

Sustainable Supply Chains:

*A Guide for Small- to
Medium-sized Manufacturers*

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Current State of Supply Chain Sustainability: A Benchmarking Report

Summary

The goal of this report is to provide small- to medium-sized enterprises (SMEs) with the tools and knowledge to begin making changes to their business that benefit the triple bottom line—financial, social, and environmental success. This is accomplished through a review of academic research, industry best practices, and lessons learned by the authors in working with businesses.

Supply chain sustainability is a topic of increasing importance for businesses and can be of particular interest to SMEs. A recent survey suggests 30% of manufacturers are gaining new profits directly from sustainability initiatives, showing a clear opportunity for bottom-line results by implementing sustainability. In this report, the concept of supply chain sustainability and its importance in today's environment is introduced. The idea of the triple bottom line as the foundation of sustainability is used.

This report highlights the importance of supply chain sustainability from a business perspective and discusses findings from recent surveys on the benefits and challenges of supply chain sustainability. It then focuses on SMEs in particular and how they may use the concept of supply chain sustainability to their competitive advantage. Finally, a roadmap for developing excellence and expertise in supply chain sustainability is presented and a tool for benchmarking and current state analysis is offered.

Supply Chain Sustainability: An Introduction

The issue of sustainability in supply chain management is gaining attention in both academic literature and industry practice as an area of opportunity. Companies across geographic and industry boundaries are implementing sustainability initiatives in the supply chain in response to pressures from consumers, regions of operation, investors, and even employees. Melnyk, Davis, Spekman, and Sandor (2010) state that supply chains must be designed and managed to deliver certain outcomes—sustainability being one of these outcomes—that are driven by customer needs. Sustainability may be driven from within the company or may, in part, be the result of customer needs and pressures as well as other supply chain partners such as suppliers and local and federal governments.

One of the key aspects of sustainability is the holistic view that is applied in understanding the total impacts of products and services and focusing improvements on areas with the most impact. This approach encompasses both the entire life cycle of a product or service and the entire supply chain of that service. Therefore, when businesses address sustainability, it is usually insufficient to simply address sustainability initiatives within the walls of the company. In order to pursue sustainability initiatives with the most potential business impact, companies must look beyond the borders of their business. Therefore, throughout this report, supply chain sustainability as the overall approach to implementing sustainability is addressed, including the supply base, internal operations, and customer base.

This report will

- Define the scope, importance, and impact of sustainable supply chains;
- Discuss the importance and opportunities for SMEs to implement sustainable supply chain practices; and
- Develop a high-level roadmap for supply chain sustainability.

Definition of a Supply Chain

A supply chain is the material, information, and services, typically crossing several different organizations, involved in producing and delivering a product or service to an end user. Supply chain management is a total systems approach to managing the entire flow of information, materials, and services from raw-material suppliers through factories and warehouses to the end customer. In fact, some scholars argue that firm survival in the modern business environment is no longer an issue of one firm competing against another firm but has, instead, become an issue of one supply chain competing against another supply chain (Fine 1998).

Defining Sustainability: Triple Bottom Line Approach

A sustainable supply chain is one that includes measures of profit and loss as well as social and environmental dimensions (Carter and Rogers 2008; Linton, Klassen, and Jayaraman 2007). Such a conceptualization has been referred to as the triple bottom line—financial, social, and environmental performance (Elkington 1994, 1998; Kleindorfer, Singhal, and Wassenhove 2005). The use of triple bottom line is adopted in this report as the definition of sustainability.

Carter and Rogers (2008) state that the triple bottom line is the intersection of social, environmental, and financial performance, as shown in Figure 1. Therefore, for a company to pursue sustainability they cannot pursue financial or social initiatives in a vacuum. Instead, it is strongly recommended that supply chain managers link environmental, social, and financial goals within a broader strategy to ensure the business pursues sustainability rather than philanthropy.

Business success can no longer be measured by only financial performance, as other aspects are critical to long-term success. Researchers such as Markley and Davis (2007) discuss how businesses should not just be measured by traditional financial measures, but also by their social/ethical and environmental performance. These concepts revolve around the idea that companies managed and evaluated using the triple bottom line may have a better likelihood of long-term success.



Figure 1. Sustainability as defined by the triple bottom line (Carter and Rogers 2008)

The Triple Bottom Line and Stakeholders

Recent research has shown that implementing triple bottom line initiatives is largely in response to growing pressure on businesses to pay more attention to the environmental and resource consequences of their operations. This pressure comes from a variety of groups including stakeholders, government regulations, nongovernment organizations, and competitors (Dai and Blackhurst 2011; Sarkis 1998). This presents an added complexity in implementing sustainability within the supply chain. Historically, business initiatives (such as total quality management, lean manufacturing, and others) require relatively minimal stakeholder input, as these initiatives are profit motivated. However, the inclusion of the triple bottom line, by definition, brings in additional stakeholders who focus on the financial, social, and environmental impacts of the business.

