

Deloitte.

Lifecycle Assessment:
Where is it on your
sustainability agenda?



“Green” is no longer enough

The past decade has witnessed a surge of companies clamoring to build reputations as good “corporate citizens” focused on environmental stewardship. Among Deloitte’s largest clients, 60% have issued sustainability reports. The marketplace for natural products grew by 25% from 2006 to 2008 despite slower consumer spending throughout the economy.¹ What started as a public relations or marketing device for some and a cost-savings initiative for others is evolving to a new level as the market is demanding greater transparency and traceability of sustainability performance across the supply chain. Consumers are confused by labels like “green” and “eco-friendly.” Investors are skeptical that sustainability efforts really pay off beyond a slight boost in corporate image. Cash-strapped companies want to make sure their investments are targeted at the most high-impact projects. And what’s more, many levels of government and other types of stakeholders are starting to demand greater transparency around environmental claims.

Enter lifecycle assessment, or LCA. This approach emerged in the late 1980s, but until recently was popular mainly in Europe, manufacturers’ associations, and a few eco-conscious R&D departments. It is only starting to be adopted on a larger scale by U.S. companies looking to better understand the full environmental impact of their products. The aim is to quantify the environmental impacts of a given product throughout its lifecycle in order to identify opportunities for improvement.

LCA can deliver real benefits when used appropriately, but it can be time-consuming and technically challenging. From cost-efficiency through an improved network of locations or more informed materials selection, to growth opportunities stemming from product innovation and improved branding, LCA can enable financial results through better data visibility. LCA, however, must be nested within a broader sustainability management approach in order to deliver the desired results. This paper is the first in a series that will explore the business implications of LCA.

Market drivers for LCA

Corporate sustainability initiatives have grown in number, scope, and size in recent years. Sustainability is now widely accepted as a core business issue rather than a passing fad. However, particularly in light of the current economic downturn, many stakeholder groups are no longer satisfied with vague assertions that green is really “gold,”² or that green products are in fact any better for the environment. Customers (both

businesses and consumers), investors, environmental interest groups, and government are pressuring companies for enhanced quantification of environmental impacts.

- **Companies are taking action.** Branded companies are demanding more information on suppliers’ sustainability programs to align with and support their own organizations’ goals. Wal-Mart, the world’s largest retailer, has launched a “Sustainability Product Index” which requires suppliers to provide more transparency on their sustainability performance. While still in the early stages of adoption, the index is the first step of a collaborative effort involving dozens of retailers, suppliers, academics, NGOs and other partners that aims to create a global set of standards for measuring and communicating the sustainability impact of products. The collaboration should eventually create a common database of product lifecycle data. As evidence that this trend extends beyond Wal-Mart alone, two-thirds of companies in a recent study say they expect their customers will ask them to reveal their carbon footprint in the next year.³
- **Consumers want to know.** Most consumers today are thinking about environmental impact when making purchases. According to a recent Deloitte survey, fully 95% of shoppers “would buy green” if they had the right information and an otherwise satisfactory product.⁴ But as the market for environmentally friendly products grows, so does frustration with unverifiable “green” claims. Customers are overwhelmed by the onslaught of products purporting to be good for the environment. One in four has “no way of knowing” whether such products actually do what they claim.⁵ Third party certification schemes are one way to gain consumers’ trust, and the most reputable ones typically require some sort of verifiable quantitative information to back them up. In fact, companies such as Tesco (a UK-based retailer), Walkers (a UK-based Pepsi-Co subsidiary), and footwear manufacturer Timberland are including carbon “nutrition” labels on some of their products. As the standards themselves proliferate, some pundits are calling for a Green Product Council to provide a unified set of guidelines for product labels.⁶ One thing is clear: no matter what standards gain credence, hard data will become more crucial to green marketing as consumer savvy advances.
- **Capturing cost savings.** Some green efforts have clear cost-savings, like most energy efficiency projects. For other projects, connecting

¹ *Green Living Report*, Mintel, 2009.

