
WISCONSIN'S PROFITABLE SUSTAINABILITY INITIATIVE

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Manufacturing is a prominent element of Wisconsin's economy, accounting for fully one-fifth of the state's gross domestic product (GDP) and placing Wisconsin as the top "per capita" manufacturing state in the country. A number of large manufacturers are headquartered in Wisconsin, such as Harley Davidson, Oscar Mayer, Mercury Marine, Oshkosh Truck, and Johnson Controls, but the vast majority of the state's 8800 manufacturers are small to mid-sized companies with 500 or fewer employees.

A 2008 Next Generation Manufacturing Study commissioned by the Wisconsin Manufacturing Extension Partnership (WMEP) identified that approximately 33 percent of Wisconsin's manufacturing companies recognized the value of sustainability and deemed it as critical to their strategic direction. However, the study also found that fewer than 20 percent of responding manufacturers had made any progress on implementing sustainability processes in the workplace.

The study cited the following challenges faced by manufacturers:

- No visible link between sustainable practices and profits;
- A lack of time and resources to identify and institute sustainable practices; and
- Very little to no knowledge about sustainable practices and processes.

To address this "gap" and promote best sustainable practices among Wisconsin manufacturers, the state developed a program for its manufacturers called the Wisconsin Profitable Sustainability Initiative (PSI). In 2010, an initial PSI pilot program (phase I) was launched involving 50 manufacturers. It was funded by the Wisconsin Department of Commerce and the American Recovery and Reinvestment Act. Based on the success of phase I, phase II of PSI was launched in 2012 with additional manufacturers,

and phase III was launched in 2014 and is currently ongoing. Phases II and III are funded by a grant from the Wisconsin Economic Development Corporation and cost sharing by the manufacturers involved. Over 130 Wisconsin manufacturers have now participated in PSI.

The Profitable Sustainability Model

The PSI sustainability model is a program that was developed to demonstrate the wide range of economic, social, and environmental benefits that can be realized by Wisconsin's small and mid-sized manufacturers through the implementation of sustainable business practices. PSI utilizes a triple bottom line approach (sometimes referred to as "people, planet, and profits") and a cost-benefit analysis to assess current sustainability efforts and identify opportunities for improvement. The program includes three distinct steps:

- **Diagnostic (30 days):** This initial step identifies and prioritizes opportunities for the manufacturer for sustainable improvements over a broad range of environmental, energy, process optimization, health and safety, and logistics project alternatives.
- **Assessment (60 days):** This step is a deeper evaluation of the opportunities revealed by the diagnostic to identify current conditions and costs and determine the feasibility of specific improvement opportunities. The output of the assessment process includes a cost-benefit analysis used to prioritize improvements based on sustainable impact, payback period, and return on investment (ROI).
- **Implementation (6–24 months):** The PSI implementation plan uses findings from the assessment step to drive business execution. Projects range from replacing low-efficiency light fixtures, to reducing the use of toxic substances and the resulting wastes, to reducing raw material use and scrap production, to replacing old machinery with energy-efficient models, to optimizing freight routes and shipping schedules.

A team of organizations with various sustainability experiences contributed to phases I and II of the PSI program. These phases were administered by WMEP, which also used its manufacturing specialists who are well versed in lean manufacturing, and Six Sigma principals to assess opportunities for process optimization improvements in manufacturing. SCS, an environmental engineering firm, developed a sustainability diagnostic tool and managed the first two phases of PSI's environmental and energy efficiency evaluations. Baker Tilly, an accounting firm, developed the ROI and financial analysis tools; LogiServe, a logistics consulting firm, evaluated opportunities for potential transportation and shipping improvements; and the University of Wisconsin-Stout Manufacturing Outreach Center (MOC) performed process optimization reviews in northwest Wisconsin. Phase III of PSI is currently conducted by WMEP and MOC.

Project Examples

Ninety-eight sustainability projects were identified in the first phase of the program. Approximately 60 percent of the projects related to energy efficiency, 20 percent to process optimization, 10 percent involved environmental improvements, and 10 percent logistics. The following are examples of the types of projects performed.

An electrical equipment manufacturer produced approximately 1500 gallons per year of waste solvents that required expensive management and disposal as a hazardous waste. The use of a solvent recovery distillation still was identified as a way of recycling the waste solvents for reuse at the plant, and to reduce the amount of hazardous waste generated to less than one gallon per year.

An aluminum components manufacturer replaced its older die ovens with energy-efficient models with a payback of 1.15 years, and implemented a second scrap reduction project, saving \$600,000 per year.

A printer facility had a large air compressor system that powered numerous operations. Leaks within the

pipings, connections, hoses, and nozzles required the large electric air compressors to run more often, and at high air pressure, which used excess amounts of electricity. An ultrasonic leak survey was conducted on the system that identified over 350 separate leaks. The leaks were repaired, and a preventative maintenance program was developed that includes periodically surveying and repairing new leaks.

A cheese processor conducted a "lean and clean" review, looking at both production and environmental improvement opportunities in its operations. It recognized that bringing currently outsourced cut-and-wrap packing operations back in-house would eliminate a bottleneck in the production process, cut delivery time, reduce fuel for shipping, reduce waste, and lower costs.

Two metal foundries used sand to create molds for molten metal when casting their products. Sand that could no longer be reused was being transported to the solid waste landfills for disposal. An evaluation of their sand was performed along with analytical testing, and a "beneficial reuse" determination was obtained for the sand from the state regulators. This allowed the sand to be reused as base fill at road construction projects, saving the landfill disposal costs.

A resin manufacturer was required to calculate and report its greenhouse gas (GHG) emissions by a European customer as part of a supply-chain evaluation. The GHGs were calculated for a baseline year, an "energy dashboard" was developed to help the company track pertinent energy metrics over time, and a plan was established for continuous improvements.

A packaging manufacturer developed a sustainable packaging alternative to the PVC "clamshell" packaging that is commonly used for many consumer items. The new packaging combines recyclable chipboard or corrugated cardboard (60 percent recycled material) and 90 percent recycled PET plastic. Assistance was also provided in evaluating whether having in-house capabilities for the design and manufacture of product prototypes would speed up the production and sales cycle time.

Conclusion

WMEP compiled the environmental benefits from 146 projects with 73 manufacturers who participated in phases I and II of PSI. The annual projected environmental benefits included significant reductions in greenhouse gas (7719 metric tons of CO₂ equivalent), solid waste (7719 tons), diesel fuel (53,713 gallons), natural gas (397,637 therms), electricity (7.57 million kWh), and air emissions (17 tons). The financial benefits have resulted in a strong ROI for the manufacturers, increased sales, 58 new jobs, and additional investment.

An increased focus on sustainability resulted in numerous benefits for manufacturers including increased profits, creating jobs, improving employee recruiting (especially among Millennials), becoming a market differentiator, and minimizing a company's environmental footprint. The emphasis on ROI differentiates PSI from other sustainability initiatives. The process is designed to adapt to variations in business strategies and tactics and identifies a range of product and process improvements for significant financial and environmental gains.

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