



STANFORD

GRADUATE SCHOOL OF BUSINESS

CASE: OIT-71B

DATE: 10/15/10

WALMART'S SUSTAINABILITY STRATEGY (B): 2010 UPDATE

I don't think there's better money that we're spending anywhere.

— Fred Krupp, President of Environmental Defense Fund, commenting in 2010 on his organization's investment in working with Walmart on its sustainability strategy

PROGRESS AS OF 2010

In 2007, Walmart had recently launched a new business strategy designed to meet three sweeping and aggressive environmental goals set by CEO Lee Scott: (1) to be supplied 100 percent by renewable energy; (2) to create zero waste; and (3) to sell products that sustain people and the environment.¹

Andy Ruben, vice president of corporate strategy and business sustainability, and Tyler Elm, senior director of the same group, had architected an approach that would link sustainability to business value and involve a wide variety of constituents in developing solutions, including suppliers, environmental NGOs, government representatives, and others. This open, “network” approach was a departure from Walmart's traditional, closed philosophy, but it seemed to be generating valuable innovation as literally hundreds of outsiders started working collaboratively with the company.

As Walmart's sustainable value networks (SVNs) got up and running, they had begun to generate results in the form of cost savings, increased transparency, stronger supplier relationships, and other benefits. Opportunities to further expand the sustainability effort seemed to be abundant. Ruben and Elm's main challenges were to keep sustainability linked to the core business, sustain the initial enthusiasm and engagement around the strategy from insiders and outsiders alike, and produce measureable results.

Lyn Denend and Professor Erica Plambeck prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. It provides an update to GSB No. OIT-71A, Walmart's Sustainability Strategy, which was originally published in 2007.

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Three years later, in 2010, Walmart as a company had grown to more than 8,800 stores in 15 countries around the world. Its 2 million associates served 200 million customers a week and its sales topped \$405 billion.² Against this backdrop, sustainability seemed to be alive and well within Walmart, although much had changed. CEO Scott had retired in 2009 and was replaced by Mike Duke, who had previously overseen Walmart's international operations. Ruben had accepted a position to lead Walmart's private brand operations in 2007, where he believed there was a large opportunity to drive sustainability through product design. As he explained:³

The change that we can create through Walmart's own [private brand] products is huge because they sit on roughly 15 percent of the shelf next to every product in the store. We can take a leadership role in driving changes with these products without having to convince a large CPG [consumer packaged goods] company to pursue this as a strategic effort. We can simply create a lower cost, better quality, more trusted product that sits next to their product. And then they will either rise to the challenge or become obsolete.

Elm also left the sustainability core team in 2007 "to lead a group within Walmart that was looking at using sustainability as a platform for related diversification," he recalled. About a year later, he departed the company, shortly after John Menzer, vice chairman of U.S. operations and leader of the group, retired and the group was disbanded. The other core team members had returned to the business, too, and many of the original network captains had moved on, either within or outside the company. For example, Peter Redmond (captain of the seafood network) accepted a position with the Global Aquaculture Alliance (GAA) as its VP of global market development. He commented on his departure this way:

I enjoyed working at Walmart a lot, and I could actually see where we were going to be able to have an impact on physically changing the whole way an industry worked. The problem was that I only had so much of the day that I could dedicate to sustainability and the rest of my time had to be spent on my 'day job' [buying, selling, merchandising]. And right about that time, I had a couple offers that were in this arena. They came at a good time. I'd been with the company a long time and I was kind of looking for a change.... The new position keeps me in an area that I have a passion for.

Moreover, sustainability itself had been moved under corporate affairs and government relations, led by executive vice president Leslie Dach. This move caused some observers to question whether sustainability was becoming less of a core business strategy and more of a public relations initiative. "I think they believed [Dach] was a good guy to put this under because he would help maximize the external value of it," commented Elm.

In parallel with these changes, Matt Kistler, who had proven himself as the leader of the packaging network, assumed the role of senior vice president of sustainability. Rand Waddoups filled Elm's position. While Ruben and Elm had been focusing on the entrepreneurial activities of launching and evangelizing sustainability at Walmart, Kistler and Waddoups had a mission to institutionalize the effort. "Matt's core strength is institutionalization," Waddoups said. "He's done a phenomenal job of building corporate policy to support the system of sustainability inside

of Walmart.” For example, the core sustainability team had gotten Walmart’s tier one suppliers across all of the SVNs to complete a supplier sustainability assessment known as the “15 questions.” These questions covered supplier performance on metrics related to energy and climate, material efficiency, natural resources, and ethical production, as shown in **Table 1**.

**Table 1: Supplier Sustainability Assessment
15 Questions for Suppliers**

Energy and Climate: Reducing Energy Costs and Greenhouse Gas Emissions
1. Have you measured your corporate greenhouse gas emissions?
2. Have you opted to report your greenhouse gas emissions to the Carbon Disclosure Project (CDP)?
3. What is your total annual greenhouse gas emissions reported in the most recent year measured?
4. Have you set publicly available greenhouse gas reduction targets? If yes, what are those targets?
Material Efficiency: Reducing Waste and Enhancing Quality
5. If measured, please report the total amount of solid waste generated from the facilities that produce your product(s) for Walmart for the most recent year measured.
6. Have you set publicly available solid waste reduction targets? If yes, what are those targets?
7. If measured, please report total water use from facilities that produce your product(s) for Walmart for the most recent year measured.
8. Have you set publicly available water use reduction targets? If yes, what are those targets?
Natural Resources: Producing High Quality, Responsibly Sourced Raw Materials
9. Have you established publicly available sustainability purchasing guidelines for your direct suppliers that address issues such as environmental compliance, employment practices and product/ingredient safety?
10. Have you obtained third-party certifications for any of the products that you sell to Walmart?
People and Community: Ensuring Responsible and Ethical Production
11. Do you know the location of 100 percent of the facilities that produce your product(s)?
12. Before beginning a business relationship with a manufacturing facility, do you evaluate the quality of, and capacity for, production?
13. Do you have a process for managing social compliance at the manufacturing level?
14. Do you work with your supply base to resolve issues found during social compliance evaluations and also document specific corrections and improvements?
15. Do you invest in community development activities in the markets you source from and/or operate within?

Source: “15 Questions for Suppliers,” Walmart, walmartstores.com/download/3863.pdf (October 11, 2010).

