

Green Suppliers Network: Lean Met Green and Got Hitched

Making environmental goals part of day-to-day improvement activities.

Lea A.P. Tonkin

All-natural or sunshine-fresh, it's not. Yet the "lean and clean" approach to running your organization can bring a refreshing breeze of financial and "green" rewards. (See Figure 1, "What is Lean and Clean?") For some folks, the financial benefits talk the loudest. For others, knowing that your work with customers and suppliers can lead to long-term environmental improvements is the most powerful draw. This article explores how organizations are taking advantage of the U.S. Environmental Protection Agency's (EPA) collaborative Green Suppliers Network program with the U.S. Department of Commerce's National Institute of Standards and Technology (NIST)-Manufacturing Extension Partnership (MEP) and related initiatives. Although it was designed with small- and medium-sized U.S. companies in mind, GSN provides a useful model for larger organizations as well.

Green Suppliers Network: Lean and Clean Partnership

"The Green Suppliers Network (GSN) program (See Figure 1) was set up to meet a number of needs of American manufacturers," said Kristin Pierre, U.S. EPA

program manager for the GSN. "Small and medium-sized companies face issues such as the increasing demand for environmental performance improvement or a reduced environmental footprint, but they may not have access to consultants and other resources who will help them. As regulators we need to not only help them meet the needs of environmental performance issues but also to help them become more competitive. We have found that these two issues — environmental and competitiveness — go hand in hand. For example, com-

In Brief

An increasing number of manufacturing enterprises realize the value to their stakeholders from committing to a "lean and clean" approach. This article shares the experience of several companies participating in the U.S. Environmental Protection Agency's (EPA) collaborative Green Suppliers Network program with the U.S. Department of Commerce's National Institute of Standards and Technology (NIST)-Manufacturing Extension Partnership (MEP) and related initiatives. Though it targets small- and medium-sized U.S. companies, GSN provides a useful model for larger organizations as well.

What Is Lean and Clean?

Sounds like a catchy line from a commercial. For a wealth of information on "lean and clean" basics, see the website <http://greensuppliers.gov/gsn>. The lean and clean definition you'll find here is: Lean and clean expands the traditional definition of lean (eliminating non-value-adding time, labor, and capital) to one that includes environmental wastes (such as eliminating energy waste and toxic emissions). This targets the root causes of wasteful practices and provides a framework for achieving specific, measurable business and environmental goals. Additional information can be found at the Lean Manufacturing and the Environment website (www.epa.gov/lean).

good fit with strategic business decision-making. Initial positive results led to the network rollout."

Here's how it works. Small- and medium-size (generally 500 or fewer employees) U.S.-based manufacturers can join the GSN, or they can be nominated by a larger organization. In some cases, a "Corporate Champion" may provide support and encouragement for supplier companies (an environmental contact and a purchasing/supplier development are required). Their mutual understanding is everyone benefits when suppliers plug "clean" factors into their overall improvement efforts. Baxter, Abbott, Boeing, Herman Miller, Northrop Grumman, and other large organizations are Corporate Champions.

Using the expertise of the local MEP center and possibly the company's state environmental programs, the company receives a technical review designed to uncover opportunities for lean and environmentally-friendly improvements ("areas of concern" are identified). If the company requests added assistance, the MEP team offers to work on-site for process improvement in a targeted area, provide related training, and measure process improvement. It's up to the company to decide about going ahead on recommended changes, whether to ask MEP people to collaborate on making them, and continuing with more MEP-assisted improvement projects. Figure 2 lists GSN Assessment Steps.

For those who are skeptical of dealing up-close and personal with the EPA, it may ease anxiety to know that reporting on the reviews, modifications, and results to environmental regulatory agencies is optional. The U.S. EPA has gathered success stories from GSN participants who shared their results, and they are available at the <http://greensuppliers.gov/gsn> website. Local MEP organizations collect data on GSN participants — cost, cycle times, energy consumption, etc. — and provide only aggregate data to the U.S. EPA.

There are costs for participation in GSN. Employee time and commitment is needed. The Department of Commerce

panies may find cost savings, new markets, and more efficiency by using alternative materials and energy resources.

"We took a look at what companies are doing — reducing waste and eliminating non-value-added (NVA) activities, and extended this to materials, energy, etc. that affect an organization's environmental impact," said Pierre. "When we did that — married lean and clean — we got a far more robust and enhanced lean program." She estimated that companies focusing on lean improvements without taking the "clean" side into consideration are leaving about 15-30 percent of potential improvements on the table.

