wbcsd u.s., inc.

case study

From cradle to grave:
Greif's Life Cycle Analysis

Summary

Greif, Inc., headquartered in Delaware, Ohio, is a world leader in industrial packaging products and services with approximately $4.27 billion in net sales in 2012. Though packaging represents only a small part of the total purchasing volume of Greif´s customers and is therefore of minor strategic relevance to them, in the mid-2000s large customers began to voice a growing interest in both the environmental properties of their packaging products as well as the potential for more sustainable packaging.

In response to this increased customer interest in sustainability and an apparent ambiguity around addressing the issue in practice, Greif decided to conduct life cycle assessments (LCAs) to evaluate its own product range as well as the container systems of competitors with the aim of elucidating sustainability-related opportunities and threats in the market. The results of Greif's LCA allowed the company to more finely attune its strategic priorities to reflect customers' wishes and improve the environmental sustainability of its products.

Company context

Greif, Inc., headquartered in Delaware, Ohio, is a world leader in industrial packaging products and services with approximately $4.27 billion in net sales in 2012. The company's core business is the production of steel, plastic, fiber, flexible and corrugated containers, packaging accessories, corrugated and multiwall containers and containerboard, and providing blending, filling and packaging services for a wide range of industries. With approximately 13,500 employees and operations in more than 50 countries on 5 continents, Greif is positioned to serve global as well as regional customers. Greif's diverse customers operate in a wide range of industries: agricultural; automotive; ceramics and glassware; corrugated containers; food, beverage and bottled water; furniture; home and building products; industrial products; mining; oils, lubricants and petroleum; lumber and pulp mills; pharmaceutical; specialty chemicals including adhesives and sealants, agrochemicals, cleaning products and industrial coatings; paint and pigments; and wire products.

Situational context

Industrial containers are highly standardized worldwide and are typically handled exclusively in business-to-business markets. Expenditures on industrial packaging often represent less than 2% of the total purchasing volume for most of Greif´s customers. Accordingly, these containers are typically viewed by Greif customers as commodities with a relatively low strategic relevance.

Though packaging is of minor strategic relevance and represents only a small part of the total purchasing volume of Greif´s customers, in the mid-2000s large customers began to voice a growing interest in both the environmental properties of their packaging products

as well as the potential for more sustainable packaging. It also became evident that purchasing and sustainability departments often considered industrial packaging to be a relevant trigger for waste generation and sustainability.

Subsequent market analyses indicated that while many of these customers had already begun integrating sustainability goals and practices into their business models and supply chains, most had an unclear picture of the environmental traits of the different containers and the materials involved in the production processes of these containers. Despite the expressed interest in integrating sustainability into their practices, many of those customers interviewed were also unclear as to what measures might be considered effective with regard to improving the sustainability of their industrial packaging.

Life cycle assessment

The environmental life cycle assessment (LCA) is a technique used to analyze the environmental aspects and impacts of a product over its entire lifetime from cradle to grave - from raw material extraction through materials processing, manufacturing, distribution, use, repair and maintenance, and disposal or recycling. An LCA assesses a product or process by examining two key factors:

- Size of the total environmental impact and corresponding emissions of a product system over its entire lifetime; and
- Relative environmental impact of each lifecycle phase.

LCA results allow managers to understand the environmental performance of product systems and to conduct simulation analyses for potential changes in the product systems. These results can subsequently be applied to business in the following areas:

- *Strategy Development:* LCAs can identify critical sustainability-related issues, opportunities and threats within the company´s product systems to allow for the development of more fact-based strategies to meet market challenges.
- *R&D and Product Development:* LCAs deliver valuable information for the product innovation process and enable managers to determine the environmental impact of alternative product design.
- *Procurement and Production:* LCAs illuminate bottlenecks in sourcing and production processes and thereby allow for prioritization of environmental improvement activities towards a more sustainable supply chain.
- *Marketing and Sales:* LCA results enable managers to make comparisons between competing products or systems and can also build the baseline for a sustainability-based product positioning and market communication approach.
- *Information, Training and Education:* LCAs facilitate the training of employees, suppliers, stakeholders and customers, shifting the organization and market processes towards more sustainable thinking, acting and resource management.

In response to the increased customer interest in sustainability and the apparent ambiguity around the issue, Greif decided to conduct life cycle assessments (LCAs) to evaluate its own product range as well as container systems of competitors with the aim of elucidating sustainability- related opportunities and threats in the market. LCAs would also help to inform Greif's customers of the environmental properties of its different product

lines and allow them to become active participants in industry discussions regarding sustainability.

Results and application

Greif's life cycle assessment indicated that the impact associated with previous manufacturing plant process improvements—such as in-plant energy reduction—was low relative to the potential environmental impact of the raw material inputs used in production of the containers themselves (e.g. steel coils and plastic resin). Also, LCA results showed that increasing the re-use of containers would significantly lower the per-trip environmental impacts of the containers. Consequently, the most environmentally impactful alteration with regard to industrial packaging, contrary to popular perception, would be to increase the re-usability of industrial containers and to reduce the amount of raw materials used in the production process rather than to reduce the in-plant energy, heat and water use. Accordingly, Greif's strategy was more finely attuned to reflect these results: the key questions of how to increase the trip rate of containers over their entire lifetime and how to reduce the quantity and improve the environmental sustainability of the raw materials used in packaging - a newly discovered critical bottleneck - became top priorities.