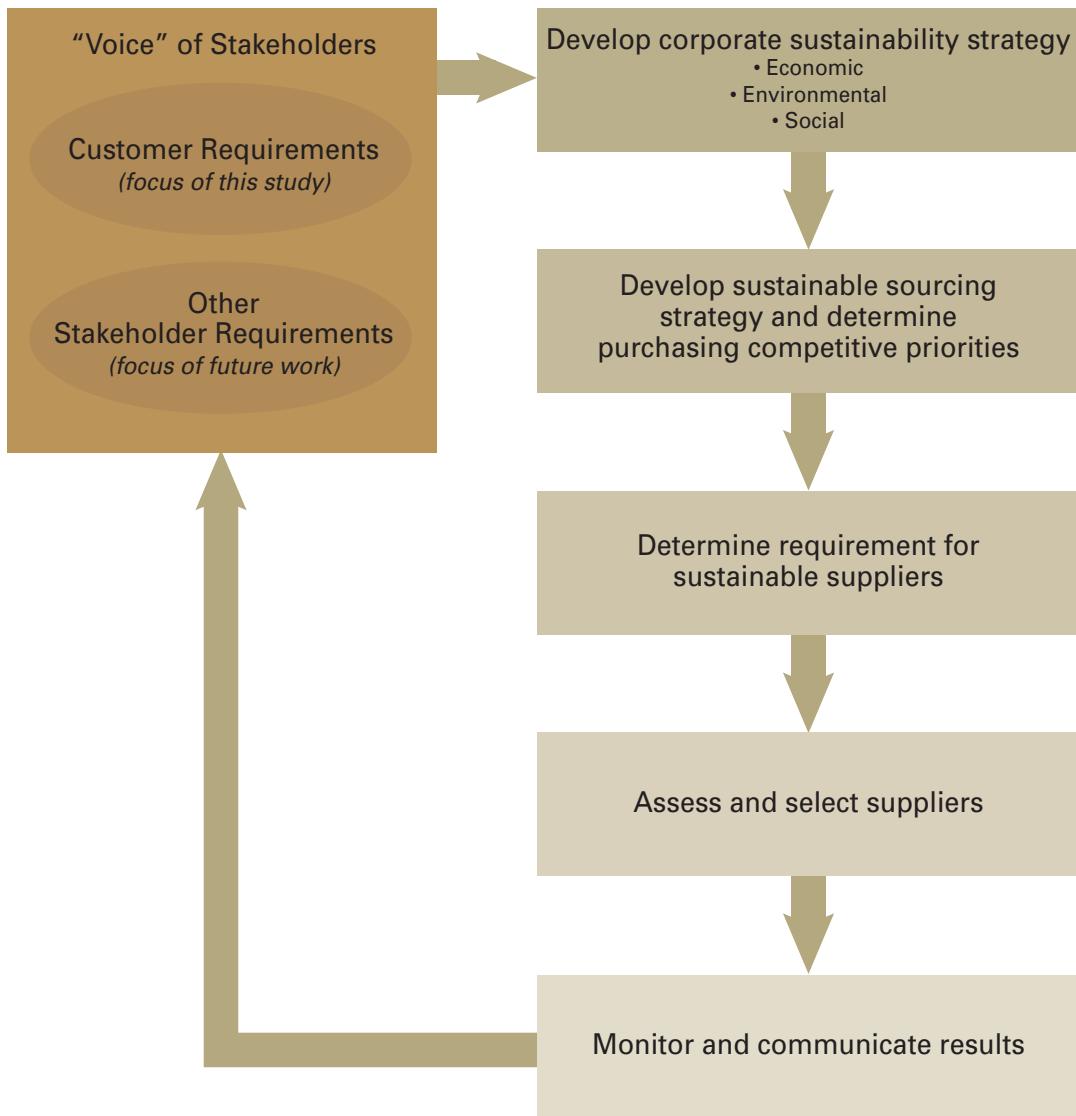
This effort pays back in terms of profit. Consumers are willing to pay “substantially more” for goods produced based on triple bottom line, and consumers will also punish producers for

unethically produced goods (Trudel and Cotte 2009). However, the story does not end there. The negative impact of unethically produced goods is greater than the positive impact of ethically produced goods. Consumers will, in fact, pay more for ethically produced goods, but if the goods are unethically produced, consumers will only purchase them at a substantial discount. This highlights not only the benefits of sustainability but the need to market or advertise these activities to various stakeholders in the supply chain, including (of course) the end customer. This is supported in academic research as well. For example, Krause, Vachon, and Klassen (2009) state that businesses that emphasize sustainability as a competitive priority will benefit by communicating sustainability efforts to customers.

Many experts are predicting that sustainable supply chain operations will, in fact, become an integral part of supply chain strategy and operations. The tools and concepts discussed in this paper will become part of daily business and tie directly into performance. In a recent Deloitte Consulting report, the tie between sustainable supply chain management and cost savings was specifically addressed. In the report, it was stated that while many organizations have traditionally focused on their internal operations for cost reduction initiatives, businesses should not ignore the massive savings opportunities in the supply chain. Leading businesses recognize that this goes beyond demanding cost cutting from their suppliers but “re-looking at their supply chain and focusing on reducing use and production of five metrics that are ubiquitous within it—energy, carbon, water, materials and waste.”

Applying the triple bottom line concept across the supply chain can lead to significant financial benefits. The United Nations Global Compact (2010) discusses how sustainability in the supply chain is driven by business needs—specifically, (1) managing risks (risks that are environmental, social, and financial in nature), (2) realizing efficiencies (such as reduction in cost for materials, labor, energy, and transportation), and (3) creating sustainable production (which can meet the needs of all stakeholders including government, customers, and suppliers). Therefore, there is a need to integrate sustainability into supply chain strategy and decision-making processes.

Recently, a framework for obtaining input from stakeholders in developing a sustainable sourcing strategy (Figure 2) was developed (Dai and Blackhurst, Forthcoming). This iterative loop could be adopted to include all facets of supply chain management. Using a framework such as this would not only allow for input but also the sharing of sustainable practices and activities across the supply chain, which could then be used to demonstrate commitment to sustainable practices across the entire supply chain.



*Figure 2. Sustainable purchasing strategy development process
(Dai and Blackhurst, Forthcoming)*

This above framework is specific to supplier selection processes, but this concept of supply chain sustainability should also be considered beyond simple supplier selection. There are implications for product development, innovation, and even the design of a supply chain that can follow a similar process.

Examples of Supply Chain Sustainability in Business

In addition to reviewing existing research in supply chain sustainability, best practices in business were analyzed. Appendix A provides summaries of several industry-based initiatives to implement sustainability across the supply chain. These activities support the research findings, show some common practices, and provide clear examples of the various expected and unexpected benefits of applying sustainability across the supply chain.

For example, in July 2009, retail giant Walmart announced the creation of a sustainability index, which will be rolled out in three phases including a sustainability index for suppliers, a life cycle analysis database, and a labeling system to provide the consumer with the environmental measurement of the product they are purchasing (Bustillo 2009; Walmart n.d.). The various sustainability initiatives at Walmart have been positive public relations, and activities such as energy reduction have resulted in significant cost savings. Reviewing the best practices of major corporations shows that there are many common elements.

Common themes identified across these examples include the following:

- Legal and Regulatory Compliance: Ensuring business units and suppliers comply with laws and regulations in their areas of operation
- Managing Natural Resource Use: Reducing the use of natural resources and their wastes, including fossil fuels, water, and material waste, as appropriate to the volume used in their business
- Stakeholder Engagement: Participation in or leadership of formal organizations focused on engaging stakeholders to improve the business
- Supplier Scorecards: Clear systems to measure supplier performance beyond traditional performance indicators to also include environmental and social performance measures

Lessons from Industry Reports

In preparing this report, consulting studies in the area of supply chain sustainability were researched. Two of them are highlighted here, then overarching themes are discussed.

In a recent report by the Boston Consulting Group and MIT (Berns 2009), a survey of more than 1,500 business leaders plus more than 400 academics, government officials, and executives of nonprofit organizations was conducted to learn more about how sustainability changes competition for businesses.

Key findings include the following: There is a strong consensus that sustainability is having—and will continue to have—a material impact on how companies think and act. In fact, more than 92 percent of survey respondents said that their company was addressing sustainability in some way. In addition, sustainability seems to be surviving the downturn. The findings highlight that fewer

than 25 percent of survey respondents said that their company had decreased its commitment to sustainability during the downturn. In fact, the opposite was true in some segments such as the automotive industry.