Look at energy costs, for example. Trimming energy usage takes a bite out of bulging utility bills. Pierre noted that U.S. manufacturers intent on energy conservation can take advantage of the U.S. Department of Energy (DOE) Industrial assessment Centers energy audits for additional savings.

Network Launch

GSN got its start several years ago, when Saturn and some of its suppliers piloted the concept. "We were able to explore the combination of lean with environmental goals," Pierre said. "We wanted to show that environmental concerns can be a normal part of doing business — a

Figure 1.

GSN Assessment Steps

Step 1: Understand the Current State

- *Get management support
- *Identify project focus and select a project team
- *Perform the operational assessment
- *Determine benchmarks and change potential
- **"Walk the floor"
- *Participate in on-site training
- *Create value stream and process maps

Step 2: Analyze System Conditions

- *Identify waste sources
- *Gather data to support options
- *Conduct root cause analysis

Step 3: Consider Improvement Options

- *Create future state maps
- *Prioritize continuous improvement list
- *Present opportunities
- *Prioritize implementation recommendations.

Source: NIST MEP.

Figure 2.

charges about \$6500 per GSN company. This cost may be partially offset by as much as \$2000 in a "buy down" the U.S. EPA offers. "The actual cost is about \$4500 for about \$9000-\$20,000 worth of MEP program assistance," Pierre said. "From this modest cost, participating companies have reported from 3X to 30X payback." GSN also offers access to as much as \$1000 in training credit (for work coordinated through MEP within three months of the facility review), and can conduct an independent follow-up survey to assess the impact of GSN-related improvements. The emphasis on training GSN companies to fix their own problems encourages self-sufficiency in building continuous improvement (CI) momentum.

Small- and medium-sized suppliers are finding that GSN's one way to polish skills in streamlining their operation and becoming a more attractive supplier. Larger organizations, realizing that their success hinges on successful collaboration with suppliers, are encouraging their suppliers to get into the game.

Uncovering Hidden Environmental Waste

Cost savings from environmental opportunities reported by GSN participants are significant, according to NIST MEP's Center Operations Manager Alex Folk. Energy conservation tops the list as far as dollar savings goes. Then there are water conservation, water pollution reduction, air emissions reduction, and solid waste reduction savings. Add cost savings from lean opportunities and other areas, thanks to the GSN activities, and the payoff becomes even more appealing. Total potential cost savings identified from 49 reviews, for example, reached more than \$27 million annually.

Folk explained that scouring an operation for lean improvements by eliminating waste (defects, waiting, over-production, etc.) can be hindered by "blind spots," if the environmental element of lean is ignored. For example, hidden environmental waste may be buried in overhead

and facility support costs. Adding to these costs may be environmental and human health risks. Also, there are environmental impacts throughout a product's life cycle affecting customers and other stakeholders. Think about energy efficiency and water conservation, not to mention full use of raw material. Consider extra processing, motion, and other wastes associated with packaging wastes, air and water emissions, packaging wastes, etc. in addition to regulatory risks.

CONNSTEP: Green Movement is Starting to Take Hold

"Lean manufacturing is hot now, and has been for several years," said Judy Włodarczyk, environmental management specialist of the CONNSTEP (MEP) organization in Rocky Hill, CT. She conducts GSN events for Connecticut companies. GSN

combines environmental considerations and lean manufacturing techniques to enhance process efficiencies, which can lead to substantial economic benefits, she said, adding, "Now that energy costs are rising, companies are looking at ways to reduce cost and consumption of water and energy. The green movement is starting to take hold. Companies such as Pratt and Whitney, United Technologies, etc. want their suppliers to improve in the environmental area." Manufacturers are hooked when they discover how better environmental performance can save big bucks as part of their lean implementation. Wlodarczyk noted that Connecticut operations for Har-Conn Chrome Company and Sermatech are among the GSN companies whose lean/green "success stories" are posted on the <http://greensuppliers.gov/gsn> website.

Targeting environmental waste in lean events brought significant performance gains at Sermatech, according to John Whalen, former general manager (now with Sikorsky). The small manufacturer specialized in developing and applying high-performance protective coatings for the aerospace industry. "If I can reduce waste in any form, I can reduce costs," Whalen said. "For example, eliminating the use of some solvents and using more environmentally-friendly alternatives reduced costs." Mapping processes such as disposal of waste containers also brought cost/environmental improvements.

