Baseline Sustainability Training for Ohio Businesses/Organizations*

- Do you wonder if sustainability could impact your organization?
- Would you like to know how sustainability may impact Ohio businesses and other organizations?
- Curious about whether there are there economic advantages to be gained from learning about sustainability best practices?

If you answered yes to any or all of these questions, this training may be of interest to you!

*The Office of Compliance Assistance and Pollution Prevention at the Ohio EPA does not endorse or support any vendors, organizations, authors or programs mentioned in this training presentation.

Sustainability involves the all members of our society. It encompasses the availability of resources and opportunities for current and future generations. Businesses which are actively involved in learning about sustainable best practices are positioning themselves for long term profitability and viability as an organization.

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What is Sustainability?

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Bruntland Report, 1987

Development does not mean going backward or lowering the quality or value of human existence. It may mean re-valuing social or ecological services which have intrinsically had ambiguous value compared to economic values such as GDP (gross domestic product) or per-capita income. The value of safe neighborhoods, quality educational opportunities, social justice, safe water, food and air are values that are often harder to qualify than economic output.

ENVR E-105 Strategies for Sustainability Management
Dr. Robert Pojasek- Harvard University

"Sustainability is about behaving (and being able to behave) in a way that can be continued.

To operate sustainably, an organization must act in a way that is consistent with and supportive of the survival of the physical environment and also the communities and economies in which it operates. Organizations seeking to operate sustainably consider how their policies, strategies and operations affect each of the following:

- **Their financial performance and the broader economic system**
- **The environment including the availability of resources and materials**
- **People in the local and global communities in which they operate."**

http://isites.harvard.edu/fs/docs/icb.topic513119.files/Five%20Basics%20Narrative.pdf

This is a definition created by Dr. Bob Pojasek, an experienced P2 (pollution prevention) practitioner, from his course at Harvard University- **ENVR E-105 Strategies for Sustainability Management (21808)**
Spring term
Robert B. Pojasek, PhD, Adjunct Lecturer on Environmental Science, Harvard School of Public Health.
Sustainability is explored at the nexus of a local business, the local government, and local citizens. A case method approach is used to help students develop the skills to develop a sustainability management system for a local business. Other cases are used to reinforce the concepts and sharpen skills. (4 credits)

How can Sustainable Development be Achieved?

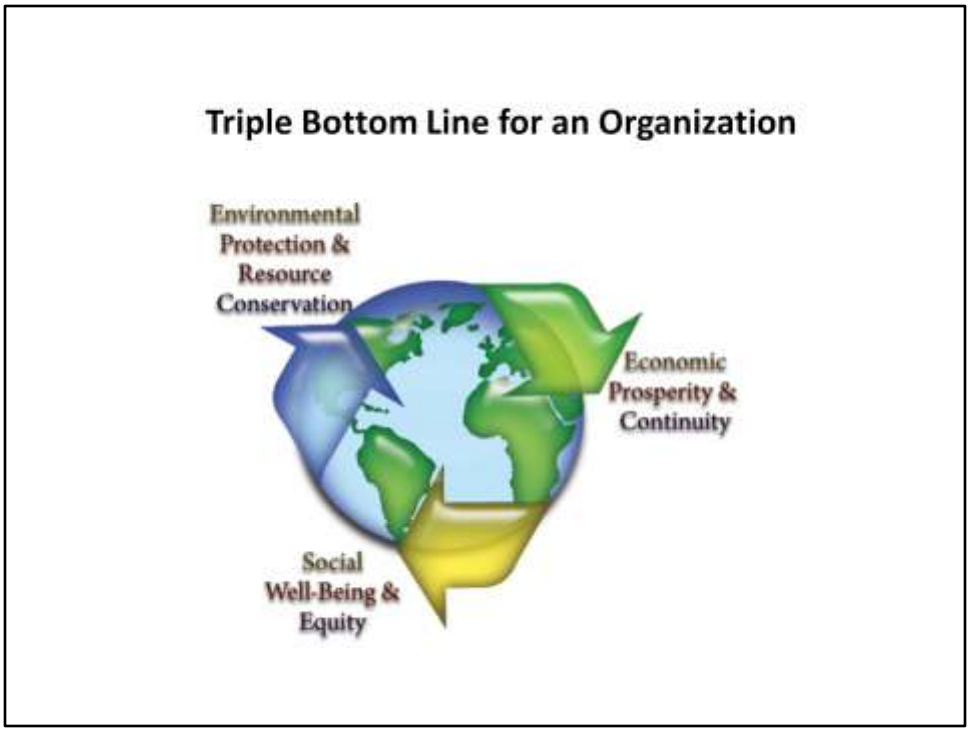
"We have the capacity to create a very different kind of economy, one that can restore ecosystems and protect the environment while bringing forth innovation, prosperity, meaningful work, and true security,"

"**The drive to develop a restorative economy must come from businesses themselves**, for no other institution in the modern world is powerful enough to foster the necessary changes." The key is to inspire a willing, un-coerced, and even joyous redesign of the way we conduct business. **What is needed are not new government bureaucracies or legislative mandates** but incentives that will redefine the basis on which **companies make decisions — from short-sighted commercial gain to long-view ecological and commercial sustainability.**

Ecology of Commerce - Paul Hawken

http://www.paulhawken.com/paulhawken_frameset.html

The major focus of sustainable development is a shift to a longer term view of profitability and stability of businesses. The availability of resources and healthy communities in which to conduct business are essential to every companies long term survival. Therefore, finding profitable ways in which to ensure the availability of these resources and being a good neighbor in the community are essential competencies for every business.