² Refers to *Green to Gold*, Daniel Esty and Andrew Winston, 2006.

³ *Acceleration of Eco-Operation: Achieving Success & Sustainability in the Supply Chain*, BPM Forum, 2009.

⁴ *Green Shopper Study*, Deloitte/GMA, 2009.
www.deloitte.com/us/greenshopperstudy09.

⁵ *Conscious Consumer Report: Redefining Value in a New Economy*, BBMG, 2009.

⁶ “U.S. Green Product Council Debated,” *Environmental Leader*, 6/17/09.

environmental initiatives with financial benefit can be more difficult. In today's economy, the refrain "show me the money" has become all too common. The challenge is identifying the efforts that drive the greatest financial and sustainability benefits. To understand where that magical intersection exists requires accurate data and sound analysis about the true environmental performance across the supply chain.

Connecting environmental initiatives with financial benefit can be difficult... Clarity around what's truly driving environmental impacts can help companies hone sustainability investments on the areas of highest potential impact.

- **Evolving regulations.** A variety of recent or in-process regulations and legislation have reinforced the call for better corporate environmental data. The greenhouse gas (GHG) cap-and-trade bill currently being debated in Congress is the most dramatic example. While the bill would only require primary emitters (those who produce a significant amount of GHGs, onsite) to obtain permits, it would effectively put a price on GHGs by limiting their emissions. This price will be partially passed down throughout the value chain, so it is important that companies know their carbon "exposure". Forward looking companies are quantifying emissions now and investing in the highest impact reductions before legislation goes into effect. Furthermore, while carbon may be the "hottest" topic today, regulations may quickly spread to other environmental issue areas. For example, as pressure on freshwater resources grows, some municipalities are ratcheting up pricing structures and imposing other restrictions on use.

Overview of LCA

Lifecycle assessment charts the course of all inputs and outputs, and their resulting environmental impacts, for a given product system throughout its lifecycle. There is a range of LCA-like approaches that vary in data intensity. The most widely-accepted and rigorous methodology is that of the International Organization for Standardization (ISO), whose guidelines underpin many certification schemes such as the Carbon Trust label. ISO defines the product lifecycle in six phases from "raw material acquisition" through "treatment and disposal."

LCAs begin with a goal-setting exercise to determine the purpose of the study and boundary of the process or "system". Comprehensive LCAs then assiduously detail every material component and every process step to quantify all inputs such as electricity usage, fuel consumption, and raw materials, and outputs like carbon dioxide emissions, solid waste, and other pollutants. These data are then characterized according to their impact category, such as global

warming, acidification, and carcinogens. This often tedious data modeling procedure can be made easier through use of LCA software.

Despite the data-hungry background of LCA, there are simplifications to the ISO approach that are well-suited to support certain information needs. Carbon labels only require a small piece of a traditional LCA: the quantification of GHG emissions and corresponding global warming potential. Given the importance of carbon in today's government and media discussions, this approach is frequently utilized rather than a comprehensive LCA, whose results on eutrophication and heavy metals may seem obscure to most companies. Even "lighter" approaches make several approximations and assumptions to enable environmental profiles that are usually accurate enough to guide important decisions. In fact, some companies may simply choose to consider the principles of LCA to help shape their approach to sustainability rather than embarking on a comprehensive and data intensive effort right away. This may include adopting a more holistic decision-making framework that deliberately considers the repercussions and tradeoffs of a given action throughout the supply chain and across multiple environmental and social dimensions.

Applications

Lifecycle assessments can be used to support a variety of initiatives.