Although almost all surveyed executives thought that sustainability would have an impact on their business and were trying to address this topic, many stated that they simply were not exploiting opportunities fully—leading to an area of opportunity. In fact, the minimum standards for meeting regulatory requirements were what many of the businesses were focusing on—being reactive to regulation changes rather than being more proactive or ahead of the curve. This may be due, in part, to a lack of vision: more than 70 percent of executives admitted they had not developed a clear business case for sustainability. Interestingly, a large number of smaller businesses are aggressively pursuing sustainability and reaping the rewards for their efforts, finding more than they had anticipated, including “tangible bottom-line impacts and new sources of competitive advantage.”

The survey also highlighted experience in implementing sustainability and found additional interesting insights. While novice practitioners mainly focused on environmental and regulatory aspects, businesses also consider the financial, social, and even personal impacts of sustainability-related activities. “Simply put, they saw sustainability as an integral part of value creation,” going beyond environmental and regulatory factors to become a part of how the business is managed.

Experienced practitioners recognized the importance of extending sustainability across the supply chain. In particular, they recognized the benefits of engaging in sustainable practices across the supply base. Sixty-two percent of these “experts” considered it necessary to hold suppliers to specific sustainability criteria, while only 25 percent of “novices” felt the same. On the flip side, consumer concerns related to sustainability were viewed as a relatively more critical force in sustainability among companies based outside of the United States and Europe.

Clearly, sustainability is becoming increasingly important and businesses that do not act are putting themselves at risk. The report concluded with two key recommendations:

- Companies need to develop a better understanding of the implications of sustainability for their business—and the companies already doing so are being rewarded.
- Companies will need to develop new capabilities and characteristics, including the ability to operate on a systemwide basis and collaborate across internal and external boundaries; a culture that rewards and encourages long-term thinking; capabilities in the areas of activity measurement, process redesign, and financial modeling and reporting; and skills in engaging and communicating with external stakeholders.

The second report, published by Accenture (Wright, Jones, and Hoyle 2009), also conducted a sustainable supply chain survey where businesses were placed into three categories with regard to sustainable supply chain initiatives: masters (those in the top quartile of performance), average performers, and laggards (those in the bottom quartile of performance of cost effectiveness and

customer service). Key findings include the following facts:

- Masters invest in improving service levels
- Masters recognize that sustainability is a concern of their customers
- Masters look at sustainability, not just at the “last mile” but throughout the entire chain
- Masters also
 - Design products for sustainability
 - Manage carbon footprint
 - Choose processes that offer the best return on capital

Most of the consulting studies researched in preparing this report concluded that sustainability matters to businesses and the leaders are taking action. It is a general consensus that sustainability is here to stay and can offer real cost savings.

Sustainability within SMEs

There are numerous opportunities for SMEs to capitalize on sustainable supply chain initiatives. In a study of SMEs and sustainability initiatives, Schaper (2002) states that there is great value for large and small businesses alike to invest in sustainability. Small- to medium-sized enterprises are “a means of innovation and change within the business sector, and form an important support to the large businesses which they co-exist alongside with. Although usually not given a great deal of attention, the role of small businesses and the entrepreneurs who operate them are a key part of the sustainability debate.” However, the study found that “compared to larger businesses, most SMEs tend to be somewhat reactive to environmental issues, and limited to small-scale, ad-hoc changes in business activities.” This is also highlighted in Revell, Stokes, and Chen (2010), who state that SMEs lag behind larger businesses in integrating environmental management into corporate strategies. Reasons for this include the following:

- A lack of understanding
- A lack of tools and resources
- Resistance due to perceived time cost and resources required
- Skepticism of the business benefits

However, SMEs do have some unique advantages over their larger counterparts (Bos-Brouwers 2010):

- Flexibility of the business—SMEs are typically less bureaucratic and more responsive, as well as having faster internal communication mechanisms.
- Leadership style—SME leaders may often be characterized as being dynamic and entrepreneurial.

Guidance regarding the “translation” of sustainability in day-to-day actions is scarce. It is

suggested that if SME leaders were to market their sustainability to stakeholders, they would see a direct impact on profitability. One way to do this is to capitalize on developing strong networks of supply chain partners. Revell, Stokes, and Chen (2010) discuss how networks can help to build cooperative relationships. For example, local networks may help SMEs focus efforts and attract regional and national attention. Therefore, SMEs may see real benefit in linking sustainability to strategy and policy within their businesses and supply chains.

Since the majority of SMEs are privately owned companies and rarely actively pursue research and publication of successful practices, success stories in implementing sustainability are not easily found. However, this does not mean that SMEs are not having success in implementing sustainability concepts throughout their supply chains. For example, Pretty Products, a manufacturer of floor mats for the automotive industry, was recently featured in *Green Manufacturer Magazine* (June 10, 2011; www.greenmanufacturer.net/article/machinery-and-equipment/eco-strategies--drive-mat-makeras-u-turn). This SME, based in LaGrange, Georgia, was able to use sustainability as the foundation of an innovation and growth strategy to turn the company around and become a leader in the industry. In addition, the authors of this report have held informal discussions with several SMEs who have had success implementing sustainability initiatives across a broad range of activities, including employee wellness programs, solid waste reduction, product development, and other areas.

The recent *2011 Next Generation Manufacturing Study* by The Manufacturing Performance Institute (2011) provides more information on the potential business case for SMEs implementing sustainability across the supply chain. First, while 72 percent of companies consider supply chain management to be important to success over the next five years, only 29 percent report being at or near world-class performance. Further, 27 percent of companies surveyed spend over 25 percent of staff time responding to supply chain issues. These statistics indicate a significant opportunity for improved performance and communication across the supply chain.

The same study also shows that the importance of sustainability has grown significantly over the past two years, with the number of companies ranking sustainability as very important growing from 35 percent to 59 percent, but with very little evidence of progress in sustainability. These two gaps can be addressed in one initiative through an effective supply chain sustainability program. Given that many manufacturers have addressed neither supply chain excellence nor sustainability, there are potentially significant cost benefits to companies by addressing these in a combined manner.