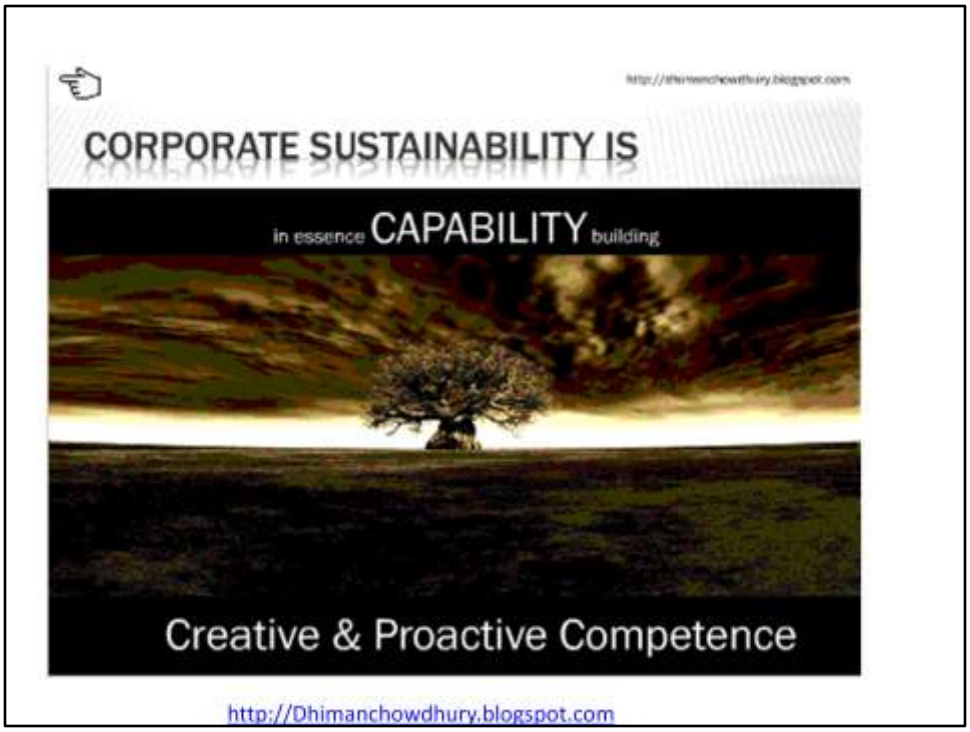
Triple bottom line accounting expands the traditional reporting framework to take into account environmental and social performance in addition to financial performance.

The concept of TBL demands that a company's responsibility be to 'stakeholders' rather than shareholders. In this case, 'stakeholders' refers to anyone who is influenced, either directly or indirectly, by the actions of the firm. According to the stakeholder theory, the business entity should be used as a vehicle for coordinating stakeholder interests, instead of maximizing shareholder (owner) profit.

The triple bottom line can be stated a number of different ways that relay the connectivity between maintaining the viability of future generations.

Compliance with environmental, labor and financial regulations are good starting points, but are only the beginning of operating in a sustainable manner.

Sustainability is also much more than “spin” on past operating practices that do not really reflect any changes in the organizations social responsibility or environmental legacy.

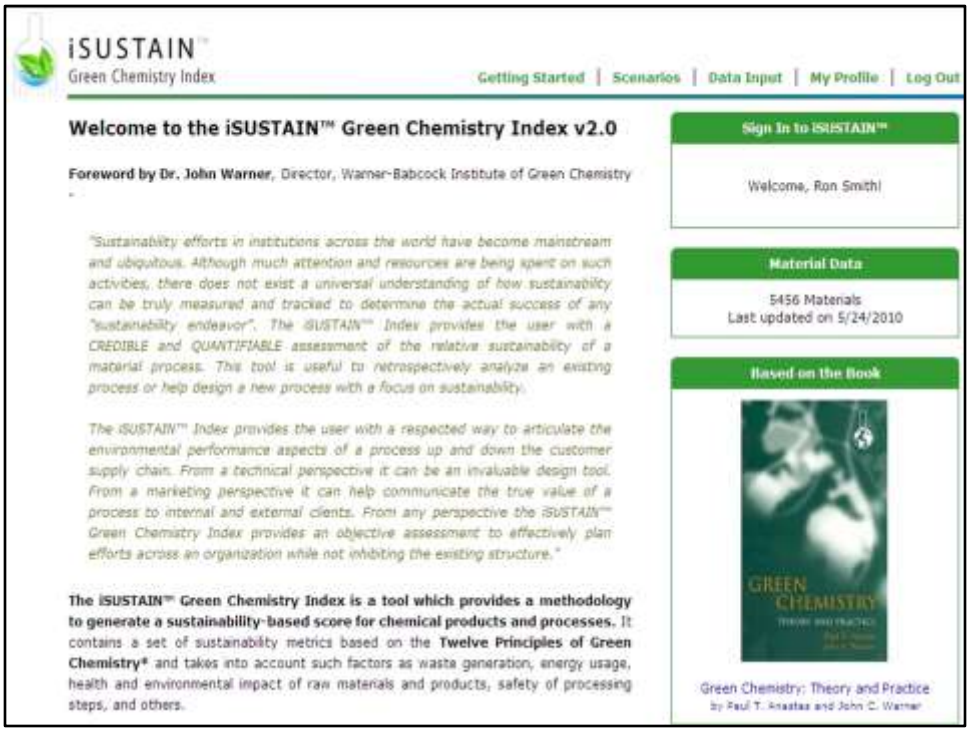


Sustainability is about building core competencies in social, environmental and economic performance. Sustainability represents a greater level of management skill and strategic vision for an organization. Sustainability represents long term shareholder and stakeholder value to investors and the community where an organization operates