“They’re very valuable,” said Waddoups, of the assessment questions. “In one sense, they help direct the suppliers so that they know what’s important to get started on. They also give us a really good ability to understand who’s learning how to be transparent. And, finally, they help us recognize who’s leading and who’s lagging.”

Another example of the core team's efforts to institutionalize sustainability within Walmart could be seen in the changes to the company's merchandising roles. Building on the pilot conducted in the textiles network back in the 2007 time frame, Walmart restructured its merchandizing organization to put buyers and supply chain people on the same team. The purpose was to help buyers better understand the supply chains and life cycles of their products so they could make better, more holistic purchasing decisions. "The new structure allows, for example, jewelry buyers to understand their products at a deeper level and where they come from. The company's Love Earth jewelry line allows customers to track the gold back to the mine," Waddoups explained. "The model was tweaked quite a bit from what was tried in textiles," he added, "but it's a similar concept."

Despite these changes to the merchandising roles, many buyers still rotated through their positions every 12 to 24 months—sometimes less. "Over the last four or five years," said Redmond, "a buyer in seafood probably lasted about eight or nine months on average." According to Elm, "The number one complaint of suppliers, regardless of sustainability, is this churn because just as they're building a relationship, everybody switches over." While there were advantages to buyers staying in one area long enough to become experts, particularly when it came to driving (and maintaining) the improved sustainability of products and processes, designing turnover into the model had some benefits, too. At the individual level, Kistler pointed out, "It allows for the broadening of skills." At the corporate level, Redmond provided this perspective:

They typically don't want to leave [buyers] in a position long enough to get too comfortable. They don't want relationships to grow between a specific buyer and a specific supplier. So if you keep turning your buyers, that scenario doesn't happen. So, ironically, the suppliers become the constant in that scenario because they have all the information and they know how everything works. That's a trait of Walmart. They have continually pushed more and more outside of the company over the years, to the point where it actually works pretty well.

In terms of Walmart's executive leadership, Mike Duke, the company's new CEO, was publicly supportive of sustainability as he assumed his new position. According to Kistler, "Very early on in his role as CEO, his direction was 'How do we broaden and accelerate sustainability in everything we do?'" However, as Redmond shared from his perspective, "Lee [Scott] was a very hands-on person. And he personally believed in what we had to do. I think Mike Duke believes to a large extent, but is also trying to carry out on a broader scale an interesting commitment that was made by someone else." Elizabeth Sturcken of the Environmental Defense Fund, who had been the leader of the EDF/Walmart collaboration since its inception, had a slightly different point of view: "Mike Duke believes that there is a lot of business value to be created here and they're working hard and looking at every angle to find that business value and make it real."

EDF had invested heavily in its relationship with Walmart in 2006 when it opened an office near its headquarters in Bentonville, Arkansas to work closely with the company on the sustainability strategy (to date, EDF was the only NGO to have made such a move). Elm had invited NGO

stakeholders to consider such a move to emulate a relationship-building tactic employed by Walmart's key suppliers.

GHG Reduction Goal and Energy Policy

Duke appeared to put his own stamp on Walmart's sustainability strategy in 2010 when he announced a goal to eliminate 20 million metric tons of greenhouse gas (GHG) emissions from the company's global supply chain by the end of 2015. This target, which was developed in partnership with EDF, represented one and a half times the company's estimated global carbon footprint *growth* over the next five years and was roughly equivalent of taking more than 3.8 million cars off the road for a year.⁴

Sturcken described how the goal came about: "We'd been talking to them about climate and the need for them to make a climate commitment since we first got [to Bentonville]. They had made commitments to make their operations efficient, but they just really hadn't dealt with the fact that their emissions on an absolute basis were continuing to grow as the company got larger." Walmart's total annual corporate emissions had expanded to approximately 20 million metric tons by 2010. This included its scope 1 and scope 2 emissions, but not scope 3. Scope 1 refers to a company's direct GHG emissions (e.g., from its manufacturing plants, stores, and/or transportation fleets). Scope 2 refers to the indirect emissions associated with the purchased electricity (or other power) that a company consumes. Scope 3 refers to all other indirect emissions associated with a company or its products, including the sourcing of raw materials, supplier manufacturing, packaging, and distribution, customer use, and/or end-of-life disposal.

As Sturcken pointed out, Walmart's carbon footprint continued to grow despite a series of relatively significant internal improvements implemented by the company. For example, in the transportation area, Walmart had improved the efficiency of its fleet by 60 percent since 2005.⁵ By 2009, it had opened new stores in all of its markets that were 25-30 percent more efficient and produced up to 30 percent fewer GHG emissions than the company's 2005 baseline. Its existing stores produced 5.1 percent fewer emissions against the same baseline (on their way to a goal of 20 percent by 2012).⁶ However, emissions were still growing due to new store openings and other growth-related factors. One of the most valuable "returns" Walmart had realized on its investment in the sustainability strategy was an improvement in public relations that aided its ability to open new stores (even though new store openings were counterproductive to reducing the company's overall impact on the environment). According to Covalence, an organization that measured the ethical reputation of companies by cumulating their positive and negative news coverage, Walmart's reputation curve was in negative territory and steadily declining until late 2005.⁷ Since then, it had been on the rise, with the company crossing over into more positive than negative coverage, led in large part by the affirmative press it was receiving on issues such as climate change (i.e., carbon emissions, packaging, waste management, and energy).⁸ By 2009, Walmart's reputation held the third-place position among 35 multinational companies in the retail industry (up from last place in the 2007 Covalence report).⁹

When delegates to the December 2009 Copenhagen Convention of the UN Framework Convention on Climate Change reached an accord that global warming should be limited to 2° Celsius (a change that is commonly associated with an 80 percent reduction in anthropogenic greenhouse gas emissions before 2050), the NGOs working closely with Walmart increased their

pressure on the company to take meaningful, decisive action to reduce its overall carbon footprint.

The company's CFL initiative provided another source of inspiration. In 2006, Scott set a goal to sell 100 million compact fluorescent light bulbs by 2008. Walmart accomplished this goal in nine months (and then went on to sell a total of 350 million CFLs by 2010). According to Miranda Ballentine, director of sustainability at Walmart, the first 100 million CFLs helped the company's customers "improve their carbon footprint by just under 20 million metric tons, which was roughly equal to the company's absolute footprint from our own scope 1 and scope 2 emissions. So a light bulb went off, no pun intended, that we could invest a certain number of resources up and down our supply system and get a much bigger, faster, cheaper greenhouse gas reduction than we could by investing that same money back into our own buildings and fleet, which are already some of the most efficient in the world."