- **Supply chain.** LCA provides a detailed breakdown of the magnitude of various environmental impacts along each step in the product lifecycle. Armed with this knowledge, companies can target supply chain improvements that drive the greatest environmental impact. Tropicana undertook an LCA study and was surprised to learn that its carbon footprint was driven not by the transportation of heavy juice containers but by the agricultural inputs needed to grow oranges.⁷ It now knows it needs to focus on sustainable agriculture practices like reduced fertilizer use rather than its distribution vehicles' fuel efficiency to achieve substantial reductions in the company's carbon footprint.



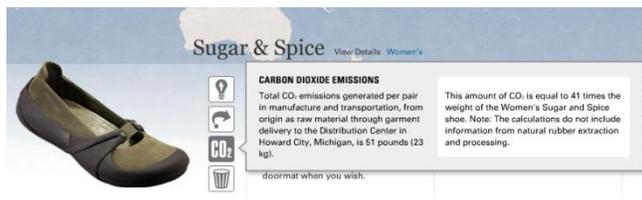
While this information helps companies prioritize sustainability initiatives, it can also enhance accountability with supply chain partners by providing visibility into each partners' portion of the product's environmental impact. Companies can then

⁷ "How Green is my Orange?", *The New York Times*, 1/21/09.

incorporate realistic environmental criteria into purchasing decisions via supplier scorecards or guidelines.

Furthermore, LCA can be used to aid site selection by allowing companies to compare the environmental implications between two different location scenarios. The same logic can be applied to broader network optimization efforts.

- **Product & packaging development.** LCA can be used to model the relative environmental profiles of a range of material choices, design prototypes, or packaging options. For example, a company might want to know whether a plastic casing or paperboard box is a better packaging option. LCA enables companies to reduce environmental impact at its source – in the design phase – rather than remediating impacts through process efficiencies and recycling campaigns down the road. While the latter are important and necessary, they target the “symptoms” rather than the proximate sources of environmental impact. Environmental criteria can be incorporated into specific design requirements for engineers, or into more general product stewardship programs. Nike, for example, has redesigned certain shoes with mechanically locking soles to reduce use of glue or solvents; insertable booties and removable logos make the shoes easier to dismantle and process for recycling.



Patagonia's “footprint chronicles” include the energy, carbon dioxide, and waste involved in producing each product

- **Marketing & communications.** LCA can be used to support marketing claims about the environmental friendliness of a product. It provides quantification of impacts that might influence consumers' perceptions of the product, such as embodied energy or carbon. More importantly, it serves as the basis for several third-party labels. Consumers don't typically have the context to understand whether 50 pounds of carbon for a pair of shoes is good or bad. Third-party labeling schemes such as Green Seal and ISO's Environmental Product Declaration use lifecycle approaches to determine whether products meet their standards, then provide an easily identifiable graphic to simplify the decision-making process for consumers. Twenty-eight percent of consumers currently look to such seals to verify products' green

claims.⁸ One can expect this percentage to grow as labeling standards evolve and the perceived credibility of claims improves. But as labels and certifications proliferate, it will be important for those with scientific backing and enforceable criteria (including those that use LCA) to differentiate themselves from unverifiable labels that are not backed by consistent standards and hard data.

In addition to product labels, LCA can serve as a communication tool of sorts between companies and consumers. Patagonia launched its “footprint chronicles” in 2008 to trace the journey of a handful of its products (now 17 in total) as they make their way from raw materials like cotton and glue to your body and then on to the landfill or back to Patagonia to be recycled into new products. For the company's conscious consumers who had previously balked at the use of the word “Eco” in product names, this provides a channel for the company to openly communicate its successes, challenges, and ongoing efforts to improve the environmental impact of its apparel.

- **Sustainability strategy & reporting.** Despite its product-specific nature, LCA can also be used to help shape enterprise-wide sustainability strategy. It unearths the drivers of a company's total GHG emissions so leadership can develop an effective carbon management strategy. It can shed light on Scope 3 emissions, which are often the largest source of emissions throughout the value chain; this information can help companies understand the implications of increased or decreased vertical integration and the impact that a carbon price would have on their purchased inputs. And by revealing major environmental impacts, it directs attention towards the most relevant issues. While many companies today are predominantly focused on greenhouse gas emissions, The Coca-Cola Company has realized water is actually a more pertinent issue. It has reduced the water needed to make 1 liter of product from 3.12 liters to 2.47 liters over the past five years.⁹ For other industries, it might not be so straightforward to identify key areas of exposure without the help of a tool like LCA.

