CASE STUDY

LOWELL CENTER FOR SUSTAINABLE PRODUCTION

Green Toys Inc. Striving to Make Sustainable Products

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University of Massachusetts Lowell

The Lowell Center for Sustainable Production at the University of Massachusetts Lowell helps to build healthy work environments, thriving communities, and viable businesses that support a more sustainable world.

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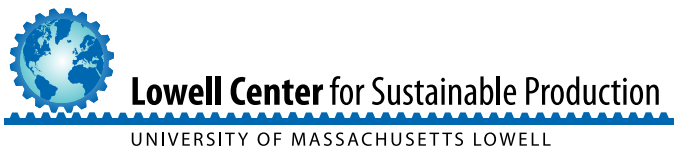

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Background

A Google search of "green products" leads to 170,000,000 results. A search of "sustainable products" leads to 8,570,000 results. With increased consumer interest in greener, safer, and healthier products, many new programs have been launched to identify and promote preferred products. There are more than 300 eco-labels worldwide.[1] Much of this information is useful but may be incomplete and some may be deliberate greenwashing.[a]

In this increasingly complex and sometimes contradictory environment, the Lowell Center for Sustainable Production determined it was important to create a definition and framework for a sustainable product. We deliberately chose the word "sustainable" to indicate that this definition goes beyond "green" attributes and also considers social impacts and benefits of products. As described in the 2009 report *A New Way of Thinking: The Lowell Center Framework for Sustainable Products,* a "sustainable product minimizes environmental and social costs throughout the product lifecycle and aims to maximize environmental and social benefits to communities, while remaining economically viable." This framework is designed to help businesses evaluate the environmental, social, and economic impacts of existing products and to design new products that minimize these impacts. Companies can evaluate whether their products are sustainable by asking the following five questions and examining criteria that define each element (see appendix).

This case study of Green Toys Inc. applies this broad framework to demonstrate the use and value of this tool. Whether a company is just beginning or is well on its way in developing greener, safer, and healthier products, the Lowell Center Framework for Sustainable Products can be helpful in evaluating whether a holistic approach is being implemented. Although some may see the Framework as visionary and therefore unachievable, this case study demonstrates that a company can meet many of these criteria and be successful economically. Innovative companies that design and make products with sustainability in mind are part of a new wave of business that is emblematic of a "restorative economy," where industry plays a significant role in supporting community sustainability by simultaneously reducing its impact on the environment and providing community benefits.[2]

a Greenwashing is "the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service." See "The Seven Sins of Greenwashing: Environmental Claims in Consumer Markets," TerraChoice, Summary Report: North America, April 2009.

The Genesis of Green Toys Inc.

Green Toys cookware and dining set

Green Toys recycling truck

Our long-term vision is to turn the industry upside down and have people think differently. Our goal is to have people look at toys like they look at food—to think about how the ingredients of toys may affect their everyday lives.

—Robert von Goeben

Robert von Goeben and Laurie Hyman are the co-founders of Green Toys Inc., based in the San Francisco Bay area. Von Goeben had many years of experience as a toy designer and also managed a venture capital fund in Silicon Valley prior to starting Green Toys Inc. in 2007. Hyman has many years of experience as a marketing executive. Hyman and von Goeben brought their expertise together to create a new type of toy company that incorporates sustainability principles as basic values and as key elements of their corporate strategy.

We model our company after innovators like the personal care products company Tom's of Maine. Tom's of Maine did not teach a new way to clean your teeth. What they did is give you an alternative to existing products. That is our model. We don't teach people a new way to play. What we want to do is provide better quality toys for existing play patterns.

—Robert von Goeben

Green Toys Inc. manufactures a variety of toys for young children. These include traditional designs for children such as sand play toys, jump ropes, trucks, tea sets, and tool sets. In 2010, Green Toys Inc. released its first products designed for babies and toddlers, including stacking blocks and feeding utensils. After three years in operation Green Toys Inc. has over 3000 customers in the US and Canada, ranging from small specialty toy stores to large retailers such as Whole Foods and Pottery Barn. Sales have grown approximately 70% annually. Green Toys Inc. currently has four employees including von Goeben who is responsible for product design, product development and finance, Hyman who is in charge of marketing, an employee who handles shipping and logistics, and an employee who is in charge of communications, processing orders, and billing.

Exploring What Make Green Toys Greener and Healthier for Consumers

While these products may look similar to other toys of the same type, they are made with a key difference. An important innovation of Green Toys Inc. is to re-think the flow of the design process. Rather than creating a toy design and then considering the materials that could be used to realize it, von Goeben first researches the greenest and safest materials available and then determines what toys can be made from these materials.