This realization, along with pressure from the NGOs, led to the creation of the company's public GHG emissions goal. In February 2010, said Sturcken, "We announced what I think is a very significant commitment by Walmart to drive environmental change through its supply chain and through its products' life cycle." She went on to explain that, although the goal was talked about primarily as a supply chain commitment, it was actually more far-reaching because it considered all scope 3 GHG emissions. Sturcken elaborated:

It's very much looking at the whole of products' life cycles. So, for example, one of the projects we're working on right now is changing the labeling on clothes to be cold water wash instead of hot water wash. Because when you look across the life cycle of a garment you find that the biggest greenhouse gas impact is in its use phase, particularly washing and also drying. So the idea with the climate commitment is to look across Walmart's product categories and find where the biggest imbedded carbon is in the products' life cycle and then overlay that with Walmart's sales data to find where the biggest opportunities are to drive environmental change.

While the negative environmental impacts associated with apparel were relatively well understood, Walmart had performed extensive life cycle analyses to further explore the carbon footprint of a wide variety of its other products. These efforts had produced some surprising data. For example, the company discovered that soap was responsible for an alarming level of greenhouse gas emissions, primarily due to the palm oil used in soap products which is linked to large-scale tropical deforestation in countries such as Indonesia. Under the banner of its GHG emissions goal, Walmart would work with its suppliers to address issues such as these. For instance, based on its improved understanding of the environmental impacts associated with palm oil, Walmart made a public commitment in October 2010 to use only 100 percent certified sustainable palm oil in its private label products in the U.S. and the U.K. by 2015. In doing so, the retailer expected to reduce greenhouse gas emissions in its supply chain by 5 million metric tons in the same timeframe.¹⁰ Walmart was working with suppliers such as Cargill, the primary source of palm oil in the products Walmart purchased, to drive toward this goal. However, in this particular case, the palm oil-based products sold by Walmart represented only a fraction of Cargill's total business so the strength of Walmart's bargaining power remained to be seen. Moreover, Cargill accounted for an even smaller percentage of global palm oil demand. In terms

of catalyzing widespread change, Walmart's leadership position in this arena could simply result in a reshuffling of suppliers (with environmentally responsible sources supplying Walmart and less responsible sources supplying companies that cared less about deforestation) unless other retailers also demanded sustainable palm oil.

Because no standards existed as of 2010 for defining or measuring scope 3 emissions on projects such as these, Walmart, EDF, and a number of other contributors had collaborated to develop a guidance document that clearly outlined what would count towards Walmart's goal, how reductions would be quantified, and a process for validating all reported improvements.¹¹ "To be meaningful, the project has to have integrity. So we've worked very hard to try and ensure that," Sturcken noted.

With regard to energy policy, Walmart seemed as though it was seeking to exert influence by example. For instance, the company's efforts helped shape the development of the Supply Star Act of 2010, which was introduced by Senators Jeff Bingaman (D-NM), Scott Brown (R-MA), Blanche Lincoln (D-AR), and Mark Pryor (D-AR). Modeled on the Energy Star program, the bill proposed to help consumers identify products that had been manufactured in an efficient and environmentally-responsible manner, and then provide tax incentives toward their purchase. It would also give companies financing, technical support, training, and other assistance to help them improve their environmental performance and efficiency, extending Walmart's own efforts with its suppliers.¹² Bruce Harris, director of federal government relations for sustainability, described Walmart's involvement:

They called us for our input. They wanted to know how our [sustainability] project was working and what we thought about what they put together. We gave them some technical assistance. I think their perspective is that we're doing a lot of good stuff in this space and we can, because we're Walmart. But they wondered about other players' ability to do the same thing and how they can best incentivize more companies to create supply chains that are efficient in energy use and resource management. We were happy to help.

As far as a potential cap and trade system in the U.S., Walmart was waiting to see what would happen (and did not appear to be doing much scenario analysis to help them plan for their business under various policy scenarios). However, the company was watching government developments closely and hiring people with the expertise to understand the political process. Overall, the company seemed poised to respond quickly whenever policy uncertainty was resolved.

Globalization

Another major accomplishment for Walmart was the extent to which the company had globalized its sustainability strategy. Back in 2007, the effort was largely U.S.-centric, with the exception of the SVN for China. By 2010, according to Kistler, "Every country, every market we're in is working on sustainability. Many of the countries now are doing their own sustainability reports, having their own events, and creating their own networks." Beth Keck, who joined the sustainability initiative in 2008 as it started to expand its international focus, was the primary liaison from the U.S. to Walmart's sustainability contacts around the world. She

provided them with support and guidance, and she monitored their results. However, because there was a dearth of people with deep skills and training in how to improve energy and water efficiency and reduce the environmental impacts of production processes, particularly in places such as China, her vision was to expand the scope of what these international leaders could achieve by connecting them directly to one another. This approach gave leaders in China, for example, direct access to their more experienced sustainability counterparts in the U.S. and other Western markets. “We’ve been able to create connectivity between them, so it’s not just a hub and spoke but it’s truly a web network. They’re learning about the strengths of each other, the U.S. team included, and can draw on that without coming to the home office all the time,” she said.

With regard to the original China network, which was formed in 2006 and led by the home office in Bentonville, “The early strategy was to try to organize our China effort using the SVN model to bring the key stakeholders together. Sometimes approaches work and sometimes they don’t, and that particular approach really wasn’t structured in a way to get the traction that was needed,” Keck explained. There were a few primary reasons for making a change. First, she said, “China is not a network, it’s a country.” Second, it was inefficient to deal with thousands of suppliers, vast numbers of related stakeholders, and China’s complex issues from Bentonville. Finally, she added, “There was the fact that we actually operated stores in China and so we had a Walmart business there that needed to figure out how to integrate sustainability into its strategy.”

In January 2008, the company transitioned all of its China-related sustainability efforts to China and laid out three key objectives for its efforts in the country:¹³

- To build an environmentally and socially responsible supply chain.
- To make Walmart’s stores more sustainable through efficient use of water and energy.
- To bring Walmart customers in China (and around the world) more sustainable products.

To initiate the new approach, the company met with approximately 100 of its Chinese business leaders and representatives from global sourcing to define a course of action. One team would immediately begin working on how to drive improved sustainability in both the business in China (i.e., stores and operations) and with the suppliers and their factories. Another team would begin planning the Beijing Sustainability Summit that would bring together Walmart’s 1,000 largest suppliers, along with government and NGO stakeholders in fall 2008.