Progress Towards Sustainable Development

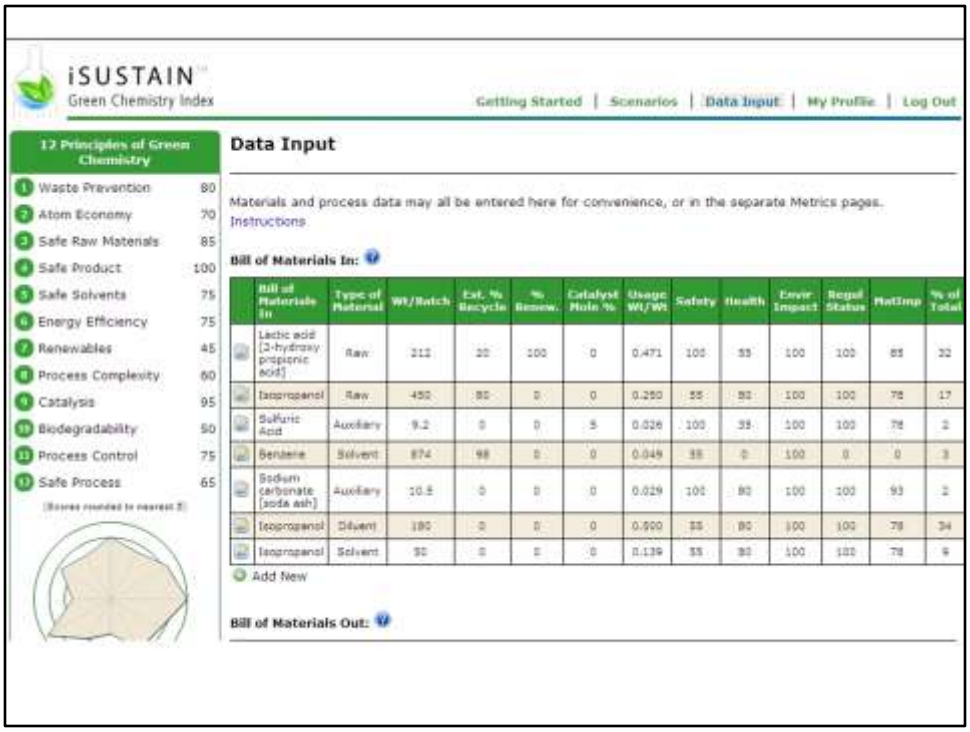
- Green chemistry re-formulation and process re-design
- Closed loop nutrient/input-output design and systems engineering
- Green building and energy efficiency integration into building and manufacturing best practices
- Ultra efficient manufacturing practices

Few if any existing systems can claim to be truly sustainable yet. Therefore we will address the progress that various organizations have made and are making to become significantly more sustainable. The elements mentioned above are not exclusive of each other but may be utilized together or alone to address more sustainable practices that the current state of a product, process, service, building system, energy system, transportation system or input/raw material.



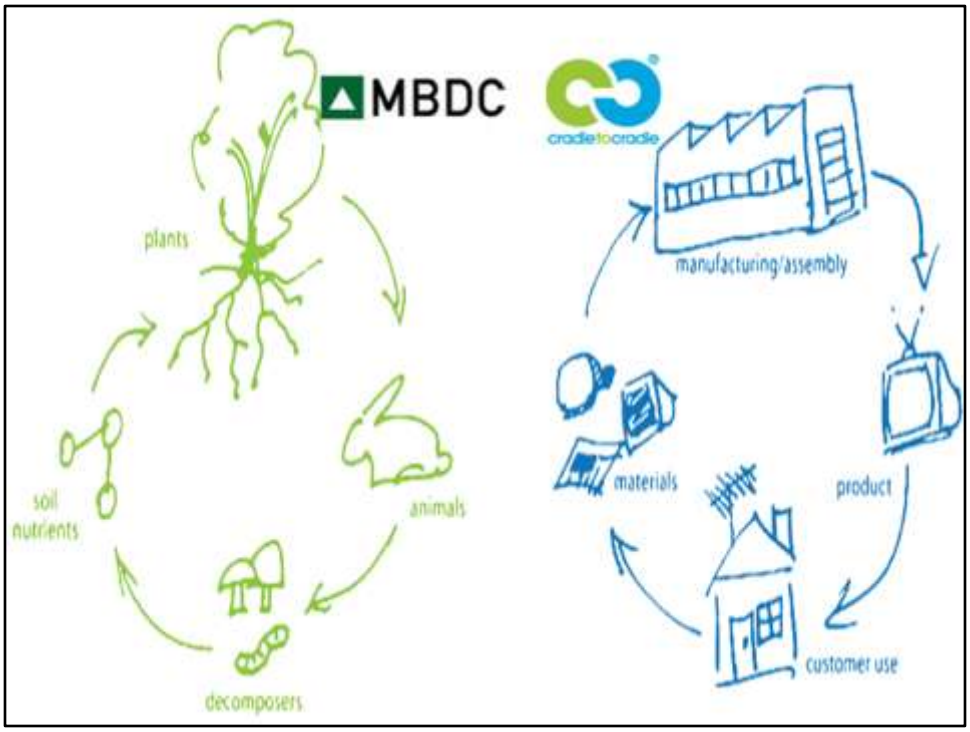
Green Chemistry is a definitive method to actively design sustainable products and processes. Unlike theoretical programs, green chemistry actually measures the impacts which products and processes have on people, planet and Profit. Green Chemistry is defined as the design of chemical products and processes that reduce and/or eliminate the use and/or the generation of hazardous substances.* This approach requires an open and interdisciplinary view of material and product design, applying the principle that it is better to consider waste prevention options during the design and development phase, rather than disposing or treating waste after a process or material has been developed. Through a principle-based approach, green chemistry results in increased efficiency, reduced hazards and the elimination of waste.

Green Chemistry in practice implies designing safer, economical, and efficacious processes and products. All of these aspects are symptoms of good product design and good manufacturing processes and can result in economic benefit for institutions that implement these practices. Green Chemistry offers a concrete path to achieve sustainable and safe laboratory practices. The 12 Principles of Green Chemistry establish a framework for practicing chemists to follow along this path.