Synthesizing the Findings

In synthesizing the literature and best practices, the following themes can be extracted:

- Companies succeed more often with a framework or roadmap for improvement.
 - Within the framework, a common language is needed.
- Businesses should develop this plan for the supply chain system rather than focusing on one location only, although it should be noted that SMEs should get their own “house in order” before deploying throughout the supply chain. They will find support, and even guidance, for these initiatives at other points in the supply chain.
 - Original equipment manufacturers that have sustainability programs will regularly reach out to their suppliers to provide assistance in implementing basic sustainability tools.
 - Small- to medium-sized enterprises may have success asking suppliers about their level of sustainability implementation. Suppliers (large or small) that have had success with sustainability are typically enthusiastic to share these successes with their customers and see it as an opportunity to differentiate themselves.
 - Small- to medium-sized enterprises can participate in third-party programs such as the Manufacturing Extension Partnership Centers (e.g., CIRAS) or the Green Suppliers Network (www.greensuppliers.gov), where an independent organization facilitates green initiatives across the supply chain.
 - This includes suppliers, manufacturing, logistics, recovery, and reverse logistics. This is echoed in many academic studies as well, including Linton, Klassen, and Jayaraman (2007) and Seuring and Muller (2008).
- In doing so, there needs to be a vision of shared values at all levels of the company. These tie into the next point of gaining support.
- Top management support is imperative for success. Businesses should not underestimate the power of culture in the organization. In this area there is research to assist as well. For example, Nousala and Jamsai-Whyte (2010) discuss sustainable knowledge transfer methods for SMEs. Specifically, that “the understanding of the elements (tacit protocols) necessary for sustainable practice and processes is relevant to the successful development and sustainability of any working group, team or SME organization.”
- Savvy businesses will realize that planning is difficult in environments of high uncertainty. Therefore, it is suggested that as businesses develop their frameworks and strategies they incorporate flexibility and risk management. This is discussed in Carter and Rogers (2008), where risk should be managed both in terms of short- and long-term financial results, including risk factors that could affect the triple bottom line. Therefore, Carter and Rogers (2008) define risk management as the ability of a firm to understand and manage financial, social, and environmental risks in the supply chain. They also discuss how risks can be managed through resilient and agile supply chains.
- Stakeholder views on carbon footprint should be understood. Legislation, consumer groups, and various geographic locations have different tolerances for carbon footprint impacts.

Depending on these views, carbon footprint assessments and reduction activities may be appropriate.

Supply Chain Sustainability: Roadmap for Implementation

In order to assist SMEs in achieving excellence in supply chain sustainability, this report recommends the following steps, which are then discussed in detail:

Step 1—Understand the Facts

Step 2—Develop a Vision

Step 3—Create a Roadmap

Step 4—Execute, Review, and Change

Step 1—Understand the Facts

The first action is to perform an assessment of supply chain sustainability in terms of financial, social, and environmental status and needs. To assist with this step, CIRAS has developed a supply chain sustainability assessment (see Appendix B) to help SMEs understand potential opportunities across the triple bottom line. In turn, this information can be used to develop a set of goals or a vision for the future at both an operational and strategic level.

Alternatively, other accepted tools and standards can be used for this initial assessment. A partial list of sustainability standards is provided in Appendix C, and many industries also have industry-specific standards that identify the key aspects of sustainability. When selecting a standard, companies should make sure the scope of the assessment is understood, including which of the triple bottom line categories and how much of the business (a single factory, the whole business, or the whole supply chain) is being assessed.

Step 2—Develop a Vision

In order to develop a long-term vision for supply chain sustainability, companies should first develop a detailed understanding of current sustainability initiatives and issues throughout the supply chain. This requires that the company go beyond the assessment from the previous step to develop an understanding of the entire supply chain (through a mapping exercise) and then talk and collaborate with suppliers and customers, along with stakeholders in the region and industry, to understand key issues. An understanding of supply chain sustainability issues for each tier and/or key player in the supply chain should be developed. Next, two to three key products should be selected and financial, social, and environmental impacts determined through life cycle assessments.

Based on the results of the assessment in Step 1 and lessons learned through stakeholder discussions and life cycle assessments, steps in supply chain sustainability can begin to be identified and prioritized. A vision statement should be developed that describes the ultimate

goals of a sustainability program and includes a set of general goals that will drive the actions. Goals may be separated into short-term (twelve months) and long-term (five years) goals. Short-term goals will focus on internal operations and strategy/policy changes, and long-term goals should focus on major initiatives and product changes. These goals will be the foundation for the sustainability roadmap.

Sample Vision and Goals

Vision: Create a sustainability culture that allows employees to improve products and operations to minimize environmental impact while maximizing shareholder return and community benefits.

Goals: Short Term

- Reduce water use by 10 percent by 2014.
- Reduce energy use by 10 percent each year.
- Ensure 100% of Tier 1 suppliers comply with the supplier responsibility statement.

Long Term

- Redesign products to minimize energy use by the customers.
- Fully eliminate the use of toxic chemicals in product x by 2020.

Step 3—Create a Roadmap

When creating a roadmap to supply chain sustainability, a company should first focus on making sure basic compliance guidelines are being met in their own facilities. Next, a business case should be developed to address gaps identified in the sustainability assessment within the facilities and then across the supply chain. Projects that can be executed quickly with little investment and clear return on investment should be selected as a foundation. Then, metrics and standards to measure improvements should be established. For example, standards and expectations should be set for suppliers across the triple bottom line.

Besides the fundamentals, efforts beyond traditional internal improvements should be expanded. Joint improvement events with key supply chain partners should be examined. Finally, the triple bottom line should be considered in the design of new products. As the sustainability program matures, these initiatives will work well as an extension of continuous improvement initiatives within a company.

Step 4—Execute, Review, and Change

In Step 4, the process loops back around in terms of executing, reviewing, and changing direction (if needed). Industries are continuously gaining a better understanding of the impacts of decisions on sustainability, so the “right” answer today may be different next year. A company must be ready to change course and review decisions on a regular basis.

See Appendix A for examples from six businesses, including how they view sustainability in their supply chains, goals, and current initiatives.

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Appendix A:

Examples of Sustainability Initiatives

Walmart

Sustainability Overview

Minimize waste, increase efficiency, and support communities by using renewable energy, which will reduce energy use and emissions. Send waste to recycling facilities and not landfills. Offer customers products that reduce impact on the environment.

Goals

- Be supplied 100 percent by renewable energy
- Create zero waste
- Sell products that sustain people and the environment
- Increase transparency of supply chain by working closely with suppliers

Initiatives

Energy

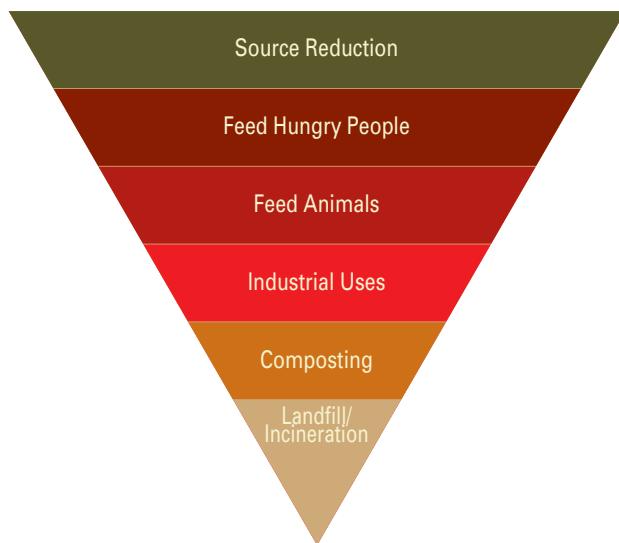
Eliminate 20 million metric tons of greenhouse gas (GHG) emissions from global supply chain by the end of 2015. This can be accomplished by the following:

- Design and open a viable store prototype that is 25 to 30 percent more energy efficient and will produce up to 30 percent fewer GHG emissions by 2009 globally.
- Reduce GHGs by 20 percent at the existing store, club, and distribution center base around the world by 2012.
- Double truck fleet efficiency in the United States by October 2015.

