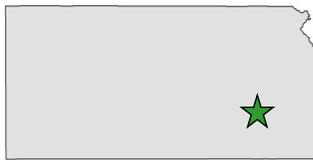


2021 Case Study

USDA Solid Waste Circuit Rider

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Company background

The Kansas State University Pollution Prevention Institute 2021 USDA circuit rider intern worked with five rural industries to help them identify ways to reduce or divert solid wastes from Kansas landfills. The industry types included four manufacturers (aerospace, architectural windows and doors, nitrogen fertilizer, tooling and prototype product manufacturing) and one hospital.

Project background

Funded by a solid-waste reduction grant from the USDA, the goal of the project was to work with rural industries, helping them reduce industrial solid waste by identifying opportunities for reduction, reuse and recycling. This project involved gathering baseline data, providing on-site technical assistance, analyzing potential diversion opportunities and making quantifiable recommendations for industrial partners. After the site visit and analysis, a site report was provided to the company containing recommendations along with environmental and economic impacts.

Incentives to change

Three of the five industries had published sustainability goals, but all five of the industries understood the environmental and economic benefit of waste reduction and diversion. Collaborating with PPI in order to determine feasible ways of reducing solid wastes from entering landfills gave all five industries an opportunity to understand potential cost and environmental savings related to their current processes and practices.

Reduction/repurposing/recycling of industrial wastes

Spent-garnet abrasives

This non-hazardous waste was generated at an aerospace manufacturing company as a result of

two different water jet processes. The intern evaluated uses for garnet abrasives and recommended a reclamation system for recycling and reusing the products. Such a unit could recycle up to 60% of abrasives a year, reducing industrial special solid-waste disposal by 51.67 tons, reducing the cost of original garnet abrasives and saving the company \$645,100. A second preferred recommendation was to reuse the spent-garnet abrasives as an alternative landfill cover layer, which allows for the beneficial reuse of 86.11 tons of spent garnet at a savings of up to \$32,700 annually.

Paint powder

The intern examined the window and door manufacturer's paint-powder waste generated by a powder-painting process that induces powder-paint waste and filter cakes. The favored recommendation was to organize the schedule of the powder-coating machine by types of powder to reclaim and reuse the paint powders. Such a simple change could reclaim up to 95% of paint powder waste a year, reducing solid-waste disposal by 10.70 tons, and reducing the cost by \$535,200. Other reuse and recycling recommendations were also offered to give the company more options.

Lime sludge

The fertilizer manufacturing company requested the intern identify alternative uses for lime-sludge wastes generated at its plant from the river water treatment system. After analyzing the process and gathering baseline data, the intern proposed five repurposing methods. Based on feasibility and complexity of implementation, the preferred recommendation was to reuse the lime cake wastes as landfill cover. This beneficial reuse of 2,696 tons of waste at a potential savings of up to \$107,500 annually.

Scrap vinyl

The intern observed a vinyl-cutting process at a window manufacturing company and identified a source-reduction opportunity of optimizing the production process by improving communication between workers and solving scheduling obstacles. This optimization involves further research and could save the company up to \$10,000 and reduce scrap vinyl waste by 2.07 tons. Recycling options, which could prevent up to 6.47 tons of solid waste from entering the landfills, were also provided to the company.

Wood waste

The same window manufacturer generates a large amount of wood wastes. The company uses wooden pallets to ship its window and door products. The pallets are customized into specific sizes and thus are not reused. The intern recommended replacing part of the wooden pallets with durable, returnable/reusable and light plastic pallets. This could help the company reduce wood waste of 14.3 tons from entering the landfill. Also, it would save \$3,000 annually in costs by replacing 20% of the wooden pallets with plastic pallets. Over time this will save even more since plastic pallets have longer life cycles

than wooden pallets. Recycling options for wooden pallets were also provided to the company.

Fiberglass composite

The intern examined a molds manufacturer's fiberglass composite wastes mainly generated in its facilities from cutting off edges of the molds. It was recommended to send the fiberglass composite waste to fiberglass recycling companies for repurposing as pallets, panels or other future applications. The recycling implementation may result in saving up to \$7,000 annually and avoiding a total of 46 tons of waste from entering the landfill each year.

Mixed solid waste

The intern examined the mixed solid waste in a manufacturing plant that currently does not have a recycling program. Recyclables such as cardboard, aluminum cans and plastics were being misplaced in trash cans. The intern recommended implementing a recycling program in the plant and estimated that 20 percent of the mixed solid waste could be recycled, thus diverting 15.48 tons of solid waste from entering landfills.

Summary of 2021 USDA intern recommendations

| Project | Annual estimated solid-waste reduction (tons) | Estimated cost savings (\$/year) | Status |
|-------------------------------------|--|---|-------------------------|
| Paint powder | 10.70 | \$535,200 | Further research needed |
| Garnet abrasives | 51.67 | \$645,100 | Recommended |
| Fiberglass | 46.44 | \$7,000 | Recommended |
| Dry lime sludge | 2,696 | \$107,500 | Recommended |
| Scrap vinyl | 2.07 | \$10,000 | Further research needed |
| Wood waste | 14.30 | \$3,000 | Recommended |
| Mixed solid waste | 15.48 | \$5,700 | Recommended |
| Total¹ | 2,824 tons | \$768,300 | |
| GHG reductions^{1,2} | 8,891 metric tons CO₂e | | |

¹Does not include projects "not recommended" or with "further research needed"

²EPA P2 GHG Calculator with Cost, Apr. 7, 2016 & EPA WARM Tool- Version 14, Mar. 13, 2018