To use the iSUSTAIN™ Index, the user generates a scenario. The scenario contains information on the materials going into a process (the Bill of Materials In or BOM In), the materials out of a process (the product and any waste streams - the Bill of Materials Out or BOM Out) and the conditions used for the various steps in a process (the Process Steps). Several alternative scenarios can be generated for the same product/process, making changes within them to evaluate their effect on the overall sustainability score, thus allowing the user to do a "what-if" analysis.

Sustainability looks to balance development with utilizing all biological and inorganic "technical" in a closed loop system. This mimics the behavior of natural systems, that utilize all waste materials as food for another organism. There is virtually no waste and the system becomes "self-perpetuating". This is the goal of sustainable development- to become self-perpetuating for all future generations.



More specifically all materials can be seen as nutrients for the next generation or level of users in a hierarchy. One such cyclical description is utilized by the MBDC (McDonough Braungart Design Chemistry) Cradle to Cradle framework .
The Cradle to Cradle framework also addresses energy, water and social responsibility through the following tenets:
Eliminate the concept of waste. "Waste equals food." Design products and materials with life cycles that are safe for human health and the environment and that can be reused perpetually through biological and technical metabolisms. Create and participate in systems to collect and recover the value of these materials following their use.
Power with renewable energy. "Use current solar income." Maximize the use of renewable energy.
Respect human & natural systems. "Celebrate diversity." Manage water use to maximize quality, promote healthy ecosystems and respect local impacts. Guide operations and stakeholder relationships using social responsibility.

MBDC

The Cradle to Cradle Design Protocol

To assist companies in (re)designing eco-effective products, MBDC uses the Cradle to Cradle Design Protocol to assess materials used in products and production processes. The Protocol is founded on the "Intelligent Products System" developed by Michael Braungart and his colleagues at EPEA.

In applying the Protocol, materials in products are first inventoried and then evaluated according to their characteristics within the desired application, and placed into one of four categories (Green, Yellow, Orange, or Red) based on human health and environmental relevance criteria. After all chemicals are assessed, the materials in a product application are optimized by positively selecting replacements for chemicals characterized as Red and using Green chemicals as they are available.

http://www.mbdc.com/c2c_mbdp.htm

One major focus of achieving sustainable development (e.g., manufacturing, construction, transportation…) is to re-design the products, processes, and services that are currently used. This is an example of a system which is used to evaluate the design of products based on the chemistry of the material inputs. This approach is also sometimes referred to as “Green Chemistry”. This process ranks the impacts of materials used in a product.

Twelve Principles of Green Chemistry *

1. **Prevention**
   It is better to prevent waste than to treat or clean up waste after it has been created.
2. **Atom Economy**
   Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product.
3. **Less Hazardous Chemical Syntheses**
   Wherever practicable, synthetic methods should be designed to use and generate substances that possess little or no toxicity to human health and the environment.
4. **Designing Safer Chemicals**
   Chemical products should be designed to effect their desired function while minimizing their toxicity.
5. **Safer Solvents and Auxiliaries**
   The use of auxiliary substances (e.g., solvents, separation agents, etc.) should be made unnecessary wherever possible and innocuous when used.
6. **Design for Energy Efficiency**
   Energy requirements of chemical processes should be recognized for their environmental and economic impacts and should be minimized. If possible, synthetic methods should be conducted at ambient temperature and pressure.
7. **Use of Renewable Feedstocks**
   A raw material or feedstock should be renewable rather than depleting whenever technically and economically practicable.
8. **Reduce Derivatives**
   Unnecessary derivatization (use of blocking groups, protection/ deprotection, temporary modification of physical/chemical processes) should be minimized or avoided if possible, because such steps require additional reagents and can generate waste.
9. **Catalysis**
   Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.
10. **Design for Degradation**
    Chemical products should be designed so that at the end of their function they break down into innocuous degradation products and do not persist in the environment.
11. **Real-time analysis for Pollution Prevention**
    Analytical methodologies need to be further developed to allow for real-time, in-process monitoring and control prior to the formation of hazardous substances.
12. **Inherently Safer Chemistry for Accident Prevention**
    Substances and the form of a substance used in a chemical process should be chosen to minimize the potential for chemical accidents, including releases, explosions, and fires.

* Anastas, P. T.; Warner, J. C.; Green Chemistry: Theory and Practice. Oxford University Press: New York, 1998, p.30. By permission of Oxford University Press.

The Principles of Green Chemistry are essential to re-designing products and processes. Beginning with Pollution Prevention-

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MBDC

The Cradle to Cradle Design Protocol

The four categories are:

Green
Little or no risk. This chemical is acceptable for use in the desired application.

Yellow
Low to moderate risk. This chemical is acceptable for use in the desired application until a green alternative is found.

Orange
There is no indication that this is a high risk chemical for the desired application, but a complete assessment is not possible due to lack of information.

Red
High risk. 'Red' chemicals (also sometimes referred to as 'X-list' chemicals) should be phased out as soon as possible. 'Red' chemicals include all known or suspected carcinogens, endocrine disruptors, mutagens, reproductive toxins, and teratogens. In addition, chemicals that do not meet other human health or environmental relevance criteria are 'red' chemicals. http://www.mbdc.com/c2c_mbdp.htm

The concepts of green chemistry are being profitably implemented by many companies. Manufacturers can now utilize systems such as this one to certify their products based on the qualities of their material inputs. Products evaluated by this process are rated for - Material Health, Material Reutilization, Renewable Energy Use, Water Stewardship and Social Responsibility

SUMMARY OF CRADLE TO CRADLE® CERTIFICATION CRITERIA

	Basic	Silver	Gold	Platinum
1.0 Material Health				
All material ingredients identified (down to the 100 ppm level)	•	•	•	•
Defined as biological or technical nutrient	•	•	•	•
All materials assessed based on their intended use and impact on Human/Environmental Health according to the following criteria: *Human Health:* Carcinogenicity Endocrine Disruption Mutagenicity Reproductive Toxicity Teratogenicity Acute Toxicity Chronic Toxicity Irritation Sensitization *Environmental Health:* Fish Toxicity Algae Toxicity Daphnia Toxicity Persistence/Biodegradation Bioaccumulation Ozone Depletion/Climatic Relevance *Material Class Criteria:* Content of Organchalogens Content of Heavy Metals	•	•	•	•
Strategy developed to optimize all remaining problematic ingredients/materials	•	•		
Product formulation optimized (i.e., all problematic inputs replaced/phased out)			•	•
No wood sourced from endangered forests			•	•
Meets Cradle to Cradle emission standards			•	•
All wood is FSC certified				•
Contains at least 50% GREEN assessed components				•

This is used here just to illustrate the types of criteria that are necessary to fully evaluate the material health of product/process inputs.