The Right Place: Reason for Hope in Michigan

"Many people have thought of lean and environmental as separate programs. Sometimes they are surprised when they work well together," said Rick Fleming, who does lean assessments for The Right Place, a Grand Rapids-based regional economic development organization and manufacturing assistance center. "For example, controlling energy usage by regulating the temperature in the wash cycle of a paint line can result in cost reductions. Another surprise for some companies is learning

how recycling water or using alternative chemicals for water treatment may reduce costs and improve throughput."

Remedies for energy waste and other environmental-related NVA activities and process steps do not have to be high-tech or high-cost changes. "At a company in Grand Rapids, for example, we suggested using blow-off 'knives' for painted parts coming out of a wash cycle, instead of drying off the parts in a high-temperature oven," Fleming said. "The result was reduced energy usage and better quality (eliminating a water staining problem)." Another example he cited: Newer fluorescent lighting systems can cut energy usage by an average 30-40 percent compared to older halide systems, with a one- or two-year payback period.

Jim Ross, Right Place Inc. vice president — innovation and technical services and Michigan Manufacturing Technology Center (MMTC) west regional manager commented that the blending of lean and clean/green improvement is well accepted in western Michigan. MMTC is part of the MEP network. "People understand that working on environmental improvement is not a punitive thing," he said. "More companies understand that being green is a part of becoming lean and is another opportunity to remove waste from the enterprise. They are also seeing the 'green' trend from their customers and it may provide future growth opportunities."

GSN participating companies gain the additional benefit of learning how their performance stacks up against others in many areas, said Bill Stough of Sustainable Research Group, who conducts GSN "clean" evaluations for GSN companies, in tandem with Rick Fleming's "lean" assessments. As part of the GSN evaluation, the MMTC-West team collects data on everything from a company's cycle times to profitability. "We run that information through the MMTC, and then we can tell them how they compare to other companies and how suggested improvements will affect their profit and loss (P&L). That really gets their attention," Stough said.

"We ask the company what value

stream they'd like to have assessed, discuss the costs to the company, and how much will be subsidized by the EPA (or in some cases, by their corporate champion)," Stough said. "If they agree, we go ahead with the assessment. It usually takes a month to two and a half months, depending on the company. We work with their employees to develop a current-state map of the selected value stream, and offer suggestions for needed improvements." Recommended changes may be as "simple" as removing clutter from the work area aisles (more effectively using materials on hand not only cuts outlays for product but also puts a dent in related costs for transportation and for heating/cooling the storage areas). "At one company, changes like this reduced energy costs and also eliminated the need for building an addition to their plant," said Stough.

"Hidden" opportunities for better operational performance are more likely to be found when the environmental side of lean is considered, Stough said. "For example, many companies in the Great Lakes area do not realize that the rest of the world is in a water shortage," he added. "They also may overlook their costs for using, treating, pumping, and discharging water. What we are doing is training them to look for opportunities to eliminate waste — including the environmental area. We want to leave them with hope that they can train their own people — and their suppliers — to do this, to be involved in every step of the process. Otherwise, their reaction might be to throw up their hands and say, 'It's just another new program.'"

Steelcase: Offering Incentives to Selected Suppliers

Shepherding suppliers into GSN makes sense for companies such as Steelcase. The Grand Rapids, MI-based office environment company offers financial incentives for selected suppliers to participate. "Our focus is on lean — reducing waste in any form — so GSN fits in perfectly," said Mary Ellen Mika, Steelcase environmental and diversity manager in the

company's supply chain group. "It helps suppliers to be more aware of costs, including environmental resources. We target suppliers we think would be good candidates for it — small or medium-sized companies that are interested or enthusiastic about it, and who might not have resources on their own to use environmental consultants. We describe the program to them. EPA has grant money to pay part of the cost and Steelcase has been offering to pay the rest." Suppliers can accept or reject this offer. If they accept, MEP will do an assessment and propose improvements, leaving the company to decide whether or not to follow up on the suggestions. Current-state and future-state value stream mapping (VSM) contrast existing and potential process performance.

Although Steelcase suppliers who are GSN participants need not share related assessment and improvement data with Steelcase, they may decide to do so. "We have environmental aspects or expectations in our initial supplier assessment procedures, when determining whether to award business to a particular supplier," Mika said. "In the end, strong, competitive suppliers will be the ones we work with. They help us to reduce costs by reducing their costs — which puts them in a better position for more business."