The data gleaned from LCA can also be used in sustainability performance reporting and management. Real product-level environmental data can help executives shape realistic internal reduction goals for water, waste, and energy, and point to promising ways to meet these goals. It can also be used to supplement sustainability reports, which frequently lack sufficient data to substantiate progress in environmental performance.

⁸ *Conscious Consumer Report: Redefining Value in a New Economy*, BBMG, 2009.

⁹ *2007/2008 Sustainability Review*, The Coca-Cola Company.

Company benefits

Organizations who utilize LCA thoughtfully can achieve a variety of benefits.

- **Growth & innovation.** By revealing the source and relative magnitude of environmental impacts, product-level LCA data can inform the innovation agenda. It points to areas ripe for improvement, and can help model the outcomes of competing new ideas. And improved marketing and sustainability claims can strengthen customer loyalty and boost sales.
- **Cost savings.** Clarity around what's truly driving environmental impacts – and their corresponding monetary costs – can help companies hone sustainability investments on the areas of highest potential impact. There's the potential for tax savings too: changes in plant locations, certain investments in R&D, and projects related to renewable energy could be eligible for tax credits or other incentives. Furthermore, LCA can help managers tie cost savings to specific initiatives, thereby demonstrating the value of sustainability throughout their own organization and to external shareholders.
- **Internal alignment.** For large organizations who have struggled with how to get different functional departments to see eye-to-eye on sustainability issues, LCA provides a common ground for internal goal-setting and communication. Engineers, bookkeepers, and marketers alike can rally around the relative objectivity provided by LCA results to achieve consensus on enterprise-wide priorities.
- **Regulatory preparedness.** For companies with carbon-intensive products, LCA can help quantify the projected product cost implications of future carbon legislation and flag those areas that warrant immediate action. Furthermore, LCA can enhance general transparency and disclosure to deflect scrutiny from regulators and other stakeholders.
- **Corporate reputation.** LCA can demonstrate that a company has moved beyond surface-level sustainability window-dressing to a deeper commitment to improved environmental impact. Its legitimacy in the eyes of scientists and regulators lend this approach an element of trust among stakeholders that other approaches lack. However, as LCA becomes more common, it will no longer serve as a differentiator in itself; it is the actual results – and what they say about a company's environmental progress – that will matter to stakeholders.
- **Risk reduction.** By identifying and quantifying major environmental impacts, LCA helps companies develop their "position" around environmental issues to which their operations contribute. Whether it's carbon emissions, toxic emissions, hazardous waste, or water consumption, each type of environmental impact represents a potential liability of which companies should be aware and manage accordingly.

Challenges

Despite its promising potential, LCA is subject to numerous challenges that can hinder its adoption. First, while the ISO guideline is emerging as a favorite among scientists and NGOs because of its rigor and thoroughness, there is still no "standard" methodology for LCA that is widely accepted. Small differences in assumptions related to system boundaries or valuation techniques can lead to radically disparate results. In this way, LCAs can create a false sense of complete objectivity. Though the technique produces a numerical output, results must be interpreted in light of their underlying assumptions and data quality. Unless two companies' products are verified by the same third-party certification agency, there is little meaning in comparing environmental impacts across competitors. Furthermore, it can be difficult to find a useful way to communicate LCA results to customers, who would need some sort of context or relative comparison in order to incorporate this information into their purchasing decisions.