Scott and Duke both presented at the Beijing Summit. First, Scott set the tone for sustainability in China.¹⁴

Meeting social and environmental standards is not optional. I firmly believe that a company that cheats on overtime and on the age of its labor, that dumps its scraps and its chemicals in our rivers, that does not pay its taxes or honor its contracts, will ultimately cheat on the quality of its products. And cheating on the quality of products is the same as cheating on customers. We will not tolerate that at Walmart. Strengthening our relationship with customers—today and in the future—is tied hand-in-hand with improving the quality of our supplier factories and their products....

He continued by underscoring why Walmart's suppliers should get involved:¹⁵

Walmart will have stronger, closer, and deeper relationships with suppliers who share our commitment to being socially and environmentally responsible. Those who share our goals, who innovate, who become more efficient, who drive sustainable practices throughout their own businesses—will be more likely to share in our business growth. And make no mistake, we intend to continue to grow.

During the next portion of the summit, Duke outlined a series of specific goals for its suppliers (as shown in **Table 2**).

Table 2
Beijing Sustainability Summit Goals

Goals	Notes
Social and Environmental Compliance	
All direct import, nonbranded and private label suppliers must declare that their factories are compliant with local social and environmental regulations by the end of 2011.	In FY 2010, all U.S. suppliers of private label, direct import and nonbranded goods were sent declarations of compliance for their consideration.
By 2012, all direct import suppliers must source 95 percent of their production from factories that receive one of Walmart's two highest ratings in audits for environmental and social practices.	As of mid-2010, 93 percent of these suppliers had green or yellow ratings. In 2009, Walmart transitioned all of its compliance audits to independent third-party auditors so the company could focus on more on remediation.
Transparency	
By the end of 2009, all direct import suppliers, as well as private label, and nonbranded product suppliers must disclose to Walmart U.S. the name and location of every factory they use to make the products Walmart sells.	As of mid-2010, 100 percent disclosure had been achieved. The information Walmart gathered about its lower-level suppliers was not shared publicly.
Safety and Quality	
Walmart will work with suppliers to drive customer returns on defective merchandise to less than 1 percent by 2012.	By the end of 2009, the return rate had reached 1.97 percent.
Energy Efficiency	
Walmart will partner with suppliers to improve energy efficiency by 20 percent per unit of production by 2012 in the top 200 factories in China from which the company sources directly (against a 2007 baseline).	As of mid-2010, 119 factories had demonstrated greater than 5 percent increase in efficiency. Walmart was working with EDF and other NGOs in China to develop and manage the measurement system and to provide guidance and training to suppliers in improving their performance.

Source: Drawn from "Walmart Global Sustainability Report: 2010 Progress Update," <http://cdn.walmartstores.com/sites/sustainabilityreport/2010/WMT2010GlobalSustainabilityReport.pdf> (October 12, 2010).

When asked about suppliers' reactions to these goals, Keck said they seemed to be "a little bit surprised, but generally enthusiastic." Two years following the summit, Laura Ediger of Business for Social Responsibility (BSR), an NGO that was working with Chinese suppliers on the ground to help them meet Walmart's goals, assessed progress-to-date this way:

I think it's a little bit early to say if [the approach has] worked in quantitative terms. But so far a lot of the suppliers have been pretty actively engaged and have responded well to Walmart's encouragement and incentives, and they've taken ownership in terms of figuring out how they're actually going to make the improvements. And so my understanding is that it's going well and that this approach is working.

Measurement

Walmart still faced challenges when it came to measuring the sustainability attributes of the products it sold. While the company continued to experiment with different approaches within and across its SVNs, it had launched two initiatives worth noting.

Sustainability Index

Walmart initiated the creation of The Sustainability Consortium—a collective of manufacturers, retailers, NGOs, and universities, working together to develop the science behind a measurement system that would lead to a sustainability index.¹⁶ According to Jay Golden, one of the original co-directors from Arizona State University, "The consortium was founded to create transparent and scientifically credible standards for the measurement of environmental and social impact of consumer products throughout their lifecycle."

Since the launch of its sustainability strategy, Walmart had been struggling with how to objectively and holistically measure the sustainability of the products it sold. As Ballentine explained:

We've got 100,000 suppliers and every one of them would love to come and tell us how green their product is. And our buyers are not scientists. They're not environmental experts. So they need to have credible, third-party science that they can rely on to make sure that they're not having unintended consequences elsewhere. So what we don't want to do is improve the carbon footprint of a product, but significantly increase its toxins; or we don't want to reduce the waste impact of a product but then increase the carbon footprint somewhere else in that product's supply system.

As noted, Walmart had conducted some of its own lifecycle analysis (LCA) work. In the energy network, the company partnered with LCA experts at the University of Arkansas to identify Walmart's 20 product categories with the highest carbon impact. "We used 'cradle to grave' carbon impact per item," said Ballentine, "and multiplied it by Walmart sales data [from the U.S.] to identify categories where we have the biggest opportunity to drive the fastest, most economical GHG reductions. It was a pretty interesting analysis but it was far from perfect because the LCA data that exists in the world is far from perfect." (See **Table 3** for a list of the

top 20 categories.) Private brands performed a similar analysis for a number of its product categories to help its suppliers identify the “hot spots” for supply chain and product innovation. According to Lea Jepson, director of sustainability in Walmart’s private brands, “We found that the information was quite extensive and it took a lot of time and a lot of energy from a pretty big team of folks to be able to identify these hot spots.” She estimated that LCA work for seven product categories took six full-time equivalents approximately 10 months (one associate was from Walmart; the others were from EDF and Harvard University).

Table 3
Walmart’s Top 20 Product Groups with the Biggest GHG Impacts

Apparel	Milk
Animal Feed	Motor Oil
Candy	Pharmaceuticals
Cheese	Sanitary Paper Products
Fresh Produce	Snack Food
Frozen Food	Soaps and Shampoos
Grains	Soft Drinks and Beverages
Household Detergents	Televisions
Meat	Vegetable Manufacturing
Media	Fruit Manufacturing

Source: Information provided by Walmart.