H&L Advantage: "Not Just Blowing Sunshine"

Going with the GSN, thanks to a nudge and financial assistance from Steelcase, netted a 15 percent reduction in overall costs, significant energy usage reductions, and the know-how to double capacity at H&L Advantage. The Grandville, MI-based company supplies metal and plastic seat components to Steelcase and has 65-70 employees. "We had been looking for a way to be better," said Steve Beurkens, sales manager. "Mary Ellen (Mika) approached us in August 2004 and asked us to participate in GSN. It was subsidized by a buy-down from EPA and also from Steelcase. The Michigan Manufacturers Program and The Right Place set up our initial evaluation, benchmarking

us against other companies of similar size (scrap, leadtimes, P&L, turnover, etc.).

"Then we picked a couple of products and value streamed them," Beurkens continued. "We learned about tools for improving, and the short- and long-term benefits of making the changes (such as kaizen and Kanban) that were suggested." The results were so dramatic that Beurkens has joined forces with Mika and EPA representatives at GSN programs around the country.

Many of the improvement ideas spawned by the initial GSN assessment and follow-up projects by H&L Advantage employees might seem like small potatoes, but they all add up. The EPA and the state Department of Environmental Quality also offered suggestions along the way. There is a mind set of continuing to look for improvements day by day, Beurkens said. One of the ideas from environmental gurus used at the company: Eliminate improper storage of old equipment outside the plant; tannic acid and oil leakage caused problems. Using alternative chemicals for water treatment cut costs and reduced their environmental "footprint." New lighting payback time was one year. "We will have close to a half-million dollars in cost savings in three years," said Beurkens. "We're more efficient, and we have higher sales. Our plant is clean and organized. Our people do most of the improvements now — re-laying out a work area or reconfiguring a process, etc. They have meetings every week to talk about improvement projects. If somebody had told us before that we could do all that in three years, we would have thought they were just blowing sunshine."

Beurkens said it pays to invest in continuing improvements, based on GSN-related learnings. For example, H&L Advantage bought a new transformer, realizing the savings from more efficiently operating at a higher power factor. They also paid for training several employees at "Steelcase University" to learn additional lean manufacturing skills from their customer. "It makes sense for us to look at all of our costs, including environmental," Beurkens said. "It's helping us to fend off competition from low-cost manufacturers overseas."

Byrne Electrical Products: Common Sense Manufacturing

For Rockford, MI-based Byrne Electrical Products, combining green with lean fit right into their overall CI focus they call "Common Sense Manufacturing (CSM)." They manufacture electrical raceways at the 240-employee company. "When Mary Ellen Mika (a representative of our customer, Steelcase) offered us an opportunity to get into the GSN a few years ago, we were initially concerned about getting the EPA involved," said Pat Young, director of product and systems improvement for the privately-held company. "Then we said yes, and invited lean and environmental assessments on our 36-in. raceway. The evaluation took a couple of days and The Right Place organized the audit team that brought us two specialists, one in lean and one in sustainability. By the time they got back to us with recommendations, we'd already started on lean and green as part of CSM."

After seven kaizen (improvement) events and feedback from the GSN evaluation process, employees at Byrne Electrical Products are keeping the CSM improvements humming along. They've cleaned up work areas, reduced setup times by using SMED (Single Minute Exchange of Die), and changed injection mold insert technology to reduce changeover time from 24 hours to 20 minutes. Reducing changeover times, in turn, cuts energy costs for powering equipment, heating molds, drying plastics, and equipment used to move the heavy molds.

They've also begun separating scrap metals and plastic. Instead of paying to have scrap hauled away, they're getting some cash back for recycling. Storing materials more carefully eliminates the need to use energy for cleaning. "We're keeping our eyes open for more opportunities," said Young. "Employees understand lean, including environmental opportunities. It's part of our culture and our journey now. It's got its own legs."

Johnson & Johnson's Consumer Products, Lititz, PA: "An Eye-Opener"

Troublesome supplier material quality issues causing rejects and associated waste cost initially drew interest in GSN by people at the Johnson & Johnson (J&J) McNeil Consumer Products facility in Lititz, PA, according to Mark Keller, director of environmental, health, and safety (EHS) at Lititz. "We were looking for ways to help our suppliers improve the quality of finishing supplies we receive while also reducing suppliers' environmental footprint," Keller said. Recently acquired from Pfizer by J&J, the plant has approximately 900 employees. Their product lineup includes Listerine brands, Lubriderm, and Pocket Paks.