Waste

- Follow U.S. Environmental Protection Agency (EPA) food waste hierarchy to determine solution for getting rid of wasted food.
- Focus on recycling.
- In 2009, the company recycled more than 1.3 million pounds of aluminum, 120 million pounds of plastic, 11.6 million pounds of mixed paper, and 4.6 billion pounds of cardboard.
- Reduce plastic bag waste by increasing plastic bag recycling and introducing more reusable bag options.
- In 2009 the company reduced plastic bag waste by 66.5 million pounds or 4.8 billion bags.

U.S. EPA Food Waste Hierarchy



Sustainable Product Index

The company has created an initiative to label products with a rating system that customers can use to compare the sustainability of similar products. The development started in July 2009 and should be completed within the next five years. Walmart distributed a Supplier Sustainability Assessment to its suppliers to answer questions on energy and climate, natural resources, material efficiency, and people and community. This assessment will determine which suppliers are viable to the company's sustainability progress and which ones need assistance in building a more sustainable business. The Sustainability Consortium will be building a database that specifies the life cycle of suppliers' products. The information in this database will be used to label the products sold at Walmart with a rating system to inform the customers how the products will have a reduced impact on the environment.

Sustainable Value Networks

The goal of the networks is to bring leaders together from Walmart associates, suppliers, companies, academia, government, and nongovernmental organizations to promote sustainability in every aspect within operations.

GreenWERCS™

GreenWERCS is a tool used to identify potentially harmful chemicals used in products from suppliers. If hazardous chemicals are found, the company will work with the supplier to find alternative solutions. This requires the suppliers to become more transparent in their manufacturing methods for both Walmart and the end consumer.

Effects on Supply Chain

To achieve the goal of doubling truck fleet efficiency, Walmart has been working to reduce the number of miles driven and to load trailers more effectively. In 2009, the company improved its fleet efficiency by 60 percent, delivered 77 million more cases, and eliminated more than 100 million miles. This resulted in a reduction of 145,000 metric tons of CO₂. The company calculates fleet efficiency by dividing the number of cases delivered by the number of miles traveled over miles per gallon.

In order to reduce the amount of waste, Walmart launched a packaging scorecard in 2008 for its suppliers. Suppliers have been able to create packaging material manufactured with less energy and fewer natural resources. In addition, the company has made their deli pizza boxes out of recycled cardboard from the company's own waste. This recycling requires redirecting efforts to and from landfills.

In January 2010, the company began a test program by offering reusable bags in California for 15 or 50 cents based on size. This requires the company to manufacture these bags at a low cost and reduce the amount of plastic bags they distribute.

In 2009, Walmart donated 127 million pounds of excess food to the Feeding America program. Ensuring that the food gets to the program in an acceptable manner requires more resources for sorting and delivering the products. This will also introduce another lane within the supply chain.

<http://walmartstores.com/sites/sustainabilityreport/2010/>

P&G

Sustainability Overview

P&G improves the quality of life for people through the products and services they offer by being environmentally and socially responsible.

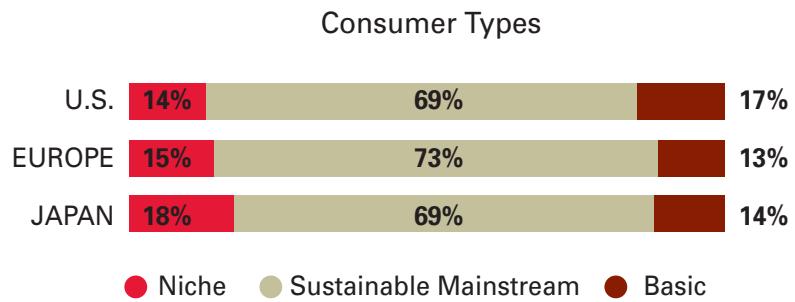
Goals

- Powering plants with 100 percent renewable energy
- Using 100 percent renewable or recycled materials for all products and packaging
- Having zero consumer waste go to landfills
- Designing products to delight consumers while maximizing the conservation of resources

Initiatives

Environmental

There are two types of customers—the “niche,” who is willing to sacrifice performance and value of a product to improve sustainability; and the “basic” group, who is not concerned about sustainability and focuses on the value the products bring to their family. Most consumers lie in the middle, meaning they will change their purchasing decisions with regard to sustainability only if they receive the same quality product. This middle group is the focus of P&G.



The company uses “life cycle thinking,” which is a discipline that determines a product’s entire environmental footprint from raw materials to end disposal. It is also working to reduce the amount of material used in products and provide education programs to consumers.

Operations and Suppliers

The company implements sustainability across the supply chain from manufacturing to finished product logistics and within supplier engagement.

- **Conservation and Process Improvement:** At the facility level, site sustainability leaders work to reduce waste, water, energy, and CO₂.
- **Waste Reuse:** Global asset recovery purchases turn “garbage into good” by using materials or selling for reuse, which reduces raw-material consumption by other companies.
- **Facility Eco-Design:** When building a new facility, the company uses the 77-Point Plan, which rates a facility’s potential impact on CO₂, energy, waste, water, and environmental quality.
- **Alternative Energy:** The company makes use of solar, wind, biomass, geothermal, and

cogeneration energy.

- **Supplier Engagement:** The Supplier Environmental Sustainability Scorecard assesses the supplier's environmental footprint by measuring energy use, water use, waste disposal, and GHG emissions on a year-to-year basis.

Effects on Supply Chain

To use 100 percent renewable and/or recycled materials for packaging, the company is looking into new sources and raw materials. For example, the company is investigating retrieving raw materials from biological processes such as fermentation. This initiative will require the company to build new supplier relationships with those who can provide the raw materials and require new supply chain routes. Having zero waste go to landfills will also require new supplier relationships. The company wants all waste to go to a valued waste stream and will have to find new ways to avoid using landfills.

The "life cycle thinking" approach requires the company to map the entire cycle of a product to evaluate its environmental footprint. This includes materials, manufacturing, packaging, distribution, usage, and disposal. If any step in the cycle does not provide a positive environmental impact, the company will try to find new routes and technologies that will improve the impact. For example, the company has partnered with the World Wildlife Fund to source renewable forest products and palm oil, which requires certified sustainable operations.

The goal of the Supplier Environmental Sustainability Scorecard is to improve supply chain collaboration and encourage the sharing of ideas to deliver more sustainable products to the end consumer. The scorecard requires relationships with the World Resources Institute, the World Business Council for Sustainable Development, and the Carbon Disclosure Project. The company hopes to develop a new industry standard for supply chain evaluation with this scorecard and encourages its suppliers to use it within their own supply chains.