2.0 Material Reutilization				
Defined the appropriate cycle (i.e., Technical or Biological) for the product and developing a plan for product recovery and reutilization	•	•	•	•
Well defined plan (including scope and budget) for developing the logistics and recovery systems for this class of product			•	•
Recovering, remanufacturing or recycling the product into new product of equal or higher value				•
Product has been designed/manufactured for the technical or biological cycle and has a nutrient (re)utilization score >= 50		•	•	•
Product has been designed/manufactured for the technical or biological cycle and has a nutrient (re)utilization score >= 65			•	•
Product has been designed/manufactured for the technical or biological cycle and has a nutrient (re)utilization score >= 80				•
3.0 Renewable Energy Use				
Characterized energy use and source(s) for product manufacture/assembly	•	•	•	•
Developed strategy for using current solar income for product manufacture/assembly		•	•	•
Using 50% current solar income for product final manufacture/assembly			•	•
Using 50% current solar income for entire product				•
4.0 Water Stewardship				
Created or adopted water stewardship principles/guidelines		•	•	•
Characterized water flows associated with product manufacture			•	•
Implemented water conservation measures				•
Implemented innovative measures to improve quality of water discharges				•
5.0 Social Responsibility				
Publicly available corporate ethics and fair labor statement(s), adopted across entire company		•	•	•
Identified third party assessment system and begun to collect data for that system			•	•
Acceptable third party social responsibility assessment, accreditation, or certification				•

The aspects of each part of the production process are also evaluated for their impacts. Each of the categories has extensive criteria and can be further researched on the Cradle to Cradle site- http://www.c2cproducts.com/detail.aspx?linkid=2&sublink=9 , as well as the references listed below-

Program References

Material Health
At the Platinum certification level, manufacturers of wood products are required to use FSC Certified wood.
Forest Stewardship Council (www.fsc.org)

Renewable Energy Use
At the Gold and Platinum certification levels, manufacturers are required to use renewable energy. If Renewable Energy Certificates (RECs) are purchased, they must be Green-e Certified.
Green-e Certification (http://www.green-e.org/)

Water Stewardship
At the Gold certification level, manufacturers are required to complete a water audit of their manufacturing process. This process is based on the Global Environmental Management Initiative resources.
Global Environmental Management Initiative (www.gemi.org/water)

Social Responsibility
At the Gold and Platinum certification levels, manufacturers are required to prepare for and obtain a third-party social responsibility or fair labor certification.The following are recommended programs:
B Corporation (www.bcorporation.net)
Social Accountability International SA8000 (http://www.sa-intl.org/)

Program Documents
- List of Chemical Evaluation Criteria
- List of Restricted Chemicals
- List of Banned chemicals
- Testing Requirements & Procedures • Description of Manufacturing Site Visit

Certification Partners
Cradle to Cradle® Certification is was founded by MBDC. MBDC is the primary company that works with clients to guide them through the certification process. However, several partners are licensed to contract with clients and take them through the certification process.

Environmental Protection & Encouragement Agency (EPEA) – Hamburg, Germany
www.epea.com, Founded by Professor Dr. Michael Braungart

EcoIntelligent Growth (EIG) -- Barcelona, Spain

www.ecointelligentgrowth.net
Zimmerman Management Solutions – Washington, New Jersey
Eugene.Zimmerman@gmail.com

About Us Consumers Manufacturers Purchasers Publications

Design for the Environment An EPA Partnership Program

Design for the Environment U.S. EPA

You are here: EPA Home » DfE » Alternatives Assessments

Alternatives Assessments

DfE's Alternatives Assessment Program helps industries choose safer chemicals for applications such as fire safety in circuit boards and furniture and non-lead solder for electronics. Alternatives analyses provide a basis for informed decision making by developing an in-depth comparison of potential human health and environmental impacts.

Alternatives Assessment Partnerships bring together environmental organizations, industry leaders, academia, and others to evaluate the environmental and health impacts of potential alternatives to problematic chemicals. The outcome of an Alternatives Assessments Partnership provides industry with the information they need to choose safer chemicals, as well as avoid unintended consequences of switching to a poorly understood substitute.

The program uses a variety of approaches to investigate safer chemistries. Life-cycle assessment can be conducted to understand the phases (e.g., production, use, and disposal) where industry can make changes to realize environmental and health benefits. DfE Hazard-based Alternatives Analyses evaluate the hazards posed by chemicals during relevant phases in the product life cycle. These approaches can be applied to identifying safer alternative chemicals for applications that now use priority chemicals of concern.

Top DfE Questions

- What does the DfE label mean?
- Where can I find a list of products with the DfE label?
- How do I apply to get the DfE label on my products?

Design for the Environment U.S. EPA

USEPA also will assist in evaluating the materials and processes of manufacturers to improve, document and certify the materials and processes associated with their products and services.

Formulators who subscribe to the CleanGredients® database can find a list of surfactants and solvents that meet the DfE's (Design for the Environment) criteria. Suppliers who subscribe can have their chemicals reviewed against the appropriate criteria and listed in the database. Nearly 400 formulators are finding safer ingredients on CleanGredients® .