> *A lot of companies start with style, for example, it's got to look like Sponge Bob Square Pants and then determine the material. We go the other way around. We say, we want the greenest, safest material. Now, what toys can we make?*
>
> —Robert von Goeben

In its start-up phase, Green Toys Inc. tested 15 to 20 materials to select a material that met its "green and safe" criteria for the range of toys the company planned to manufacture. Initially, green criteria included biodegradability, recycled materials recyclability, and energy efficiency. Safe criteria included avoidance of lead, phthalates, bisphenol A (BPA), or other additives that could leach out of plastic and pose a health hazard to consumers.

> *In choosing materials for our toys, we wanted to make sure we did not choose green without a practical purpose, just for the sake of being green. We wanted to choose green that fit in with people's everyday lives.*
>
> —Robert von Goeben

Von Goeben was intrigued by the idea of creating a biodegradable toy and began to investigate biobased plastics. He learned that a biobased plastic called polylactic acid (PLA) was being commercialized for a variety of uses. Green Toys Inc. initially chose PLA as the primary material for its toys but after further testing determined that it did not have the mechanical properties that were necessary for durable toys. Also, after investigating local waste management procedures, von Goeben realized that there was no infrastructure in place yet to separate out products made of biobased plastics and therefore these products would likely be landfilled or incinerated. Von Goeben then decided to focus on making toys from recycled materials that were currently available as a result of municipal recycling programs.

Von Goeben evaluated a variety of recycled petroleum-based plastics and eventually selected recycled milk jugs of high density polyethylene (HDPE) as the material of choice for their products. Green Toys Inc. worked closely with a local plastic manufacturer and determined that recycled HDPE could be used successfully in injection molding machinery. HDPE is one of the few plastics (along with water bottles made of polyethylene terephthalate- PET) that is separated in municipal recycling facilities. Von Goeben was able to find a trustworthy supplier that could provide a steady source of post-consumer recycled HDPE milk jugs that was of consistent quality and was not contaminated with other materials.

The use of recycled milk jugs provided a unique marketing angle. Von Goeben and Hyman recognized that they could educate both children and adults about "closing the loop" and make visible the tangible life cycle benefits of recycling. The following graphic is included on all of the Green Toys Inc. packaging:

At present, all but one Green Toys Inc. product is made of recycled HDPE. The Ecosaucer™ flying disc is made of low density polyethylene (LDPE) from recycled plastic grocery bags, which is a more flexible plastic. The company continues to do testing to identify additional materials that meet performance, environmental, and safety criteria.

Green Toys Inc. products are designed to be a firm plastic and therefore do not require plasticizers (softeners) such as phthalates. BPA, used in making clear polycarbonate plastic, is not an ingredient in HDPE. Knowing that lead and other heavy metals are sometimes used in paints, von Goeben

Examples of Green Toys Eco-labels

carefully investigated the colorant the company had selected to ensure that it contained no harmful additives. Also, Green Toys products have been designed to avoid painted coatings, thereby eliminating the hazard of surface paints that can contain toxic chemicals.

In contrast to most toy product labels that state only that the product meets safety standards as required by federal law, the labeling of a Green Toy product provides ingredient information. The packaging notes that the product is made from 100 % recycled HDPE and does not contain phthalates or BPA. In addition, the company has created a schematic to illustrate how the use of recycled milk jugs saves energy and includes this diagram on its packaging.

This information is a key element of the company's marketing strategy, which is aimed primarily at parents and toy retailers. In particular, Green Toys Inc. targets the "Whole Foods mom", as described by von Goeben. Its natural customers are parents who are seeking healthy products for their babies and young children, including food, equipment, and toys. Green Toys Inc. prides itself on being transparent about its products. Its web site provides a clear explanation of the company's materials choices and what makes them green. As part of its marketing approach, Green Toys Inc. also emphasizes that it is a California-based company, as the state is known for having the strictest environmental regulations in the US. The images above provide a good summary of how these toys are marketed. These are Type 2 eco-labels, which are self-declarations by the manufacturer that have not been verified by a third party.[b]

Certified third-party laboratories regularly conduct safety testing on Green Toys Inc. products to ensure they meet federal and state standards, including those specified in the US Consumer Product Safety Improvement Act of 2008 and the US Food and Drug Administration requirements for food contact materials. In addition, each batch of recycled HDPE is tested to ensure that it does not contain heavy metals such as lead and is spot tested for phthalates and BPA. Although these chemicals are not used in making HDPE this testing provides additional assurance for the company's environmental claims.