In addition, the company has guidelines that their suppliers must follow in order to partner with P&G. The suppliers must share the company's values and have high standards in regards to

- Complying with applicable laws of their country;
- Restricting bribery;
- Respecting basic human rights;
- Restricting employment of children, prisoners, indentures, bonded labor, and corporal punishment;
- Establishing zero tolerance of harassment, discrimination, physical or mental punishment, or other abuse;
- Providing a safe work environment; and
- Meeting all environmental rules, regulations, and laws of the supplier's country.

http://www.pg.com/en_US/sustainability/overview.shtml

Pella

Sustainability Overview

Pella has been focused on sustainability throughout the duration of its business by providing energy-efficient windows. The company focuses on business practices that improve the environment by implementing continuous improvement initiatives such as kaizen and just-in-time.

Goals

The goal of the company is to provide its customers with energy-efficient products that will save them money in their utility bills and do so by using as few resources as possible within operations.

Initiatives

Environmental Business Practices

Pella sees it as their responsibility to avoid harmful and wasteful acts toward the environment during their operations. The company strives to operate responsibly and cleaner, to recycle, and to be efficient. They see everything as a by-product that can be reused within the company or within an outside entity. To make this happen, they have to make the recycling process convenient for their employees to participate.

Continuous Improvement

Pella implements continuous improvement in its facilities by installing just-in-time practices and kaizen events. The events are one week long, and the goal is to take time and cost out of the process while improving quality and productivity. These events are not just for production but also for design, marketing, and service of the product. Just-in-time manufacturing allows the company to save money on inventory and passes the savings to the customer.

Awards

The company has been recognized multiple times for their efforts toward environmental sustainability by receiving awards and becoming members of nationally recognized organizations. Below is a nonexhaustive list of some of their achievements:

- **Energy Star Partner of the Year 2011**—Recognizes manufacturers and retailers that successfully promote and deliver Energy Star-qualified products
- **Energy Star Sustained Excellence 2011**—Recognition of achieved goals toward reducing GHG emissions, employee innovative approaches, and demonstrating the benefits of energy on a continuous basis
- **EPA Pollution Prevention Award**—Recognized for its responsible manufacturing processes and chemical waste management
- **U.S. Green Building Council**—Encourages the use of Leadership in Energy and Environmental Design (LEED) certification processes for its products and business

- **SmartWay Transport Partnership Program**—Received accreditation to participate in the program by improving the environmental performance of its freight operations

Effects on Supply Chain

To achieve their goals regarding environmental business practices, Pella has to continue to find new sources that can benefit from their wasted products such as wood and glass. This requires a constant search for new partners and the development of new transportation methods. In addition, the company's continuous improvement methods require their employees to spend time researching and developing ways to remove cost in the service they provide to their customers. This necessitates the development of optimal shipping routes to service the at-home customers. Finally, the variety of public recognition of environmental sustainability encourages the company to keep moving forward in their efforts and maintain their reputation. The SmartWay Transport Partnership in particular demonstrates that the company is focused on supply chain efficiency and sustainability by using fewer resources to serve their customers.

<http://www.pella.com/about-us/environmental-commitment/default.aspx>

John Deere

Sustainability Overview

John Deere continuously looks for energy-efficient systems that sustain air and water quality and eliminate or reduce waste. They give preference to technology and products that have favorable environmental impacts. They implement sustainability within their operations through priorities, facilities, suppliers, and products.

Goals

- Reduce the company's global GHG emissions by 25 percent per dollar of revenue through 2014
- Commit to environmental protection
- Offer products that are more productive, more efficient, and respect the environment

Initiatives

Environmental Protection through Operating Processes

Priorities

John Deere initiated its energy-efficiency program in 1972. Since then they have reduced GHG emissions by 63 percent per ton of production. They currently collect data on water usage at each manufacturing location and are developing standards for constructing new facilities with water reduction technology. In addition, each new facility is built under LEED criteria such as using wind energy. Also, each facility follows the ISO 14001 standard.

Suppliers

Deere audits supplier environmental compliance through policies, standards, systems, and programs. One outcome of this is the increase in recycling efforts in Fuguqy-Varina, North Carolina. This facility has reduced landfill waste by more than 80 percent this past year.

Product Sustainability

The company complies with EPA requirements of using engines with Interim Tier 4 emissions regulations. The Tier 3 PowerTech Plus engine includes cooled exhaust gas recirculation for reducing oxides of nitrogen emissions. In addition the 8000 E-Cut Hybrid Fairway Mower reduces leaks of hydraulic oil and reduces engine speed. Deere uses recycled or renewable materials such as corn- and soy-based plastics for combine and tractor components. They also provide remanufactured products to customers.

Renewable Energy

John Deere builds products that support the biomass movement, such as the sugarcane and corn ethanol industry. They have developed a website to educate others on the use and importance of woody biomass. The company offers products and services helping customers use and conserve

water through John Deere Water and John Deere Green Tech divisions.

Technology

The company installs technology in their products to help customers have a more precise application of crop care products. The machines have feed rate control and assisted steering for higher efficiency and less fuel consumption.

Sustainable Landscape Design

John Deere is currently participating in a test program, Sustainable Sites Initiative™ (SITES™), for the nation's first rating system for sustainable landscape design, construction, and maintenance. They will use the SITES point system to score sustainability of certain sites including rainwater use, protecting and restoring soil conditions, and managing turf and plants. SITES will use John Deere's feedback to revise the final rating system by early 2013. These guidelines will then be incorporated into the LEED Green Building Rating System™.

http://www.deere.com/wps/dcom/en_US/corporate/our_company/news_and_media/press_releases/2010/may26_2010_deeresites.page

Effects on Supply Chain

John Deere requires their suppliers to comply with their rules on environmental initiatives. This has resulted in an increase of recycling efforts and a decrease of landfill waste. This forces the suppliers to adapt their supply chains by rerouting the waste stream to recycling facilities from landfills.

The products of John Deere use renewable materials such as corn- and soy-based plastics for combine and tractor components. This requires the company to have multiple raw-material suppliers, as not all components can be made out of the renewable materials. The company also provides remanufactured products. This indicates they have a closed-loop supply chain with the customers.

http://www.deere.com/wps/dcom/en_US/corporate/our_company/citizenship/citizenship_landing.page?%0A%09%09%20%09

Caterpillar

Sustainability Overview

Caterpillar has a vision, mission, and strategy centered on sustainability. The company wants all people's basic needs to be fulfilled in sustainable ways that preserve the planet by making efficient use of the world's natural resources. They continually work to minimize the use of energy, materials, water, and land; they look to maximize recycling and minimize emissions; and they optimize the use of renewable resources.