DfE Criteria for Safer Chemical Ingredients

In establishing thresholds for green ingredients, the General Criteria delineates the safer or "low-concern" end of the ingredient spectrum, guiding and ensuring best-in-class ingredient choices for DfE-recognized products. With the development of the General Criteria, the core of the DfE review process and the standard to which it applies is transparent and ready for third-party implementation.

All components in DfE-recognized products will be evaluated against the General Criteria or against any component-class criteria, as available and appropriate. Component-class criteria define and more fully explore the green end of specific ingredient-class continuums. Using the General Criteria as a template, the component-class criteria tailor the health and environmental endpoints in the General Criteria in a way appropriate to the specific class, designating key, distinguishing characteristics and adjusting thresholds, as necessary. Developing the criteria improves the general understanding of the characteristics of safer ingredients in the class and helps identify green-chemistry opportunities and successes.

Each ingredient in a formulation has a role to play in making a product work. Whether it is to aid in cleaning by reducing surface tension (surfactants), dissolve or suspend materials (solvents), reduce water hardness (chelating agents), or provide a scent (fragrances), each ingredient type has a function. Within these "functional classes," many ingredients share similar toxicological and environmental fate characteristics. As a result, DfE focuses its review of formulation ingredients on the key (environmental and human health) characteristics of concern within a functional class. This approach allows formulators to use those ingredients with the lowest hazard in their functional class, while still formulating high-performing products.

Examples of Sustainability Best Practices/Improvement in Action

Interface Carpet and Herman Miller - Product and process re-design

Great Lakes Brewing and **GoJo Products**- Ohio Manufacturing and Operations Practices

City of Cleveland- Policy and Operations practices

Ohio School Facilities Board- Ohio leads the nation in LEED Schools

Entrepreneurial Opportunities- Sustainability as a model for new businesses

There are many examples of sustainability best practices and principles, both inside and outside of Ohio. The following process methods, metrics and information is provided to give practical examples of these principles in action.

Interface missionzero

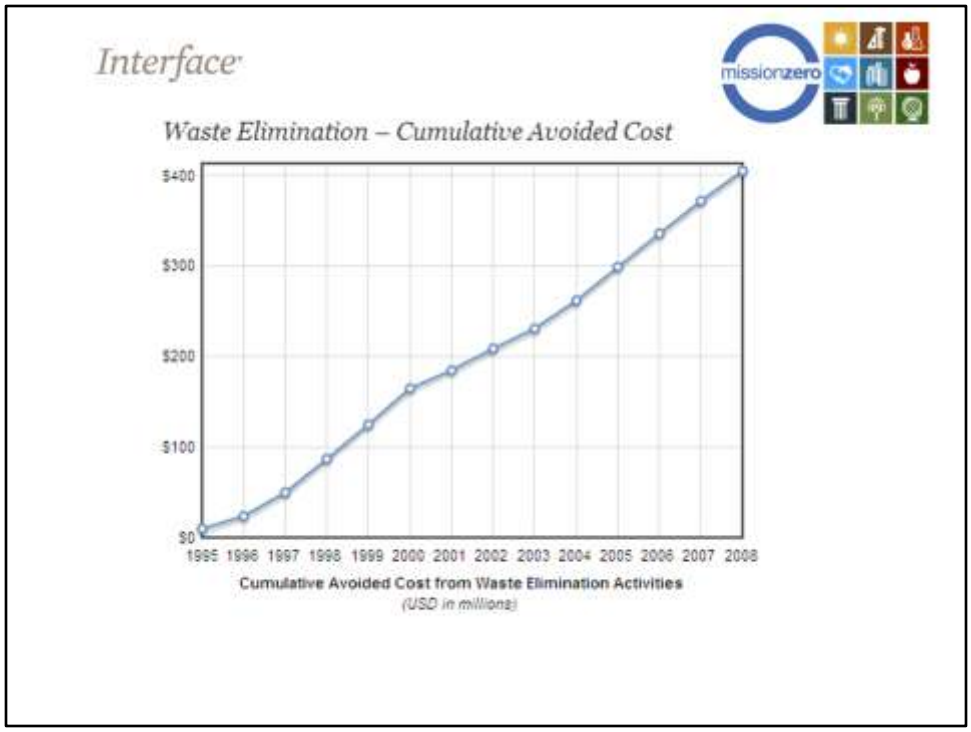
A Model, Vision and Measurements as Guides

The Interface model for sustainable business has emerged, one that guides our journey and from which other businesses can draw inspiration and design their own journeys. As we put the model to work within Interface, we set forth our vision and, imagining all it would take to realize it, developed the Seven Fronts™. We then put in place measurements, called Ecometrics™, to monitor our progress and keep us on our journey's path. Learn more about the 7 Fronts of Sustainability.