Walmart’s idea to help form the consortium was grounded in the need to overcome the challenges it uncovered through its own LCAs. The company and the industry as a whole would benefit from credible, widely accepted standards that could be more easily and consistently used by all suppliers and retailers. The company partnered with experts from the University of Arkansas and Arizona State University to lead the consortium and provided \$2 million in seed funding to launch it. As the consortium leaders worked to recruit companies, Jon Johnson, the co-director from the University of Arkansas recalled that, “Among the retailers in general, there was strong interest in an integrated data gathering and reporting framework they could use to make better, more informed sustainability decisions.... But they wanted to make sure they weren’t underwriting a branding effort from Walmart, which I think was a legitimate concern.”

By mid-2010, the consortium seemed to have established itself as an objective, independent entity. However, based on its size and market power, Walmart continued to play an important role. It was an active participant in the members’ efforts to define sustainability measurement and reporting standards, and build a global database of information about the social and environmental impacts of products at the product category level (e.g., dish soap, dog food) at different stages of their lifecycles.

As the consortium made progress, Walmart envisioned making the data available to its buyers and suppliers to help drive focused innovation. “This information will help businesses target their efforts, innovate with a level playing field, and really drive toward a future of sustainable products,” said Waddoups. The company also intended to give customers access to the information in a “simple, convenient, easy to understand manner.”¹⁷ “It can be used to help consumers make better decisions about what they purchase and bring to their homes,” he noted.

However, Waddoups continued, “We laid down a clear expectation that we probably wouldn’t put any information from the index into the stores for five years because building these standards of measurement, collecting this data across the industry, and then putting it into an easily accessible format is not a small effort.” Despite Walmart’s interest in eventually providing information at the consumer level, Johnson emphasized:

There is never going to be a sustainability consortium ecolabel on a product. If a company or a trade group wants to put that together for themselves, we would like to have a partnership with them to provide the scientific foundation for those labels. But we’re not looking to get in the labeling game itself.... The primary risk with labeling is that you begin with a lot of disaggregated data at a very detailed level. But with each level of aggregation, you get into more and more value judgments that move you away from a scientific foundation and into cultural beliefs one or another stakeholder group finds more or less important. We believe that the consortium is best situated to deal with the science piece of it, and less well positioned to deal with the moral, ethical, cultural, and political considerations.

GreenWERCS

Shortly after the original case was released, Walmart made a dramatic shift in its approach within the chemical intensive products network. “The first three chemicals that Walmart had chosen to focus on created such an uproar and confusion, I think it was quickly recognized that there was not going to be a particularly workable strategy,” said Michelle Mauthe Harvey, co-leader of EDF’s onsite partnership with Walmart in Bentonville. “There was internal discord. And there were tremendous questions from external stakeholders as to why these three chemicals were chosen, and how was this going to change the world.” In parallel, Walmart faced an unrelated (but directly relevant) civil suit in California regarding the company’s handling of hazardous waste. “For a retailer,” explained Harvey, “if a bottle of bleach falls and cracks, it becomes hazardous waste. So when it goes out the back of a Walmart store, it has to be handled as such. Aerosol cans and other products carry those same sorts of requirements.” In response to the lawsuit, the company implemented 50 new procedures, including better employee training and information systems that tracked the unique characteristics of a product to provide accurate information about its disposal.¹⁸ In parallel, recalled Harvey, “Somebody also started looking at the cost of handling that waste and made a very strong business case that just going after a small number of chemicals was not going to affect the cost of this problem.”

As Walmart sought a new model for addressing the sustainability of chemical-based products, it again collaborated with NGOs in the space. “EDF was among a group of voices that had been advocating for Walmart to take a different approach to chemicals, which would allow buyers to compare the choices that were available for a given chemical product, whether it was lawn and garden or baby lotion or automotive,” Harvey said. “They needed a tool that would allow them to see if there were better products in the same category, or if all of the products had the same problematic attributes. If so, that information would then allow them to say to suppliers, ‘There isn’t anything good in my category; we need to innovate in this arena.’”

In late 2007, the Walmart chemicals network committed itself to this new course of action by forming a team that would work together to identify chemicals of concern and then encourage

suppliers to explore and bring to market products that contain alternatives to the those targeted ingredient.¹⁹ Harvey, on behalf of EDF, was asked to co-chair the effort along with a representative from another NGO called Clean Production Action. A cross-functional steering committee was formed to oversee development of the tool, which included product companies such as Unilever and P&G, chemical companies like Dow and DuPont, the American Chemistry Society, and other NGOs such as the Natural Resources Defense Council (NRDC). Within the project structure, the co-chairs played the leadership role and the steering committee acted as an advisor, but Walmart reserved the right to make the final decisions.

The team evaluated multiple vendors to help develop the tool and ultimately chose to work with a company called The WERCS. The vendor, the team, and the advisory board collaborated for nearly 18 months to develop the scoring and weighting metrics behind the tool, as well as to define an authoritative list of chemicals that were known environmental or human health threats. The tool itself, called GreenWERCS, would bring all of this information together.

Harvey described how it worked:

Every chemical-based product that goes onto a Walmart shelf requires entry of its ingredients into the WERCS database. There's an NDA agreement between the WERCS and the supplier. And the supplier enters the chemical composition of the product as a percentage of the total ingredients—you know, 10 percent this and 4 percent that. And then GreenWERCS screens those ingredients against a list of 3,800 chemicals that are known mutagens, carcinogens, or PBTs, which are persistent biological toxins. If any red flags come up, the supplier can find out exactly what chemical or chemicals caused the problem.

Suppliers could then use the tool to explore reformulations of their products to eliminate the red flags. "In some cases, it's a dilution issue. Their product has a higher percentage of a given component. If they add a little more water, they can reduce that. Or, it's a little too acidic, they can make it a little more basic, or vice versa, to move it out of the hazardous waste category," Harvey explained.

Because of supplier concerns related to sharing proprietary information, the GreenWERCS tool provided Walmart with more limited information. "What Walmart will see is simply a red flag that says this product includes a chemical of concern. The buyers will know whether it's a mutagen or endocrine disruptor, but they won't know what the chemical actually is, unless the supplier chooses to tell them," Harvey said. Buyers would also be able to look across a product category to compare products on the shelf. For example, within the window cleaner category, they could see which 12-ounce, ready-to-use window cleaners had red flags and which did not. However, they would not be able to see aggregated data across product categories. "When the tool was being developed, we anticipated that we would be able to access aggregated data. For instance, 100 products in Walmart include chemical X, or these are the top 10 products with problematic chemicals in them. Unfortunately, to date, the nature of the nondisclosure agreements has been such that those aggregated numbers are restricted. We're trying to work through that issue now," Harvey noted.