Green Toys Inc. is the first toy company in the US to use recycled HDPE as its primary material. Because of the challenges of using this material in injection molding machines, it is not commonly chosen. Some other companies are also exploring the use of recycled plastics. For example, Sprig Toys makes its products from a biocomposite material that is composed of wood waste (sawdust) and recycled polypropylene.[3] Preserve makes a range of consumer products from recycled polypropylene including toothbrushes, tableware, and kitchen products such as food storage containers. Because recycled polypropylene is not as consistently available as HDPE plastic, Preserve asks its customers to send used yogurt containers to the company so that they can be made into Preserve products. The company also takes back its products free of charge for further recycling.[4]

b EcoLogo, an environmental certification organization, is currently developing a Type 1 eco-label for toys that will require third-party verification. For information, see *www.ecologo.org.*

How Green Toys Are Made

It's the early days. It's the Wild West. You know it's going to get bigger. There are other companies like us—everybody's trying to figure it out. We've got the first application that works.
—Robert von Goeben

Green Toys Inc. contracts with a plastics manufacturer, Kennerley-Spratling (KS), based in San Leandro, California, to make its products. KS has created a wide range of injection molded plastic products since 1955. Von Goeben searched throughout the US for a plastics manufacturer with which to collaborate and chose KS because of its proximity, experience, and its willingness to work with recycled plastics. Von Goeben worked with engineers at KS to design and tailor molds that would work effectively with a recycled plastic resin. This resin had formerly been blow molded. This process was challenging, but it is now an essential element of what differentiates and provides a competitive advantage to both Green Toys Inc. and KS. Through working with innovators like Green Toys Inc., KS has developed experience in working with recycled plastics and now can market this expertise to its customers. As a result, KS is finding that other clients are interested in using recycled materials.

The workers at KS make Green Toys by mixing recycled HDPE in a pelletized form with colorant. The mixture is then sent through the injection molding machine. Operators receive the finished parts and separate them from the plastic pieces that are holding the toy parts. These pieces are then returned to the manufacturing process so the recycled plastic is not wasted.

Von Goeben spends many hours visiting and asking questions of suppliers and views this activity as a key aspect of his job. "With a name like Green Toys Inc., there's really no room for error," he says. For example, PolyOne, a provider of a wide range of specialized polymers, supplies colorant to Green Toys Inc. Von Goeben wanted to determine that there was no lead or chromium in the pigment that makes up the colorant. When he asked the supplier about the specific raw materials in plastic colorants, he was told "no one has ever asked this question." By persevering, von Goeben finally reached a chemist who worked in the company that supplied pigment to PolyOne for their colorants and was able to get these questions answered to his satisfaction. Although this practice is time consuming, von Goeben sees this effort as vital to his business model.

An in-depth health and safety evaluation was not conducted for this case study. A walk though of the plastic manufacturing plant found the plant to be clean and workers wearing safety glasses and other protective equipment. Because the design of Green Toys Inc. avoids hazardous materials, workers are not exposed to these substances in the production process.

Manufacturing Green Toys

Plastic pellets mixed with colorant

How the Production of Green Toys Inc. Benefits Local Communities

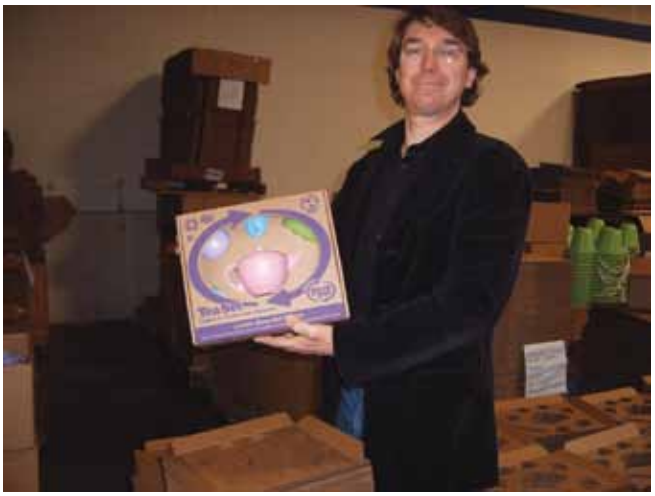
Green Toys Inc. corporate headquarters, plastics manufacturing and assembly facilities, packaging supplier, warehouse and shipping facility are all located in the San Francisco Bay area. The only part of the supply chain that is not local is the recycled resin supplier, located in southern California. Because of the proximity of the different elements of the business, the company utilizes local delivery and does not pay for transportation as its parts and products are moved from one location to the other. Von Goeben notes: "we've squeezed all the transportation out of our supply chain. And that's a huge, tangible environmental benefit." This local supply chain model is an example of a new trend that is called "onshoring" or "reverse globalization."[5] Not only does this approach save fossil fuels because of transportation efficiencies, it also provides local employment.