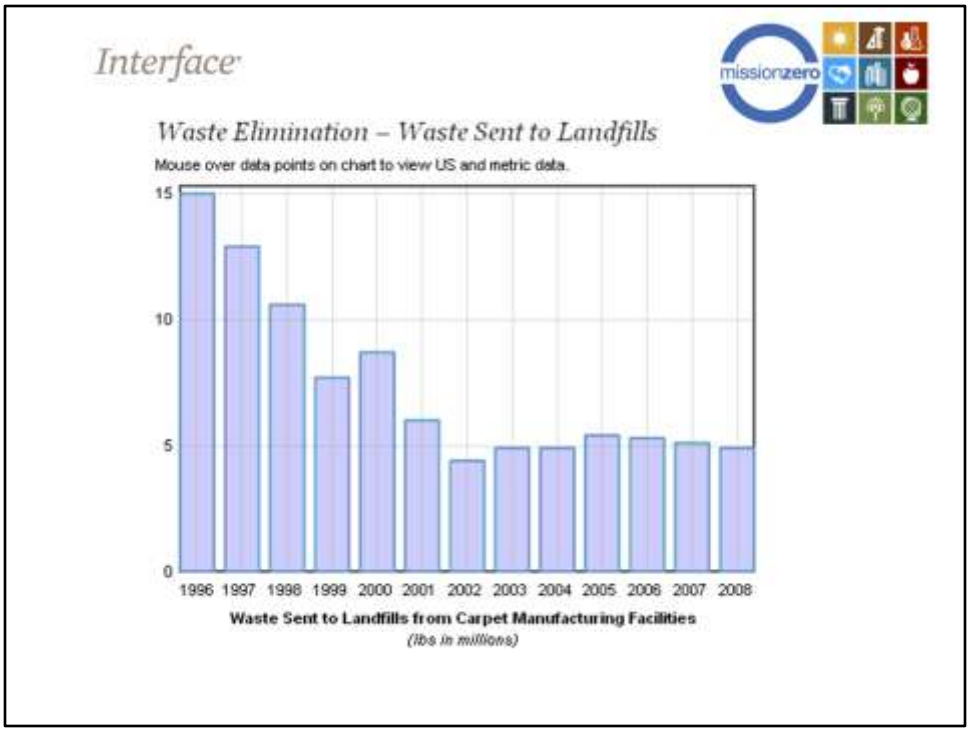
http://www.interfaceglobal.com/Sustainability.aspx

Interface Carpet and their CEO and Founder- Ray Anderson are recognized around the world as one of the true pioneers of profitable sustainable manufacturing practices. The 7 Fronts of Sustainability are on the next slide.

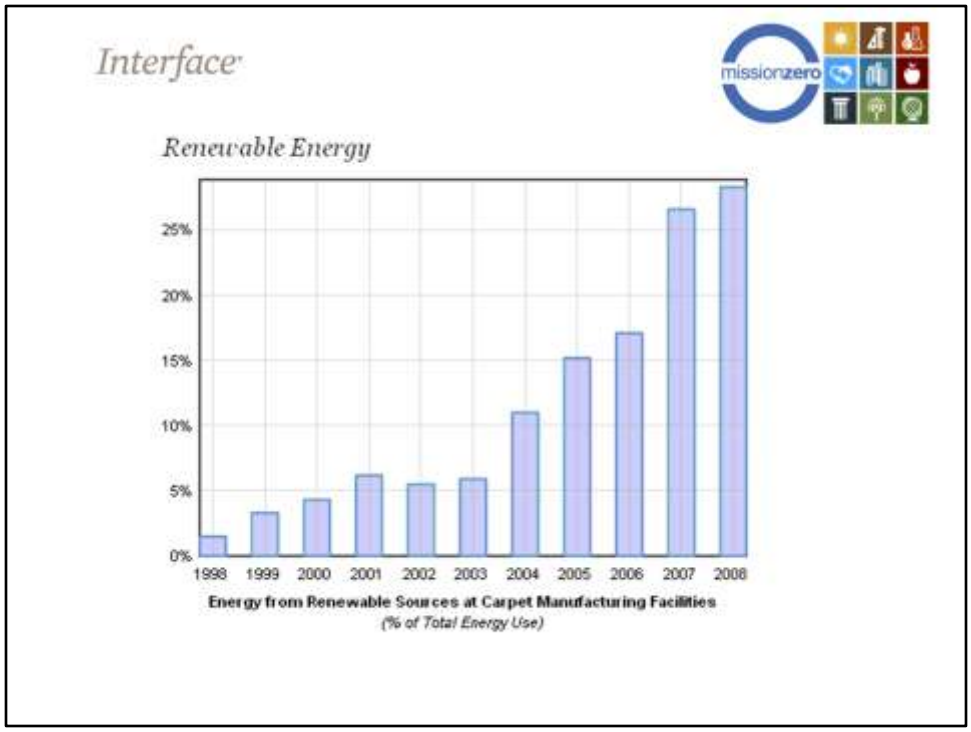
Interfaces approach to sustainability is a continual improvement model much like any quality or environmental management system. They continually measure, evaluate and manage improvement in ALL aspects of their business performance.



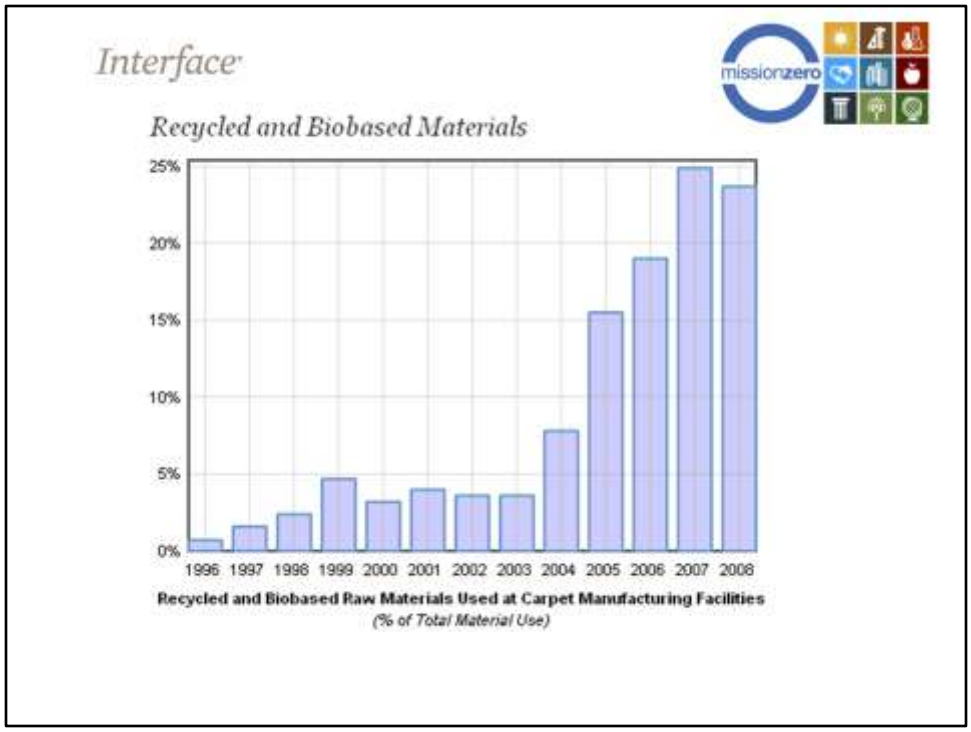
Each of the following slides emphasizes the profitability of "doing well by doing good". Sustainability is an indication of management competency and is reflected in standards such as the Dow Jones Sustainability Index.