Another concern was that the new tool was not supported by an audit or verification process to ensure that the chemicals reported by suppliers (and their associated percentages) accurately represented what was in a product. "It's not hard to check, but it's costly and that has not been implemented as of now," commented Harvey. "We need a validation process... with a sufficiently onerous penalty that there's no benefit to lying about your product." Walmart had begun experimenting with spot audits of its chemical-based products. When a problem was identified, a product could not go back on the shelf until the discrepancy was resolved.

An early version of the GreenWERCS tool was released in May 2009. At that time, Walmart used it to screen more than 150,000 chemical-based products in its stores.²⁰ In its *Global Sustainability Report: 2010 Progress Update*, the company reported that "more than 50 percent of the chemical-intensive products on our shelves contain no ingredients of concern as identified by the Chemical Intensive Product Sustainable Value Network (SVN). The tool, however, also helped us identify suppliers whose products do contain chemicals of concern, and we are actively working with them to identify alternative chemical components."²¹ Sturcken interpreted the results slightly differently: "The alarming news was that about 50 percent of the products that Walmart has on its shelves have chemicals of concern or hazardous materials, as defined by that screening tool. But GreenWERCS has given them better information that will allow them to drive their suppliers to safer substitutes—safer for the planet and safer for people's health," she added. Since the initial GreenWERCS evaluation was completed, Walmart and its suppliers had reduced the percentage of chemical-intensive products with chemicals of concern in its stores to 40 percent of all products screened.

As of 2010, buyers were not yet using GreenWERCS on a widespread basis. "We want to see active use by buyers in 2011," Harvey said. However, "It's already creating a desire to change and improve among suppliers, without anybody asking for it. Once they know there's something in their product that's creating uneasiness, they have an incentive to try and take it out," she said. Sturcken added, "The companies that are making these products are the ones that are being innovative. They're seeing a business opportunity to sell more to Walmart if they can show that their products don't contain some of these chemicals of concern."

As Walmart continued to refine the tool for its uses, the WERCs intended to make it available to other retailers. No decisions had yet been made about whether information gathered via the tool would be made available to consumers.

OTHER NETWORK UPDATES

Seafood

As of 2010, the seafood SVN had been combined with the food and agriculture network. "The biggest driver was that there was so much overlap between the two," explained Waddoups. "We didn't want them *not* working together. For example, there was a lot we could learn about more sustainable chicken and beef by looking at what was happening in the seafood area. So we wanted to make sure that there was a lot of cross-pollination in ideas and thoughts." Kistler added, "It all about the importance of having a more sustainable food supply."

Overall, in the seafood arena, the network was still working to drive progress against the objectives outlined in 2007. In terms of its primary goal to transition to 100 percent MSC certified wild-caught seafood by 2011, the team was making progress but was at risk of missing its target. As of the end of 2009, Walmart's wild seafood was 55 percent MSC certified. "We're behind," Waddoups admitted. One of the problems, he said, was that, "There simply aren't certification criteria set up for a lot of types of seafood. So you can't be 100 percent certified when you can't be certified on a number of products. We're working with MSC to encourage them to build these other certification standards." Additionally, as Robert Fields, director of fresh meat, seafood and deli for Sam's Club, described:

We've found that there's certain fish we need to walk away from. For example, we walked away from orange roughy when we identified that, in our opinion and the MSC's opinion, it was not currently sustainable. For the last 10 years, it was fished extremely hard and we found out that the age of the fish to be able to mature and breed is so lengthy that it takes a very long time to build its biomass back up. So we felt like that fishery needed a break and needed an opportunity to reenergize itself.

As a result, Walmart and Sam's Club stopped carrying orange roughy in its seafood assortment.

Regarding the progress of the network toward its goal, Redmond commented that, "It was relatively easy to get to the 50 or 60 percent level. But, obviously, the further you go toward that 100 percent target, the harder it gets because you're getting into smaller fisheries, smaller fish, or smaller volume fish, and much more difficult problems. When we set the initial five-year goal, we always knew that we would find it more and more difficult as we made progress. But we thought that we could still get close to the 100 percent mark within the 2011 timeframe." The idea, he explained, was to set an aggressive goal to get people's attention. "If we had gone out to the suppliers and said 'Okay, by 2011, our goal is to be 75 percent certified,' we'd end up at 60 percent," said Redmond. "So it's a fundamental trait within Walmart that you set the goal very high but you maintain an element of realism as to where you think you'll end up." According to Fields, "We will likely get to 75-80 percent of our goal. While it will take longer than our deadline to certify some of our fisheries, we recognize the opportunity and plan to continue supporting them in their efforts towards certification."

When asked whether he was concerned about any negative repercussions of falling short of the goal, Fields said he was "not necessarily concerned." He continued: "Even if we miss the mark, the goal has helped get the entire industry working together as a whole to solve issues that we've had in regards to seafood sources.... This has increased the quality of the fish we buy and it's going to assist us in being able to meet the demands for seafood 20 or 30 years from now." "The important thing," added Waddoups, "is to keep working with suppliers to help them move towards certification, even after 2011." As Redmond noted, "I think the NGO community and the MSC are likely to view that as a pretty good success."

Electronics

The priorities of the electronics network also remained largely the same as they were in 2007. One of the biggest ongoing challenges for the team continued to be e-waste. Consumer behavior

remained a significant barrier. Kevin O'Connor, the Walmart vice-president and general merchandise manager in charge of the electronics network elaborated:

We find that on small devices ... the customer is willing to either bring it into the store with them or utilize a trade-in program. But when it comes to big bulky devices, whether it's a computer monitor or television, they really want you to pick it up at their home, and that's a really tough business model to make work. There's just no value to those items. It's expensive to recycle them and pick them up. And you can't get the financial model to work, unless you're going to charge customers fifty bucks, or a hundred bucks, to pull them out of their homes. And they're not really willing to pay that kind of money right now.

According to Waddoups, "We're making money on these smaller electronic items. But we're still looking for a program or solution that makes sense from a customer and business perspective that would allow us to expand the program and give customers more options for dealing with these types of materials."

In terms of its accomplishment in the electronics network, O'Connor emphasized that:

Back in 2008, we went 100 percent RoHS compliant on all the electronics that we buy [in the U.S.]. So, our telephones, our audio products, our TVs, our computers—everything went RoHS compliant a couple of years ago. At the time, we had to make a decision whether we were going to pay more money for those products because they were harder to produce. And we made the decision to pay a little bit more money, but to bring our scale and leverage to the situation. And once we did that, over the course of a year or so, the cost actually came down so that the products ended up costing the same amount of money as they did prior to RoHS certification.