Green Toys Inc. contracts with the Work Center, a human services agency based in San Mateo, California, to assemble its toys. The Work Center provides vocational training for individuals who are disabled, have mental illness, or have other challenges that have made it difficult for them to succeed in a traditional work setting. The mission of the Work Center is to provide these individuals with training in the "soft" skills they need to find and keep a job, such as coming to work regularly and on time and working cooperatively with others. Work Center clients do product assembly and packaging, mailing and labeling, and other related services. Green Toys Inc. has been very satisfied with the quality of their work and has found that their price is competitive with other assemblers.

Green Toys Inc. contracts with a printer based in Livermore, California to print and die cut boxes, which are then shipped to the assembly location. Packaging has been one of its biggest challenges because the company is committed to avoiding plastic packaging and twist ties. Von Goeben describes the packaging design process as "origami" as the packaging must fold in a way that will hold the product in place but also leave it visible so that the consumer can see all the parts it contains.

A third-party logistics company, Orion Logistics, based in Hayward, California, provides "pick and pack" services to Green Toys Inc. A "pick and pack" service means that Orion Logistics stores Green Toys Inc. products, keeping an inventory of what is in the warehouse so they can fill and ship orders as needed. In addition, Orion Logistics is experienced at meeting the shipping requirements of different retailers. For example, an order from a large retailer may have very specific pallet shipping requirements whereas a small order from a specialty toy store may not.

Green Toys packaging design



A Green Toy in its packaging

Green Toys Inc. as a New Model

Although it is too soon to evaluate long-term economic viability, Green Toys Inc. has grown by approximately 70% annually in its first three years. The Green Toys Inc. business model provides local employment and meets a social need by supporting clients of the Work Center. It also greatly reduces supply chain transportation costs. The company developed criteria for safer and greener materials and chose those that have the performance characteristics they need for their products. These business decisions are providing the company, the community, and consumers with environmental, social, and economic benefits.

Lessons Learned for Making Sustainable Products

Grow thoughtfully. Making sustainable products requires careful attention to financial and business details. Says von Goeben: "Our biggest challenge is to manage our growth. The first couple of years we weren't able to grow as big and as fast as we wanted to, because we had to make sure we had all our ducks in a row from an economic and environmental standpoint."

Start the design process by choosing environmentally preferable materials. This is a new and different way to approach design. Once you have found materials that meet green and safe criteria, then determine what products can be made.

Work closely with the product manufacturer. Using greener materials may require the specialized tooling of machinery. Although this process takes time up front, it may eventually provide a competitive advantage.

Know what is in your products. Become familiar with your suppliers and ensure that they provide detailed information about materials composition. Visit your suppliers to see how raw materials are managed.

Test your raw materials and products frequently. It is critical to maintain quality standards to avoid the perception of greenwashing. Test your raw materials and finished products regularly to assure that they meet specifications for greener, safer, and healthier products.

Look for opportunities to support local communities. See how your business can invigorate your community with employment opportunities and support of environmental initiatives.

Endnotes

1 2010 Global Ecolabel Monitor: Towards Transparency. World Resources Institute and Big Room, Inc. Available at *www.ecolabelindex.com*

2 Hawken, P. *The Ecology of Commerce: A Declaration of Sustainability*. NY: HarperCollins, 1993, pg. 210.

3 Dixon, K. "Toy Designers Choose Recycled Materials." 3/16/09. *www.plasticstoday.com*

4 See *www.preserveproducts.com*

5 Said, C. "Green Toy Maker Goes Extra Mile—Keeps it Local." *San Francisco Chronicle*, April 19, 2010.

6 From Edwards, S. "A New Way of Thinking: The Lowell Center Framework for Sustainable Products," Lowell Center for Sustainable Production, November 2009, pg. 13. Available at *www.sustainableproduction.org.*

Are Green Toys Inc. Products Sustainable?

