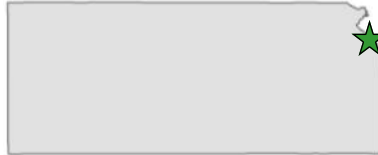


2010 Case Study

Deffenbaugh Industries

Intern: Vishrut Patel
Major: Mechanical Engineering
School: Kansas State University

Kansas City, Kansas



Company background

Deffenbaugh Industries, Inc., founded in 1957, is one of the largest waste management services companies in the Midwest. Deffenbaugh provides collection, transportation, and disposal of commercial and residential waste and recycling, construction waste, and portable toilet (Jonny On The Spot) waste, and truck and industrial supplies services. Headquartered in Kansas City, Deffenbaugh Industries employs more than 1,000 people and operates in Kansas, Missouri, Nebraska, and Iowa. Deffenbaugh also owns Johnson County Landfill, and a construction and demolition landfill at Olathe. For only its Kansas City operations, Deffenbaugh operates more than 340 heavy-duty refuse trucks as well as a large truck shop facility that runs 24/7.

Project background

Deffenbaugh Industries has been through many improvements following ownership changes two years ago, including newly purchased office and shop buildings, implementation of a fuel-efficient truck fleet, and Routeware software installation in its trucks for more efficient operation. Deffenbaugh's subtitle D landfill at Johnson County meets or exceeds all federal, state, and local regulations. Deffenbaugh also collects 4,000 standard cubic feet per minute (scfm) of landfill gas (methane) from the waste each day. Patel conducted several feasibility studies for Deffenbaugh to allow their improvements to continue.

Incentives to change

After purchasing the new company building, Deffenbaugh established a 'green team' that worked on many energy efficiency projects including re-lamping the shop facility with T5 bulbs, implementing internal recycling, and replacing older HVAC units with more efficient ones. Deffenbaugh also promotes products made from recycled materials by purchasing office supplies and apparel made from such materials. By hosting an intern, Deffenbaugh Industries hopes to expand their environmental stewardship and continue to reduce their carbon footprint.

Projects reviewed for E2/P2 potential

Deffenbaugh's major environmental impact is its low-mileage refuse trucks operating 24 hours a day. The first project Patel investigated was the feasibility of propane-injection systems for Deffenbaugh's refuse trucks. Patel worked closely with drivers, mechanics, and vendors, as well as executives of the company to refine the data collection system for the ongoing project. After many changes, all except one truck showed reductions in diesel usage, from 200 to 5,000 gallons annually, depending upon the truck. However, the project will not be implemented until it is possible to show the effects of propane systems on exhaust gases from the trucks. Patel recommended running a test on more trucks with the simplest mechanical propane-injection systems, which could reduce a diesel consumption by more than 2,500 gallons and save more than \$5,500 annually per truck.

Deffenbaugh also started its efforts in recycling construction and demolition (C&D) materials that had been coming to its C&D landfill. Recycling these materials will save valuable airspace of the landfill, as well as support LEED building construction sites served by Deffenbaugh, and promote recycling of materials such as wood, asphalt shingles, concrete, and scrap metals. Patel visited different processing centers and collected valuable information for the company about such operations. He also contacted different companies to look for possible markets for recyclable C&D debris.

Patel observed water usage at one of the circular hand-washing units in the shop, and estimated that these hand-washing units wasted more than 14,000 gallons of water annually during shift changes and at lunch times alone. It would not be feasible for Deffenbaugh to replace the units with new individual sinks, so Patel suggested replacing them with unused sinks located in nearby restrooms.

Table 1: Summary of 2010 Intern Recommendations for Deffenbaugh Industries

Project	Annual Cost Savings	Environmental Results	Status
Propane Injection Systems Results for one truck	\$5,767.34	2,561 gal of diesel	In Progress
Construction and Demolition Recycling	Not yet determined	Not yet determined	In Progress
Water conservation – replacing circular units with un-used sinks	> \$100 from water savings	> 14,370 gal of water	Recommended