Goals

2020 Goals for Operations

- Design all new construction to meet LEED or comparable green building criteria
- Eliminate waste by reducing waste generation and reusing or recycling all that remains
- Hold water consumption flat
- Use alternative/renewable sources to meet 20 percent of their energy needs
- Reduce absolute GHG emissions from existing facilities by 25 percent
- Increase energy efficiency by 25 percent
- Reduce recordable workplace injury rates to 0.6 and lost-time case rate due to injury to 0.15

2020 Goals for Products, Services, and Solutions

- Increase customer materials efficiency by 20 percent
- Increase customer energy efficiency by 20 percent
- Reduce customer GHG emissions by 20 percent
- Provide leadership in the safety of people in, on, and around their products

Initiatives

Products and Services

Caterpillar provides products and solutions that help customers become sustainable. Some of these solutions include mining education, emissions solutions, earthmoving solutions, Tier 4, power plant solutions, Cat certified rebuild, upgrades and retrofits, railway power products, simulators, and operator training. In addition, the company remanufactures diesel engines.

Environment, Health, and Safety

The Cat Production System is active in all parts of the organization to develop standard work in all areas of environment, health, and safety. The company encourages all employees to challenge waste, eliminate inefficiencies, and work to understand their impact on the world.

Effects on Supply Chain

Efforts to increase recycling resulted in finding alternative methods for recycling wood shipping

gates and pallets. In 2010 the facility in Desford, U.K., had a full year with zero waste sent to landfills. This required an increase in collaboration with recycling vendors.

Caterpillar Japan Ltd. installed high-efficiency automatic machining units that tripled running speed, improved cutting conditions, reduced pallet changeover time, and improved machining swarf capture. This resulted in a 50 percent reduction in machining time. These machines not only save energy, but allow the company to decrease the lead time in getting the product to the customer.

To achieve their 2020 goals, Caterpillar must evaluate their relationship with energy suppliers (electric, water, gas) and develop new relationships with those companies that can supply them with alternative energy means (wind, solar, biomass).

<http://www.caterpillar.com/sustainability/sustainability-report>

ConAgra Foods

Sustainability Overview

ConAgra institutes corporate responsibility into their mission statement and continually works to provide sustainability for people, their communities, and the planet they live on. Every three years, the company conducts assessments at all facilities to ensure compliance with the most recent environmental and safety laws. Up through 2015, the company has four focus areas within sustainability: climate change and energy, water resources, sustainable packaging, and sourcing and supplier engagement.

Goals

By the end of 2015, the company aspires to accomplish the following goals:

- Reduce GHG emissions by 20 percent per pound of product produced
- Reduce water use by 15 percent per pound of product produced
- Divert at least 75 percent—or 10 percent above the base line, if greater—of all solid waste from landfills
- Reduce packaging by 10 percent per pound of product produced
- Increase the amount of packaging made of renewable resources from 45 percent to more than 50 percent
- Increase the use of recycled content in their packaging by 25 percent
- Actively work with their supply chain to encourage continuous improvement in the areas of energy, water, materials, and waste
- Collaborate with growers of key specialty crops to implement sustainable farming practices that optimize yield while improving land stewardship

Initiatives

Sustainable Agriculture

ConAgra is using their Lamb Weston business to educate farmers on creating sustainable business practices throughout the supply chain. The growers are going beyond U.S. EPA guidelines to keep potato and vegetable crops safe from pests, weeds, mold, disease, and bacteria through integrated pest management. The company is also working with their suppliers to improve their water efficiency. Approximately 53 percent of the growers have converted to drip irrigation, which has reduced water use by 17 percent and fertilizer use by 50 percent.

Greenhouse Gas Management

ConAgra joined the Carbon Disclosure Project's Supply Chain Leadership Council in 2009. The company now requests that more than 70 of their top suppliers and manufacturers disclose information related to their GHG management programs to the council. This disclosure helps the

company pinpoint where the most gas emissions are occurring.

Transportation and Logistics

ConAgra is working with their transportation business partners to reduce their carbon footprint. They are working with their suppliers to improve efficiency in all modes of transportation. They have developed a “Perfect Pallet” initiative that strives to optimize pallet efficiency by adjusting packing size and orientation. In addition, the company has redesigned the packaging material of their products to increase truckloads.

Effects on Supply Chain

The sustainable agriculture initiative requires the company to maintain a close relationship with its raw-material/food suppliers. In order for ConAgra to have a sustainable supply chain, they rely on their suppliers to comply with these initiatives and the code of conduct they have developed. Those that do not comply will have to be removed and replaced.

The greenhouse management initiative again requires compliance by the suppliers. The suppliers will have to develop creative ways for tracking their carbon emissions and sharing this information with ConAgra. Those that do not comply will not receive business from ConAgra.

The transportation initiative requires ConAgra to manage the way they distribute their products. The company has to work with their suppliers to determine the most optimal routes, modes of transportation, and loading strategy.

http://company.conagrafoods.com/phoenix.zhtml?c=202310&p=corp_sust_dev

Appendix B:

Supply Chain Sustainability Assessment for SMEs

The following pages provide an assessment of sustainability practices. This tool is intended to help SMEs understand their current practices in the triple bottom line across the supply chain. There are separate sections for financial, social, and environmental aspects of sustainability. Within each section, the assessment is separated into Supply, Internal Operations, and Customers and Distribution.

To use the assessment, rate your current and planned activities in each of the items in the assessment. Once the assessment has been completed, review areas of low scores to determine potential elements for improvement. In considering these areas, review the potential impact to your business, relevance to your industry, and importance to your stakeholders. As described in the report, start with your internal operations and expand to other portions of the supply chain as appropriate.

CIRAS Financial Supply Chain Sustainability Assessment

Activities	Explanation/Examples (if needed)	Score (Current)	Score (Planned)
SUPPLY			
Tactical			
Understanding of Supplier Engagement in Sustainable Practices	Surveyed your supply chain to understand what suppliers are engaging in sustainable practices and how it can benefit you		
Local Supply Base	Programs to maximize use of a local supply base		
Supplier Suggestion Program	Program in place to accept, analyze, and reward supplier suggestions in financial, social, and environmental initiatives		
Strategic			
Early Supplier Involvement	Suppliers involved in new product design to provide input in financial, social, and environmental impacts of design decisions		
Supplier Coordination	Coordinate with your suppliers by sharing information (demand, forecasts, etc.) to maximize efficiencies		
Total Cost of Ownership Analysis	A defined process to consider costs beyond landed cost in evaluating supplier pricing (such as cost of quality, inventory, risks, etc.)		
INTERNAL OPERATIONS			
Tactical			
Impacts of Defined Benefit Plan Obligations to Employees	If the business has defined benefit (pension) plans, is the financial impact understood and managed		
Employee Wage Analysis	Analysis to determine wage competitiveness and long-term wage expectations		
Understanding of Regional Economic Impact and Interconnections	Analysis of impacts of local operations on local environment (community), including financial, social, and environmental impacts; this includes aligning business philanthropic activities with your benefits		
Environmental Cost Accounting	Accounting for environmental costs, attempting to put a cost on environmental programs and projects		
Strategic			
Integrated Long-Term Business Strategy	Strategic plan covers financial, social, and environmental strategies		
Strategic Alliances	Alliances with other businesses to jointly work on sustainability projects		
Corporate Policies and Procedures	Detail and extent of consideration of sustainability throughout organization's policies/procedures		
Risk Management Preparedness	Company has a risk management plan in place to identify and manage financial, social, and environmental risks		
CUSTOMERS AND DISTRIBUTION			
Tactical			
Product Development and Innovation	Product development process includes sustainability considerations		
Strategic			
Surveillance of the Market for New Opportunities	Formal process to identify growth opportunities, including opportunities from environmental or social initiatives		