"We decided to pilot the GSN 'Lean and Green' process in our own plant, to understand what our key suppliers would be exposed to, before rolling it out at a supplier level," Keller said. "We invited Pennsylvania Department of Environmental Protection and federal EPA GSN and EPA Performance Track representatives from Washington, DC to be involved in the pilot. As part of our ISO 14001 environmental management system we are continually challenged to look outside our facility footprint by 'greening' our supplier-based products and materials used within our manufacturing processes. Also, J&J is a lean company, and we thought GSN would be a way to implement lean here." (They paid full price for the GSN evaluation and follow-up in December 2006 — \$6500 — because of company size.)

"Going green and lean has been an eye-opener for us," according to Keller. "We found that we needed to track areas that previously were not in the spotlight." Curt Pagano, manager, lean Six Sigma and a former EHS specialist at Lititz, said that using VSM and other lean tools incorporated in the GSN evaluation highlighted the need to look more carefully at inputs and outputs. "For example, we're looking not just at components we're purchasing but also at the containers they are in, byproducts from using the product, and related usage of energy. Most of that is never captured on

standard VSM. It can be overlooked by 'regular' lean," he said.

Major cost savings and a decreased energy/environmental footprint resulted from evaluating water usage and changeovers from one flavor to another for Listerine production, for example. (They make 11 flavors.) A "flush in place" process eliminated the need to flush the system with water before and after a color change, Pagano said. The change also decreased cycle time from about 90 minutes to 20-25 minutes. "It involved one basic change, taking a water flush out, then bleeding the line before the next process," he said. "Also, we open valves at certain times, to drain an optimal amount. It did not involve capital cost." For five-six years, the savings from this change is pegged at approximately \$1 million to \$1.5 million. Due to FDA (Food and Drug Administration) cGMP requirements, this new process needed to be fully validated prior to implementation.

Slashing the changeover times and required water usage provides needed flexibility for flavor changes. "We went from 235 kilos (water) per washout to zero, and from 450 gallons of waste to just over 80 for changeovers from one flavor to another," said Pagano. "We used to run just a couple of flavors in the old days, when we had batching. Now we are doing hundreds of changeovers per year. We are trying to achieve a one-piece order-by-order flow, with more short runs."

The next phase of this non-traditional approach is to harmonize flavors so one base flavor is used for all flavors. This could further eliminate the need to wash out pipes, resulting in the elimination of bulk waste and reducing water usage.

Charlie Souders, environmental manager at the Lititz plant, commented that their initial GSN results suggest potential benefit from inviting suppliers to get started in the network. He cautioned that an effective initial current-state process analysis and an understanding of the high-level inputs and outputs for the process are critical for lean/green progress. "Then you can identify the data needed, and get into GSN," Souders said. "If you don't have ade-

quate data, you are wasting a lot of time."

Souders also suggested that communicating with suppliers about a holistic approach will be most effective. "You need to identify everything that goes into cost of goods sold," he said. "Lean identifies what will offer mutual benefit. The green part identifies hidden costs you may not have been aware of. Bundling them together makes a more attractive package: You reduce waste, including electricity and water usage, etc. If you are just making lean improvements without analyzing inputs and outputs, you could be increasing your usage of resources such as water."

Pagano noted that involving personnel from various areas in an organization will bring optimal GSN results. "On project teams, you need finance, operations, production people, planning/scheduling, quality, process engineering, EHS,

and subject matter experts as needed," he said. "Lessons learned" by J&J people at Lititz are shown in Figure 3.

J&J has decided to roll out GSN with selected suppliers, although the timetable is not definite. "We're still figuring out what are the next best steps after our pilot," Souders said. "We need to determine what type of supplier profile would best be involved. The main goal is to improve operations from a process and environmental standpoint. Under ISO, we are asked about how we are promoting our environmental policy with suppliers. Our challenge is to constantly look for ways to improve. GSN's lean and green approach is a new tool for us."

Another incentive to make the commitment to environmental progress as part of CI: Customers asking for major reductions (as in Wal-Mart's case) of packaging across the board.

