savings</u>
Asphalt	685.00 Tons	\$ 60,204.65
Comingled Bottles & Cans	24.19 Tons	\$ 1,783.77
Concrete	673.00 Tons	\$ 59,149.97
Electronic Scrap	14.05 Tons	\$ 1,235.12
Metal	94.44 Tons	\$ 8,300.33
Mixed Wood and Pallets	89.07 Tons	\$ 4,054.11
Paper and Cardboard	146.93 Tons	\$ 10,834.62

Total Cost Savings (Avoided Cost of Disposal) = \$ 145,562.57

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Case Study - Janssen Pharmaceutical Companies of Johnson & Johnson, Raritan, NJ



Janssen Pharmaceutical Companies of Johnson & Johnson implemented numerous reuse and recycling programs at their location in Raritan, New Jersey and realized **\$85,694 in total cost avoidance savings** in 2011 as a result of these programs.

The company's reuse programs have focused on office furniture, office equipment and computer equipment. In addition, Janssen donated numerous items to Convoy of Hope, a disaster relief agency, including chairs, tables, promotional products, Styrofoam coolers, ice packs, glass jars, and any other items that could be helpful to those coordinating disaster relief efforts.

Janssen's recycling program keeps many tons of material out of the waste stream, thereby helping the environment and the company's bottom line. Included among the materials recycled by Janssen are paper, bottles and cans, scrap metal, plastic, wooden pallets, ink cartridges, computers, polystyrene, kitchen grease and food waste.

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Case Study - Federal Correctional Institution at Fairton, Fairton, NJ



U.S. Department of Justice Federal Bureau of Prisons

The Federal Correctional Institution in Fairton, New Jersey recycles a variety of materials, including paper, tin and aluminum cans, corrugated cardboard, plastics and scrap metal. The materials are baled at the correctional institution, which not only makes the materials more manageable, but also more valuable. While the recycling of these materials is notable and helps reduce disposal costs at the Federal Correctional Institution at Fairton, the focus of this case study is the facility's on-site food waste composting system that became operational on July 30, 2012.

Both food preparation waste and unconsumed food from cafeteria operations are composted in the system. A carbon source is added to this nitrogen-rich mix and then sent through an in-vessel aerobic composter that was purchased from B&W Organics of Sulphur Springs, Texas for \$49,000. The mix must be maintained in the composting system at the correct temperature and moisture level for 72 hours. It is then removed from the composter and placed in rows to cure. The piles are turned every other day for three weeks. The end result of this process is the production of a nutrient rich compost that is used at the facility in various landscaping applications.

The Federal Correctional Institution at Fairton is recycling 1,000 pounds of food waste per day through its composting system. Thanks to the success of this program, the facility now only needs its 30 cubic yard garbage dumpster emptied every other week instead of on a weekly basis, which has resulted in disposal savings of **\$210.00 per week, or \$10,920 over the course of a year**. In addition, approximately \$7.00 in fuel and \$67.00 in labor costs are saved every other week as a result of this reduction in the amount of solid waste in need of disposal. Thus, the payback time for the purchase of the composting equipment is 4.5 years based solely on the annual savings in disposal costs. The payback time is just under 4 years when these other related savings are factored into the equation. By producing its own compost, the Federal Correctional Institution at Fairton also saves money in regard to its landscaping materials purchases.

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Case Study - Township of South Brunswick, NJ



The Township of South Brunswick, which is located in central New Jersey in Middlesex County, has always been very progressive in terms of recycling and thus has had a successful municipal recycling program in place for many years. The township's recycling program switched from a curbside dual stream recycling system to a curbside single stream recycling system in 2012. A large variety of paper grades and bottles and cans are collected through the curbside program. In addition to providing curbside collection of recyclable material, the township also operates a recycling depot wherein residents can drop off the materials collected through the curbside program, as well as recyclable scrap metal, appliances, rechargeable and button cell batteries, automobile batteries, tires, used motor oil, antifreeze, empty propane tanks and clean textiles. The recycling depot is open Monday through Saturday from 9:00 a.m. to 5:00 p.m.

Nancy Paquette, the former South Brunswick Township recycling coordinator, developed a compelling cost comparison between the township's residential solid waste collection/disposal and residential curbside collection recycling programs (both of which are collected on a weekly basis by the same company) in which she **determined that recycling is 60% more cost effective than solid waste disposal** on a cost per ton basis and a cost per pound basis. Ms. Paquette's calculations are as follows:

Estimated 2012 cost for solid waste and recycling service per unit

Solid Waste:

Base collection cost: \$1,359,407

Disposal:

15,773 tons (2011 waste)

15,773 tons X \$62.50 = \$985,813

Total annual cost per unit =

$\$1,359,407 + \$985,813 = \$2,345,220 / 16,115 \text{ units} = \$145.53/\text{unit}/\text{year}$ or $\$12.13/\text{month}$

Cost per ton:

$\$2,345,220 / 15773 \text{ tons} = \$148.69/\text{ton}$

Cost/pound:

$\$148.69 / 2000 = \0.074

Recycling:

Base Collection Cost (Single Stream): \$381,948

Revenue (2012 with 4 months averaged): \$112,550 (4,595 tons)

Total Annual Cost per unit:

$\$381,948 - \$112,550 = \$269,398 / 16,115 \text{ units} = \$16.72/\text{unit}/\text{year}$ or $\$1.39/\text{unit}/\text{month}$

Cost per ton:

$\$269,398 / 4595 = \$58.63/\text{ton}$

Cost per pound:

$\$58.63 / 2000 = \0.029

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Case Study - WithumSmith+Brown, PC (Morristown, New Brunswick, Paramus, Princeton, Red Bank and Toms River, NJ)



WithumSmith+Brown is an accounting firm that enjoys the many positive benefits of waste reduction and recycling. The firm has six offices in New Jersey and implements best practices in waste reduction and recycling at each of its locations. While WithumSmith+Brown provides each of its employees with a desk side recycling container and recycles paper, bottles, cans, corrugated cardboard and laser cartridges, the firm's various waste reduction initiatives are particularly noteworthy, especially the many "paperless" office initiatives implemented to reduce paper utilization and paper waste in the office. The firm's "paperless" office initiatives have not only been successful from an environmental perspective, but they have also helped WithumSmith+Brown save money and improve their bottom line.

WithumSmith+Brown promotes the concept of the "paperless" office in many ways. Instead of printing documents, the firm now scans documents as all employees are provided with a scanner. In addition, the firm has reduced its faxing and hard mailings and provides each client with a virtual file cabinet rather than paper copies of documents. Another effective waste reduction strategy employed by WithumSmith+Brown is setting the printing preference default to double-sided printing on all of its printers. **These initiatives have saved the firm over \$22,000** in storage costs since fewer paper files are now retained! WithumSmith+Brown's switch from paper to digital has resulted in other impressive cost savings, as well. For example, WithumSmith+Brown has **saved over \$45,000 in printing costs by going digital** for its holiday cards, partner announcements and presentations! This represents a 66% reduction in printing costs for a firm that has grown by 36% in one year's time! WithumSmith+Brown's "paperless" initiatives have also helped the firm **reduce its annual paper shredding costs by nearly \$2,000**. Thanks to their many "paperless" initiatives, WithumSmith+Brown has also been able to save procurement dollars since less paper is now needed for business operations. In fact, **over \$2,800 in paper procurement costs were avoided over the last year thanks to the firm's "paperless" strategies**.

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Case Study - The Valley Hospital, Ridgewood, NJ



The Valley Hospital is a fully accredited, acute care, not-for-profit hospital serving more than 440,000 people in 32 towns in Bergen County and adjoining communities. The hospital is located in Ridgewood, New Jersey and like any hospital or institution of its size; waste management is a very important matter that must be addressed.

The Valley Hospital collects and recycles many different materials including batteries, light bulbs, electronic waste, scrap metal, food waste, toner cartridges, carpeting, yellow grease and commingled paper, plastic, glass bottles and corrugated cardboard. **In 2014, the hospital recycled 418 tons of material, which saved the facility over \$44,300 in solid waste trucking and disposal fees.**

For some recyclable items, such as certain paper grades, scrap metal, textiles and yellow grease, **the hospital receives revenue back from its recycling end-markets. In fact, The Valley Hospital earned \$11,250 in 2014 for the sale of these recyclable materials.** The Valley Hospital continues to add new materials to its recycling program and thus recently implemented a textile recycling program, as well as a Blue Sterile Wrap recycling program. (Blue Sterile Wrap is made of polypropylene, a polymer with good resistance to chemicals and wear and is used in all hospitals to protect patient gowns and toiletries, medical devices, and surgical instruments from contamination.)

Waste reduction is also promoted at The Valley Hospital. For example, the facility's food delivery trays no longer require paper liners. This has saved procurement dollars for the hospital while at the same time eliminating 2,100 pounds of paper from the waste stream each year.

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Case Study - Campbell Soup Company, Camden, NJ



Campbell Soup Company's corporate headquarters and pilot plant, located in Camden, New Jersey, have established a robust recycling and reuse program, and have achieved a 92% recycling rate for fiscal year 2014. The company's recycling streams include items that are sent to compost (food waste), single stream recycling (paper, comingled bottles, cans and plastic) and asset recovery/reuse (white goods, furniture, and equipment). Non-recyclable waste is sent to the Camden County Resource Recovery Facility (RRF) for incineration and energy recovery. Other than residual ash from the burning of the company's non-recyclable waste at the RRF, the Camden headquarters does not send any trash to the landfill. **For fiscal year 2014, Campbell's composting, recycling and reuse initiatives saved the company's Camden operations over \$219,000 in disposal costs! The savings from composting, recycling and reuse would have been even greater (almost \$330,000) if all of this material had been landfilled.**

Campbell is currently looking into additional ways to increase recycling and reuse at its headquarters through employee education and engagement, waste assessments, and the use of neighborhood waste stations throughout corporate offices. The latter initiative would involve removing all trash cans and recycling containers from the company's 1,500 offices and cubicles and training staff to use centralized waste stations for all trash, recycling and composting. This approach would reduce the burden on the company's sanitation staff, thereby reducing labor costs, and would allow the company to greatly reduce its purchases of the plastic bag liners that are currently used in office trash cans. Besides minimizing waste, this measure would also save procurement dollars for Campbell.