SCALE: 1—none (*not at all*)

- 2—low, limited (*e.g., experimenting with idea, pilot testing*)
- 3—some (*e.g., adopted practice in a few areas/departments*)
- 4—many/frequent (*e.g., widely used practice in company*)
- 5—high (*e.g., extensive efforts throughout entire company*)

CIRAS Social Supply Chain Sustainability Assessment

Activities	Explanation/Examples (if needed)	Score (Current)	Score (Planned)
SUPPLY			
<i>Tactical</i>			
Human Rights	Policy and processes in place to ensure suppliers meet human rights expectations (safety, right of association, child labor, etc.)		
<i>Strategic</i>			
Mission Statement	Supply mission statement includes focus on supplier well-being in addition to business results		
Codes of Conduct	Established codes of conduct for working with our suppliers and other supply chain partners		
INTERNAL OPERATIONS			
<i>Tactical</i>			
Workforce Analysis	Understanding of current and projected workforce needs		
Safety	Existence of formal joint management/employee safety programs		
Employee Training (Skills)	Formal employee qualification and training program		
<i>Strategic</i>			
Employee Performance Reviews	Annual or greater conduct of employee performance reviews		
Learning and Training (Mentoring)	Employees are mentored and given opportunities to learn best practices within the company		
Commitment	Written management goals include all aspects of the triple bottom line		
Rewards	Employees are rewarded for developing ideas related to financial savings, social issues, and environmental impacts		
CUSTOMERS AND DISTRIBUTION			
<i>Tactical</i>			
Transportation	Logistics and transportation decisions consider the impact to our environment		
<i>Strategic</i>			
Life Cycle Assessment (Consumer Health and Safety)	Efforts to understand the impacts of products on consumers throughout the entire life cycle		

SCALE: 1—none (*not at all*)

2—low, limited (*e.g., experimenting with idea, pilot testing*)

3—some (*e.g., adopted practice in a few areas/departments*)

4—many/frequent (*e.g., widely used practice in company*)

5—high (*e.g., extensive efforts throughout entire company*)

CIRAS Environmental Supply Chain Sustainability Assessment

Activities	Explanation/Examples (if needed)	Score (Current)	Score (Planned)
SUPPLY			
<i>Tactical</i>			
Suppliers	Supplier selection criteria include environmental dimensions		
Environmental Standards for Suppliers	Suppliers required to adhere to certain environmental performance standards		
Environmental Audits of Suppliers	Suppliers audited on environmental performance		
Packaging	Returnable packaging, reduced packaging, recyclable packaging, environmentally responsible packaging, using packaging and pallets that can be returned after they are finished being used		
<i>Strategic</i>			
Best Practices	Benchmarking and best practices assessments are conducted with suppliers and other supply chain partners		
INTERNAL OPERATIONS			
<i>Tactical</i>			
Substituting Environmentally Problematic Materials	Replacing a material that can cause environmental problems with another material that is not problematic		
Remanufacturing	Rebuilding a product where some of the parts or components are recovered		
Environmental Department/Teams	Dedicated teams focused on integrating environmental initiatives		
Participation in Environmental Initiatives, Certification Programs	For example, ISO 14000, Eco-Management and Audit Scheme, EPA, Green Lights, Green Seal, OSHA		
Water Use Management	Programs in place to refuse/reduce/reuse/recycle		
Pollution/Chemical Management	Programs in place to refuse/reduce/reuse/recycle		
Solid Waste Management	Programs in place to refuse/reduce/reuse/recycle		
Energy Management	Programs in place to refuse/reduce/reuse/recycle		
<i>Strategic</i>			
Life Cycle Assessment (Environmental Impacts)	Efforts to understand the impacts of products throughout the entire life cycle from cradle to grave		
Environmental Mission Statement	Leadership/Mission/Vision statement exists		
Spreading Risk of Environmental Problems	Use of a third party or expert to deal with environmental issues		
Employee Environmental Training Programs	Environmental awareness and training programs exist for employees		
CUSTOMERS AND DISTRIBUTION			
<i>Tactical</i>			
Product Reclamation	Process in place to reclaim end-of-life products from customers		
<i>Strategic</i>			
Design of Products	Eco-efficient products, eco-design, process improvement, design for environment		
Environmental Communications	Formal method to communicate with stakeholders on environmental issues		
Specific Design Targets	Quantify and communicate environmental design goals and environmental impacts		
Environmental Risk Analysis	Assessment of risks of materials to the environment or to people		

SCALE: 1—none (*not at all*)

- 2—low, limited (*e.g., experimenting with idea, pilot testing*)
- 3—some (*e.g., adopted practice in a few areas/departments*)
- 4—many/frequent (*e.g., widely used practice in company*)
- 5—high (*e.g., extensive efforts throughout entire company*)

Appendix C:

Sustainability Standards

STANDARD NAME	REFERENCE	FOCUS AREA
Global Reporting Initiative	www.globalreporting.org	Triple Bottom Line Indicator-based
OECD Sustainable Manufacturing Toolkit	http://www.oecd.org/site/0,3407, en_21571361_47075996_1_1_1_1_1,00.html	Triple Bottom Line Indicator-based
Greenhouse Gas Protocol	http://www.ghgprotocol.org/	Greenhouse Gas Emissions
ULE 880	http://www.ulenvironment.com/ulenvironment/eng/ pages/offering/standards/organizations/	Environmental and Social Practice- and Indicator-based
Social Accountability 8000	http://www.sa-intl.org/	Social Practice-based
ISO 26000 (Social Responsibility) and ISO 14000 (Environmental Management)	http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/social_responsibility.htm http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/environmental_management.htm	Social and Environmental
Cradle to Cradle Certification	http://www.mbdcc.com/detail.aspx?linkid=2&sublink=8	Social and Environmental Product-based

Note: This appendix is not intended to provide a full listing of sustainability standards or endorse any standards. The goal is to provide examples of popular standards as a starting point for manufacturers.



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