Lessons Learned: Johnson & Johnson (J&J) McNeil Consumer Products, Lititz, PA

Among the "lessons learned" about GSN participation, shared by Mark Keller, Curt Pagano, and Charlie Souders at the J&J McNeil Consumer Products plant in Lititz, PA are:

- *Clearly identify the problem up front. Make sure that your initial project scope is not too broad. This will keep the team focused.
- *For employees familiar with lean concepts, one and a half days of training was too much; it can be reduced to one-half day or one day.
- *Involve the right people on the project team (stakeholders and subject experts).
- *Dedicate employees' time for the three days of a GSN process evaluation. Do not allow outside interferences that will slow the project pace.
- *Conduct a preliminary assessment before the three-day session concludes. It should confirm project scope, the adequacy of data, what other data should be collected, deliverables, and capital availability for process improvements (may be an issue for smaller companies)
- *If lean or an environmental management system has not been integrated into a facility culture, GSN will provide direct benefits such as process improvements, cost savings, and reduction of the environmental footprint.

Figure 3.

Baxter International Inc.: Engaging Suppliers, Seeing Results

Promoting GSN benefits to suppliers helps Baxter International Inc. achieve its environmental and overall performance improvement goals, according to Jenni Cawein, corporate EHS engineering. "Advancing the health of the planet affects the health of the people. As a healthcare company, we work to improve both of them," Cawein said. "This is not just based on good intentions. A key realization is that sound environmental practices can contribute to and even drive competitiveness. There is also a significant bottom line benefit to us, and we would like our suppliers to benefit as well. The benefits go far beyond cost avoidance (reducing raw material costs, etc.). We've seen higher throughput, greater flexibility, optimization of assets, scrap reduction, better employee morale, etc. A lot of those benefits tie directly into what lean manufacturing is trying to achieve. It is learning to see with two kinds of eyes, and bringing greater mutual benefit.

"We realized early on that for small- and medium-size suppliers, getting to a higher level of environmental performance can be difficult and distracting," Cawein continued. "We consider them to be an extension of us, and so we have tried to share our expertise with key suppliers through site visits, conferences, questionnaires, and meetings. But for a number of reasons, including limited resources, these methods have not been nearly as effective as GSN. Our purchasing and environmental people aggressively support their participation in GSN." Eight of Baxter's suppliers have elected to participate in GSN. Medegen Medical Manufacturing Services in Ontario, CA, for example, is noted in the GSN success stories at <http://greensuppliers.gov/gsn>.

"One of the things we love about GSN is that we're seeing actual, quantifiable results," Cawein said of suppliers that choose to share related improvement details. "Our suppliers don't have to share

the results of their GSN activities — we do get aggregate performance improvement information by industry sector from the EPA — but some have opened up to us about their financial and environmental results. We know that when a supplier is stronger financially and environmentally, it positively impacts us."

LeHigh Press Puerto Rico

Applying techniques learned through GSN participation, as encouraged by their customer, Baxter, brought greater efficiency, flexibility, and environmental awareness, according to Luis Herrera, president of Lehigh Press Puerto Rico (located in Junco, PR). The company manufactures inserts and labels for the healthcare, food, and general consumer sectors. Herrera said a challenge for the organization included finding ways to recover necessary margins after giving away profits in exchange for volume. LeHigh Press was invited by Baxter to join the GSN program sponsored by the EPA through PRiMEX and MEP centers.

"We selected a dedicated production line we had for Baxter to produce labels used in the blood bag in blood centers," Herrera said. They completed a competitive review questionnaire. Using this data, a transformation planner was developed. Opportunities identified ranged from on-time delivery to energy utilization.

Next, process mapping (current and future state maps) with PRiMEX showed possibilities for operational and environmental improvements. Then they worked on implementing related changes.

"The application of techniques we learned has helped us to increase our flexibility in serving four plants that use these labels. In addition, the project increased our awareness to reduce waste and look at the waste from an environmental perspective," Herrera said. Top management's review of related savings and impacts included: improved material handling practices (\$27,000 annually), maximized material utilization (\$53,000 a year), reduced waste generation (\$47,000 annually), and other opportunities adding up to more than \$200,000 in savings or cost avoidances per

***"We know
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supplier is
stronger
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mentally, it
positively
impacts us."***

***Jenni Cawein
Baxter
International Inc.***

Resources

*Green Suppliers Network: website <http://greensuppliers.gov/gsn>. Learn about the U.S. Environmental Protection Agency's (EPA) Green Suppliers Network program with the U.S. Department of Commerce's National Institute of Standards and Technology (NIST)-Manufacturing Extension Partnership (MEP) and related initiatives. Tools and resources, membership information, and other information can be found here, as well as links to other sources.