As part of this program, Walmart continued to have its products tested for RoHS compliance. "It's part of our quality testing process, which is conducted by a third party. We test every new item as it's coming off the production line, because the models transition every year. We also test randomly throughout the year," O'Connor said. Exhaustive RoHS testing was expensive because *all* homogenous materials in a product (which could number in the hundreds or even thousands) had to be shown to have concentrations of the specified hazardous substances below the defined thresholds. For instance, according to Ron Brushia, a research scientist with the California Department of Toxic Substances Control, "A covered electronic device, such as a laptop computer, is likely to cost \$60,000 to \$100,000 to completely test for RoHS compliance, based on quotes from private testing labs."²²

In its annual sustainability report, Walmart published its U.S. goal to become fully RoHS compliant and announced when this goal had been met.²³ However, the company did little else to publicize RoHS compliance to its customers. "We don't promote this directly to consumers because RoHS is very difficult to explain," said O'Connor. Another reason that many retailers opted not to make a big deal about RoHS compliance was because it was still difficult to know whether suppliers were consistently meeting all RoHS requirements, with no short cuts or slip-

ups. As Chris Smith head of RoHS enforcement for the U.K.'s National Weights and Measures Laboratory (NWML) described when the standards were first released, "Finding fully-compliant products is difficult."²⁴ For example, when Greenpeace conducted a test of five commercially available laptops, it discovered a hazardous chemical in the HP product that the company claimed to have phased out years ago. This revelation came as an embarrassing surprise to HP, even though the restricted flame retardant was "virtually undetectable when embedded in plastic."²⁵ Although testing procedures and overall compliance had improved over the years, "some areas still need to be worked on" according to the NWML.²⁶ Challenges related to the accuracy and completeness of verification testing were also common with programs such as Energy Star, despite the fact that testing energy consumption was relatively simple by comparison.²⁷

In addition to eliminating hazardous substances from the products it sold, the electronics network was focused on improving their energy efficiency. For example, by 2009, the company had worked with its suppliers to have all of its TVs manufactured with panels that made them 30 percent more energy efficient. "Just like with RoHS compliance," O'Connor noted, "we used our scale and scope to help drive innovation in the area." Next, Walmart was turning its attention to video game consoles. "There are different technologies that we're looking at, but it's our goal this year to make some big progress on the gaming side of the business," O'Connor commented.

Textiles

One of the major changes in the textiles network since 2007 was that Walmart was no longer buying organic cotton directly from farmers. It was again working through its tier one suppliers, such as Sara Lee, to drive improvements in the sustainability-related practices of the textiles supply chain, down to the farmers. The decision to delegate relationships management with the farmers to its suppliers corresponded with a movement within the company in 2008 and 2009 to refocus on Walmart's core competencies. Its deep expertise was in selling finished merchandise, not buying raw materials. As Waddoups explained, "What we realized is that we put the cart before the horse. We needed to better understand how the total supply chain worked before we tried to just own the cotton portion of the supply chain. So our current focus is again on partnering with our suppliers to dramatically reduce the cost of organic cotton without us owning the cotton itself. We found that, for now anyway, this model works better for us." When asked if the change raised concerns with any of the farmers with whom Walmart had been developing relationships, he indicated that it did not. "Because it's not like we reduced our demand," he said. "We actually increased our demand for organic cotton over time. Now they just sell to one of our suppliers instead of directly to us."

As Kistler pointed out, Walmart still maintained direct-to-farm programs in other product categories:

I think what we've found in cotton is that the advantages that exist in some categories were not as great. Unlike coffee or apples, we don't sell cotton as a product. We sell coffee. We sell apples. But we don't sell cotton. So buying a commodity that Walmart does not sell directly to its end consumer may not yet be something that Walmart is best suited to work in first. But I will say that the

learning experience we got out of cotton has now propelled us a lot farther and faster in other areas where we're actively buying directly.

Mary Fox, the senior vice president in charge of the textiles network, emphasized that one of the main activities the network has been focused on is helping educate and guide its suppliers toward more sustainable practices. "For the most part, our suppliers do not have all the answers on sustainability or where to start. So we spend a lot of time sharing best practices to help them get going. They don't have infrastructure to do this on their own." For example, in April 2010, the textiles team trained the dye mills serving Walmart "on where they can make significant energy reductions and water reductions that will result in cost savings but, more importantly, lead to a more sustainable process," Fox said.

CHALLENGES GOING FORWARD

In 2010, Walmart was still dealing with a wide range of supplier responses to its sustainability program. According to Ballentine:

We have three kinds of suppliers. There are the active; those are the suppliers who are literally knocking down our doors saying, 'I've got this greenhouse gas innovation idea. Can we work together on it?' And we've got lots of those kinds of suppliers. The second category is the agnostic suppliers. They're the ones who kind of say, 'Well, okay. If Walmart's going that way, we'll go that way.' But they can take it or leave it. And the third group is the annoyed; those are the suppliers who say things like, 'If we do this, all we're going to get is cost savings?' Or 'All we're going to get is the longer-term relationship with Walmart?' Those kinds of suppliers still think that this is about tree-hugging and not really about benefiting their company or the relationships in some material way.

Despite this challenge, Waddoups commented on Walmart's efforts to forge stronger relationships with its suppliers: "On the whole, it's a pretty exciting time for us all to figure out how we move beyond the simple 'If you give me a low cost, I'll sell more of it' and on to 'If you give me the best value—in terms of sustainability and cost and quality—then I'll sell more of that and we'll have a relationship that is long lasting and creates innovation for us in the future together.'" Elizabeth Fretheim, director of business strategy and sustainability in the logistics network, described what this looked like in her area:

We're intimately involved with all of our suppliers. And our involvement comes from providing encouragement, all the way through providing funding for R&D, working with them on testing equipment that they come out with, and giving them a real life operational environment. So, we're very engaged with our suppliers on pushing technology forward.

Based on the company's experience over the last few years, Waddoups said, "The assumption that we have found to be true in nearly every case is that suppliers who drive sustainability also tend to be the same suppliers who are bringing us the most innovative products that are new, that are of better quality for our customers, that are lower cost because they've cut out inefficiencies

that they've found in the supply chain and are utilizing resources as effectively as possible and, therefore, as appropriately as possible."