To increase container re-use and to shift customer behavior towards more sustainable end-of-life treatment of containers, Greif expanded its business model through the creation of a global reconditioning service for the end-of-life treatment of the products, known as EarthMinded® Life Cycle Services. EarthMinded® Life Cycle Services re-collects, re-conditions and enables re-use of used industrial containers in North America and Europe to reduce the environmental footprint of industrial containers. Also, EarthMinded® Life Cycle Services recycles containers at their end of life to re-claim their raw materials. The new service was well received by customers and allowed Greif to strengthen customer relationships and further expand its business size and turnover while simultaneously increasing sustainability in industrial packaging.

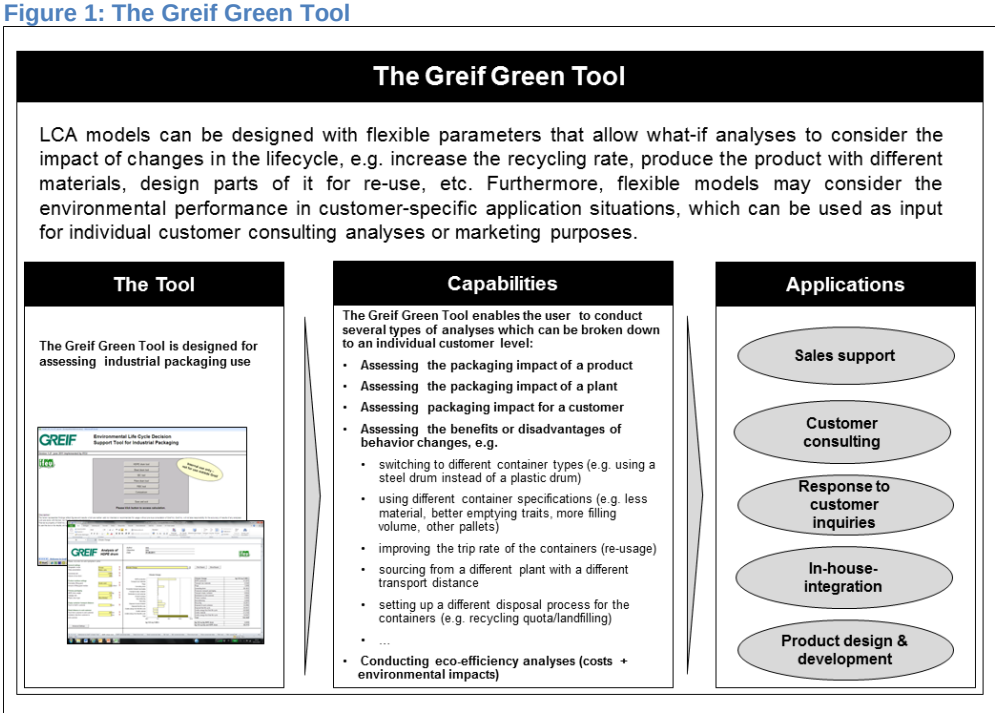
In addition to expanding the business via reconditioning services, the LCA results helped Greif integrate sustainability into its product development with the aim of ensuring that new products are mutually beneficial to the environment and the business. For example, Greif conducted systematic research on innovative production processes that would allow its products to be less materially intensive while still retaining their quality and functionality. This process resulted in the development of a new design and production process for plastic drums—known as *NexDrum*®—that reduced the material needs for a Greif plastic drum by approximately 15%. Analysis showed that achieving the same CO_2 reduction realized by the 15% material reduction would require an up to 60% reduction in energy, heat and water demand at Greif´s manufacturing plants. The LCA results allowed Greif to support the market introduction of this new product with a fact-based communication concept that emphasized the environmental as well as product benefits.

Moving Forward

In 2010, Greif developed the proprietary "Greif Green Tool" to help counsel customers on selecting the right container for their needs while reducing their carbon footprints.

The Greif Green Tool (see figure 1) is a calculator based on the Greif LCA models for industrial containers. The tool enables packaging users to evaluate the total environmental impact of industrial packaging usage in their given situation. Based on a status quo analysis, the Green Tool allows users to create what-if scenarios and determine the environmental impact of potential alteration in industrial packaging use. For example, the user could see the impact if he modified the container specification, sourced the containers from a different plant at an alternative location, or sent more used containers to be reconditioned. Furthermore, an eco-efficiency-analysis model was implemented to consider packaging decisions by simultaneously considering monetary cost and environmental aspects.

Figure 1: The Greif Green Tool



The Green Tool helps Greif respond professionally to customer inquiries regarding the environmental properties of Greif's products as well as give customers advice on what they can do to improve sustainability in their packaging application—for example, allowing Greif to re-collect used containers for remanufacturing and re-use or implementing material-reduced container designs such as *NexDrum*®.

Together, Greif's life cycle analysis and the subsequent introduction of the Greif Green Tool create mutual benefit by providing substantive statistical results with regard to the environmental characteristics of its products. This can then be used to synthesize stakeholder interests, inform product design and support external communications. The Green Tool allows customers to review and increase sustainability in container application, while it also helps Greif strengthen its relationships with customers, increase its in-house integration at customers' organizations, and successfully implement sustainable services and products for the customers to ensure long-term growth in productivity.

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