*Kidwell, Mitch, "Lean Manufacturing and the Environment," *Target* Sixth Issue 2006, pp. 13-18. The author explained how lean strategies benefit the environment without the need for special "environmental" toolkits or a separate focus on environmental considerations.

*Langenwarter, Gary. "'Life' is Our Ultimate Customer: From Lean to Sustainability," *Target* First Issue 2006, pp. 5-15. The article described how a commitment to sustainable practices can pay off in the short term and the long term, and noted that environmentally sustainable practices are a natural extension of lean.

*National Association for Environmental Management (NAEM); it is a not-for-profit educational association for environmental and EHS (environmental, safety, and health) managers. The organization sponsors a variety of training and education sessions. See their website www.naem.org for information about specific categories such as environmental management, energy and renewables, etc.

year. "Thanks to this initiative, we were able to participate in the QUEST competition sponsored by the PR Manufacturing Association, where we were awarded the first prize for the local industry sector," said Herrera. "This exposure has allowed us to acquire new customers."

Teamwork Needed

Based on experience working with LeHigh Press and other suppliers, Cawein suggested that manufacturers seeking to bring their suppliers into GSN ensure that they are talking with the right people within their supplier's organization. In some cases, manufacturing people on the production floor may be more receptive than the sales/relationship manager. "We've also learned that it takes more time than we expected, to make sure that 'lean and clean' is working well," she said.

Work with internal supplier operations as well as external suppliers, counseled Cawein. "EHS is not a separate function. Bring together design, quality, purchasing, and all of the functions who can work together with EHS on improving efficiency and reducing waste. If you ignore any of these areas, you're not going to be as efficient or effective as you could be."

Developing effective metrics boosts change in day-to-day performance, and ultimately, cultural change. "We've added

waste metrics, water usage, and energy usage, for example, to current-state maps when we do VSM or kaizen events," Cawein said. "Then the teams create a future-state map and come up with goals and steps toward these goals. You may not see these opportunities until someone brings your attention to it. It's a way to enhance the benefits from improving your processes. Lean talks about eliminating all kinds of waste, and that includes excess water and natural resource usage, etc."

In the spirit of continuous improvement, Baxter is also rolling out a program called Lean Energy, aiming to reduce greenhouse gases and improve energy efficiency. The company hopes that the lean and clean approach it has used to drive waste reduction can also yield savings in energy use and cost.

So What's Holding You Back?

Fear of the big guys from the EPA breathing down your neck may scare off some potential candidates for GSN. Small suppliers may want to keep cost savings under wraps, shielded from customers' eyes. Others may not realize that lean and clean make a good team. A sales job is needed. "MEP's mission is focused on the small and medium manufacturing enterprise," said MEP's Alex Folk. "The challenges are often tied to getting the word out

to the SMEs and helping them find the time to make the commitment. A small business lacks the flexibility of resources often available to larger companies, so we have to be creative, showing that short-term gains can be reinvested into the next opportunities.

"Larger companies across all industries have increased their focus on supply chains for many reasons," he continued. "The key for supply chains is a commitment to the suppliers who are willing to participate. There is a long history of generating cost concessions from suppliers which will continue to be a reality. This program offers suppliers the means to achieve cost savings, reducing the environmental footprint (reducing risk) and improving overall competitiveness."

Folk added, "The whole premise behind a lean transformation is tied to the culture of a company, so throughout our interaction we continually measure company commitment to a cultural change." The MEP approach is tied to a progression of Assessment (identify the current state and prioritized opportunities), Training ('teach to fish' — focused on improving the overall competitiveness of U.S.-based manufacturing and providing the tools to help them-

selves establish a sustainable change), Implementation (teaming with companies to apply the tools to specific issues and broader application), and Continuous Improvement (partnering with companies to support them throughout the transformation and to sustain the changes).

Editor's note: The assistance of Judy Wlodarczyk of the CONNSTEP (MEP) organization in Rocky Hill, CT; Mary Ellen Mika, Steelcase; and Virginia Hoekanga of the National Association for Environmental Management (NAEM) in the development of this article is appreciated.

Lea A.P. Tonkin, Target senior editor, lives in Woodstock, IL.

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