When asked what he saw as the greatest challenges moving forward, Ruben talked about the tension between institutionalizing the company's learnings and continuing to experiment:

Our core challenge in sustainability is to continue to seek validity over settling for reliability. Reliability is doing what worked. The network structure worked. So keep the network structure and a single person running sustainability. Seeking validity would be saying, 'Maybe sustainability needs to be broken up into the business or maybe not. Let's continue to seek out how it needs to evolve with the business.' The challenge is to continue to push on what this looks like inside the company, how big it can be, how it's approached as a strategy ... and not simply get locked into a framework, a rut. If we settle on all of the structure right now, we'll be limiting ourselves.

Chris Sultemeier, senior vice president of transportation, raised another concern:

I think we'll always have challenges around trying to coordinate, communicate, and work cross-functionally with all the different areas of the business that have potentially competing priorities. I think that will continue to be an ongoing challenge because if you're sitting in merchandise or replenishment, and we're telling you to change your business process because it makes it easier for us sitting in transportation and logistics, they're willing to do that because we're all part of the same company. But will they lock that process and continue to do that long-term? Or do you run the risk of something becoming de-optimized over time because new people come in and they don't realize the benefit so they start doing it in a way that is easier for them even though it may hurt the whole? This has to be something you stay on top of daily.

Thinking back to his time at the company, Elm gave an example of how difficult it could be to maintain what Sultemeier called the "system perspective." "In the early years," he said, "the buildings were a source of a lot of the quick wins." However, when the economic downturn began, senior management in the U.S. faced increasing pressure to maintain sales and profitability. Accordingly, they initiated certain promotional programs in the stores; for example, using spotlights or playing videos to draw attention to particular products on the shelves. "That started adding a lot of energy to the box," Elm continued. "And I think it was frustrating to the people in the buildings network and the people who were leading sustainability in that group because their efforts to reduce energy use were later eroded by additional lighting and in-store video to support the company's merchandizing goals."

Despite the many challenges inherent in this type of work, Walmart had made significant progress toward becoming a more environmentally sustainable company. Kistler and team remained committed to the sustainability strategy and to expanding the base of support that would enable Walmart to achieve its goals. However, the company's efforts represented just a small step toward addressing the huge environmental challenges that remained, particularly in

the areas of global climate change and chemicals. Large-scale policy change was needed to stimulate more companies to improve their environmental performance and give leaders like Walmart a profit incentive to sustain and accelerate their efforts. Looking forward, it remained to be seen if Walmart would more directly engage in policy development to help advance sustainability at a higher level.

DISCUSSION QUESTIONS

1. Between 2007 and 2010, what are the most important strides Walmart has taken in support of its sustainability strategy? Why?
2. What are the greatest challenges/risks that threaten its efforts? Why?
3. Thinking about the next three to five years, how would you adjust the company's course?
4. Given its underlying business model and scale, can Walmart ever truly be sustainable? Why or why not?

Endnotes

¹ See GSB No. OIT-71A, Walmart's Sustainability Strategy (A), April 2007, for more information about the launch of Walmart's sustainability strategy and its original goals. Note that Walmart's third goal was initially "to sell products that sustain the company's resources and the environment." In 2009, Walmart modified this goal to read "to sell products that sustain people and the environment."

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³ All quotations are from interviews conducted by the authors, unless otherwise cited.

⁴ "Walmart Announces Goal to Eliminate 20 Million Metric Tons of Greenhouse Gas Emissions from Global Supply Chain," Walmart press release, February 25, 2010, <http://walmartstores.com/pressroom/news/9668.aspx> (October 11, 2010).

⁵ "Message from Mike Duke," Global Sustainability Report: 2010 Progress Update, Walmart, 2010, http://walmartstores.com/sites/sustainabilityreport/2010/message_from_mike_duke.aspx (October 5, 2010).

⁶ Ibid.

⁷ "Retail Industry Report," Covalence SA, 2008, p. 16.

⁸ Ibid., p. 31.

⁹ "Responsible Sourcing Stories," Walmart, <http://www.walmartcsr.ca/index.php/en/responsible-sourcing/walmart-ranks-3rd-highest-ethical-reputation-worldwide> (October 5, 2010).

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¹¹ The complete guidance document can be accessed at <http://blogs.edf.org/innovation/2494-2/> (October 11, 2010).

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¹³ Mike Duke speech, Sustainability Summit—Beijing 2008, <http://walmartstores.com/Sustainability/8685.aspx> (October 12, 2010).

¹⁴ Lee Scott speech, Sustainability Summit—Beijing 2008, <http://walmartstores.com/Sustainability/8685.aspx> (October 12, 2010).

¹⁵ Ibid.

¹⁶ See "Members," Sustainability Consortium, <http://www.sustainabilityconsortium.org/members> (October 12, 2010) for a complete listing of members.

¹⁷ Sustainability Index, Walmart, <http://walmartstores.com/sustainability/9292.aspx> (October 12, 2010).

¹⁸ Donna Beth Weilenman, "Walmart to Pay \$24.6 Million to Settle Hazardous Waste Civil Suit," May 3, 2010, <http://beniciaherald.wordpress.com/2010/05/03/wal-mart-to-pay-24-6-million-to-settle-hazardous-waste-civil-suit/> (October 13, 2010).

¹⁹ "Environment: Products: GreenWERCS," Global Sustainability Report: 2010 Progress Update, Walmart, 2010, http://walmartstores.com/sites/sustainabilityreport/2010/environment_products.aspx (October 5, 2010).

²⁰ "GreenWERCS™ Commercially Available for Chemical Manufacturers," The WERCS press release, February 18, 2010, <http://www.businesswire.com/news/home/20100218006187/en/GreenWERCS%E2%84%A2-Commercially-Chemical-Manufacturers> (October 13, 2010).

²¹ "Environment: Products: GreenWERCS," op. cit.

²² From an email exchange with Rob Brushia August 2008.

²³ "Product Goals and Progress to Date," Global Sustainability Report: 2010 Progress Update, http://walmartstores.com/sites/sustainabilityreport/2010/commitments_products.aspx (October 5, 2010).

²⁴ "RoHS Police Are Busy at Work," *Electronic Engineering News Digest*, January 12, 2006.

²⁵ Ibid.

²⁶ "RoHS Watchdog Reports Less Violations in 2007," June 13, 2008, http://www.eetasia.com/ART_8800528851_480200_NT_421feace.HTM (October 5, 2010).

²⁷ Opportunities Exist for Federal Agencies to Better Inform Household Consumers," GAO Report, September 27, 2007.