Campbell has established global initiatives to achieve a 95% recycling rate across all manufacturing sites by the year 2020. Currently, the company's global operations have achieved an 86% recycling rate. Initiatives to increase the company's recycling rate include the installation of anaerobic digesters at Campbell's largest manufacturing facilities. This process transforms waste that would have gone to the landfill into useful energy that powers the company's manufacturing sites. Campbell's corporate asset recovery team works to find beneficial reuse or recycling options for some of the food-processing and electronic equipment that the company no longer uses or needs. **In fiscal year 2014, the asset recovery team sold or reused almost 2.7 million pounds of used equipment and generated nearly \$3.2 million in revenue from the sale of used equipment.** In addition, Campbell scrapped or recycled almost 144,344 pounds of equipment and donated used items from the Camden headquarters totaling 3,618 pounds.

Eco-Friendly Strategy	Waste in Tons	RRF Cost Avoidance	Landfill Cost Avoidance
Compost	2,776	\$150,071	\$231,966
Recycle	180	\$14,894	\$20,204
Reuse	777	\$54,376	\$77,292
Totals	3,733	\$219,341	\$329,462

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Case Study - Anheuser-Busch Newark Brewery, Newark, NJ



Anheuser-Busch’s Newark Brewery is committed to recycling as this approach not only makes sense environmentally, but economically, as well. The company has a successful recycling program in place to manage all the byproducts generated from the packaging and brewing departments. The facility recycles a wide variety of waste materials, including spent grain and yeast, plastics, aluminum cans, glass cullet, cardboard, paper, metal and wood pallets. By recycling as many materials as possible, Anheuser-Busch’s Newark Brewery has been able to greatly reduce the amount of waste in need of disposal. Furthermore, the company has worked with its solid waste haulers to ensure that as much as possible of the non-recyclable waste material generated is incinerated at a waste-to-energy facility rather than disposed in a landfill. In fact, in 2014, only 22% of the total volume of trash generated by Anheuser-Busch’s Newark Brewery (which equates to 52 tons) was landfilled.

Recycling has also proven to be an economically sound waste management strategy for the company. The recycling program that has been implemented has generated revenue for the facility and has also saved the company money in terms of avoided disposal costs. **Anheuser-Busch’s Newark Brewery recycled 78,886 tons of material in 2014, which generated \$1,248,847.00 in revenue for the company!** In addition, by recycling this material rather than disposing of it all at the waste-to-energy facility, for example, the Anheuser-Busch Newark Brewery avoided over **\$5,400,000 in disposal “tipping” fees.** While the revenue received from the sale of its recyclable materials is significant, the avoided cost of disposal alone in this scenario makes a strong economic case for recycling.

Recyclable Byproduct	Tons	Revenue (\$)
Grain	70,493	\$983,851
Yeast	6,232	\$47,379
Plastics (green strapping, shrink wrap and label backing)	73	\$5,315
Aluminum	91	\$117,552
Glass Cullet	1,064	\$5,320
Cardboard & Paper	552	\$52,207
Metal	38	\$14,171
Wood Pallets	343	\$23,052
	Total = 78,886 tons	Total = \$ 1,248,847.00

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Case Study - New Jersey Resources, Wall, NJ



New Jersey Resources' (Wall, New Jersey) award-winning waste reduction, recycling and recycled product procurement program has been in place for many years and not only benefits the environment, but also the company's bottom line. While New Jersey Resources recycles a wide variety of materials in its program, the company's metal and electronic waste (known as e-waste) recycling efforts are prime examples of this "win-win" aspect of recycling.

Metal recycling has been an integral part of company operations for years. In fact, New Jersey Resources has been recycling various metals for over 25 years. **In 2014, over 381 tons of metal was recycled to produce over \$96,000 in revenue! If these metals had been landfilled instead of recycled, the disposal cost would have been over \$26,000 and valuable landfill space would have been wasted.** In addition, New Jersey Resources recycles many types of e-waste, such as personal and lap-top computers, printers, fax machines, wires, cords and other miscellaneous electronic devices. Almost 12,000 pounds of e-waste were recycled by the company in 2014 rather than landfilled. Furthermore, over 4,000 pounds of dry-cell batteries and waste lamps were recycled. **Recycling of these three waste streams saved 150 cubic yards of valuable landfill space and over \$1,500.**

New Jersey Resources also saved landfill space and money in 2014 through an innovative reuse initiative. **The company transformed over 29,020 pounds of used high-density plastic pipe that was destined for the landfill into new conduit piping for irrigation systems, thereby saving 210 cubic yards of valuable landfill space and almost \$24,000 in disposal costs.**

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