Second, while some datasets needed to feed analyses are publicly available, there is no standard to govern their quality. What's more, since such datasets are not tailored to the specific company conducting the assessment, they are useful for identifying sector-wide issues but may not be accurate enough for internal decision-making. When companies choose to gather their own primary data, they often find it painstaking to obtain given the level of technical skill and the number of supply chain partners involved. This reality points to yet another challenge: many companies lack the in-house expertise required for data measurement, modeling, and interpretation of results in a realm previously dominated by engineers and scientists. Companies who dive full-bore into data collection may find the resources and time spent in the effort are not justified. Nonetheless, in many situations the benefits to be gained from LCA do outweigh these challenges. It is therefore prudent for companies to at least build familiarity with the topic so they can spot opportunities where its application could be advantageous.

Where to begin?

For companies that haven't yet considered quantifying their environmental impact, the prospect can seem daunting. Such companies can take action now to start preparing themselves for enforced government reporting or retailer scorecarding. Start by developing a sense for which environmental issues are material to your organization and assessing the organization's capacity to act. Convene internal stakeholders to develop an initial, qualitative understanding of the areas of greatest exposure, and use that to provide greater focus and prioritization of sustainability efforts. Assess people, processes, and technology to determine where there are gaps when it comes to executing a quantitative management approach to

sustainability. To do this, ask whether your company could produce information on energy consumption, GHG emissions, water usage, and percentage of waste recycled. If not, what would it take to do so? Engage the CIO to start talking about the investments needed to provide visibility into environmental performance.

Scenario planning is a helpful tool to accompany these actions; it will help you understand the robustness of your strategic direction in the light of evolving regulations and fluctuations in the price of natural resources (including oil). To develop realistic scenarios, familiarize yourself with the various policies under debate and stay abreast of new developments as important bills move through the legislative process. For example, examine the structural changes in the marketplace that may result from tax credits and other incentives in areas like renewable energy and building efficiency. Take stock of glaring weaknesses that could take a long time to correct, and consider investing in early measures to mitigate major risks before they become actual costs.

What companies do with the results of an LCA will determine whether the effort is worth it.

Use it wisely

The first step in harnessing the power of LCA is to decide when it's even necessary. For decisions and communications based on detailed data, such as product design choices, targeted supply chain improvements, or carbon-free labels, a comprehensive LCA could be the way to go. But for other sustainability endeavors, a less data-intensive approach that relies upon certain approximations, or LCA "lite", might be more suitable. Companies who employ LCA of any kind on a regular basis must figure out how to manage data across their product portfolio so as to minimize the cost and effort of additional assessments. Regardless, what companies do with the results of an LCA will determine whether the effort is worth it. LCA can be a core enabler of business decisions made in the name of sustainability, but it is only one component of a broader sustainability performance management agenda which could include stakeholder engagement, improved information management systems to automate environmental performance data capture, and external reporting that follows the Global Reporting Initiative's guidelines. Companies who succeed in integrating LCA with existing decision-making frameworks can achieve smarter sustainability.

This publication contains general information only and Deloitte is not by means of this publication rendering accounting, business, financial, investment, legal, tax, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your business. Before making any decision or taking any action that may affect your business, you should consult a qualified professional advisor. Deloitte, its affiliates, and related entities shall not be responsible to any loss sustainable by any person who relies on this publication.

Contacts

Peter Capozucca

Principal
Deloitte Consulting LLP
pcapozucca@deloitte.com
+1 203 708 4382

Chris Park

Principal
Deloitte Consulting LLP
chrpark@deloitte.com
+1 313 324 1258

Bill Lappin

Principal
Deloitte Consulting LLP
wlappin@deloitte.com
+1 404 631 2211

Michael Gilson

Partner
Deloitte Tax LLP
mgilson@deloitte.com
+1 312 486 3240

David Linich

Senior Manager
Deloitte Consulting LLP
dlinich@deloitte.com
+1 513 723 4163

Special thanks to Laurel Martin, co-author and Summer Associate, for her contributions to this article