This box summarizes this case study in the context of the **Lowell Center Framework for Sustainable Products,** illustrating that Green Toys Inc. is well on its way to meeting many of the criteria:

Is the product environmentally sound? Green Toys Inc. chooses the greenest materials that meet its functional requirements. In choosing recycled HDPE, Green Toys Inc. removes a material from the waste stream to make a new product, saving energy in the process. Green Toys Inc. evaluates other material inputs, such as colorants to assure they are not hazardous. Packaging is recyclable and avoids plastic or twist ties.

Is the product healthy for consumers? Green Toys Inc. avoids additives that can leach out of plastic and harm the users of its products and also avoids painted coatings that may contain toxic chemicals. Green Toys Inc. products are safe in use.

Is the production process safe for workers? Although an in-depth workplace inspection was not conducted for this case study, workers were observed when walking through the plastics manufacturing plant and assembly facility. It appears that working conditions are safe, workers receive health and safety training and are treated respectfully. Because the design of Green Toys Inc. avoids hazardous materials, workers are not exposed to chemical toxins in the production process.

Does production benefit local communities? Green Toys Inc. has created a model of local production and so has created jobs as a result. In addition, by contracting with the Work Center, Green Toys Inc. assists in improving the social welfare of individuals who are re-entering the workforce.

Is the product economically viable? As the company has been in existence for three years, it is too soon to evaluate long-term economic viability. However, in the short-term the company is thriving and growing, continuing to introduce new toy designs and making improvements as needed.

Appendix

Lowell Center Framework for Sustainable Products[6]

Healthy for consumers A sustainable product is healthy for consumers. This means:	• It avoids chemicals that cause cancer or mutations, damage the reproductive, nervous, endocrine or immune systems, are acutely toxic or accumulate or persist in the environment. • It is safe in use—not flammable, explosive or corrosive, does not cause lacerations, choking or strangling, burns/shocks, damage hearing or injure eyes.
Safe for workers A sustainable product is safe for workers. This means:	• Workplace is safe: clean, well lit, ventilated, with good air quality, well designed ergonomically, free of exposure to toxins, equipped for fire safety and other emergencies. • Workers receive adequate health and safety training. • Working hours and pace are not excessive. • Workers have some job control and input into production process. • If workers are housed in dormitories, the living quarters are clean, and workers have sufficient food, access to potable water and sanitation. • Workers are treated fairly and with respect and dignity; there is no corporal punishment, verbal abuse, coercion, discrimination or harassment. • Child or forced labor is not permitted. • Workers have freedom of association and the right to collective bargaining. • Employees' skills are well utilized and their ideas and input are valued. • Communication is valued and encouraged among workers and management.
Environmentally sound A sustainable product is environmentally sound. This means:	• Chemical and material inputs/outputs are not hazardous (see Healthy for Consumers above). • Product is energy, water and materials efficient in production and use. • Waste is prevented and/or minimized throughout the product lifecycle. • Product and packaging are durable as appropriate, and are reused, repaired, recycled or composted. • Product is designed for disassembly; it can be taken apart and remanufactured. • Renewable resources and energy are utilized in production and use. • Scarce resources are conserved and ecosystems are not damaged in extracting resources for production. • Critical habitats are preserved during extraction, production and use.
Beneficial to local communities A sustainable product benefits the communities in which it is made. This means:	• Workers receive a living wage and can support their families without additional government assistance. • The work design is supportive to family life—e.g., families are not separated, and good-quality child care is available for workers' children. • The work design promotes equity and fairness in the community – e.g., there is no age or gender discrimination. • Some of the firm's profits accrue to the local community to be used for public improvements (such as in education, health care). • The work design promotes community input and participation and the community is informed about production and labor practices.
Economically viable A sustainable product is economically viable for the firm/organization. This means:	• The product is responsive to market requirements. • Innovation is encouraged to anticipate market needs. • The firm is stable in terms of ownership and philosophy. • The company reinvests in the facility to improve its capacity for further production. • The product is priced for economic viability and also aims to internalize costs so that its production can be environmentally sound and socially just. • The firm is recognized for its corporate social responsibility: this includes programs that support and value employees as well as programs that benefit the community and environment.

THE SUSTAINABLE PRODUCTS PROJECT

The Sustainable Products Project of the Lowell Center promotes the design and development of safer, healthier, and greener products through engaging stakeholders, conducting research, and providing information that can spark innovative, environmentally sound solutions. The Lowell Center Framework for Sustainable Products is a tool to help businesses evaluate the environmental, social, and economic impacts of existing products and to design new products that minimize these impacts. This case study of Green Toys Inc. applies this broad framework to demonstrate the use and value of this tool.

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