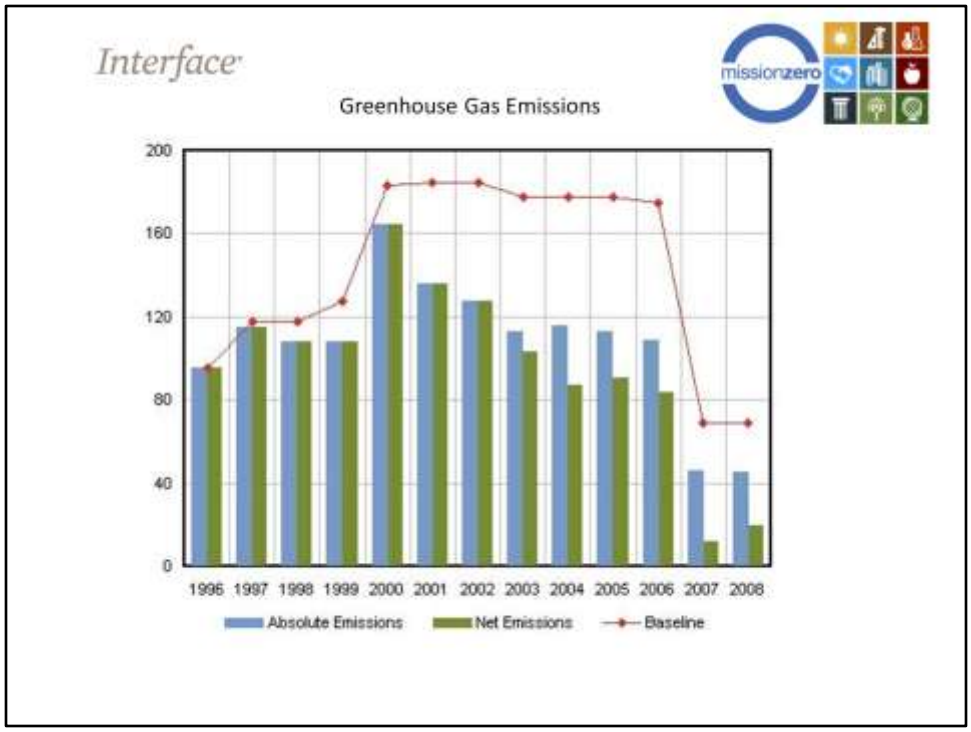
Interface continues to find ways to incorporate their waste materials back into product. They also take back “used” carpet and backing, turning them into new products.



Interface continues to utilize more renewable energy to lower their environmental footprint.



Interface also utilizes recycled and biobased materials to minimize costs as well as minimize their depletion of non-renewable materials such as petroleum.



Interface has also significantly reduced their emissions from this approach as well.

Herman Miller (HM) Sustainability Practices

A few key results of Herman Miller Design for Environment initiatives-

- **Elimination of Title V permits-** HM eliminated Hazardous Air Pollutants (HAPs) and Hazardous Waste containing glues, solvents and coatings.

- **HM pioneered the powder coating of MDF** (medium density fiberboard)

Herman Miller Sustainability Practices

The MBDC Cradle to Cradle Design Protocol adopted by Herman Miller goes beyond regulatory compliance to thoroughly evaluate new product designs in three key areas:

Material Chemistry and Safety of Inputs--What chemicals are in the materials we specify, and are they the safest available?

Disassembly--Can we take products apart at the end of their useful life to recycle their materials?

Recyclability--Do the materials contain recycled content, and more importantly, can the materials be recycled at the end of the product's useful life?

How We Do It

As an international company with multiple manufacturing plants and office sites, establishing and maintaining Herman Miller's environmental standards can be a challenging task.

That's why we created the Environmental Quality Action Team (EQAT), a cross-functional steering committee of Herman Miller employees, founded in 1989, that sets our environmental direction and priorities and measures results. The EQAT's team-based approach reflects our culture of participative management. In 1991, the EQAT created Herman Miller's first formal environmental policy statement and established zero landfill use as our first-ever environmental goal. Since then we have continually expanded our goals to make Herman Miller, Inc., a sustainable business. We now track and/or report monthly on eight strategies that monitor our progress.

Herman Miller, Inc. MBDC- Cradle to Cradle® Certified Products

Caper® Stackable Side Chair	Silver
Celle™ Chair	Silver
Mirra® Chair	Silver
My Studio Environments™	Silver
Celle™ Chair (select models)	Gold
Mirra® Chair (Select Models)	Gold
Teneo™ Storage Furniture	Silver
Meridian® Filing & Storage	Silver
Tu™ Filing and Storage	Silver
Embody™ Chair	Silver
Aeron® Seating	Silver
The Be collection™ keyboard trays	Gold
Intent™ Furniture	Silver
Sense™ Table	Silver

Herman Miller has done extensive application of green chemistry and life cycle analysis to certify a wide selection of their products

Design for the Environment:

- 99 percent recyclable and manufactured using 33 percent recycled materials
- MBDC Cradle to Cradle™ Gold certified
- GREENGUARD® certified
- level™ 2 certified

Designer: Jerome Carusc

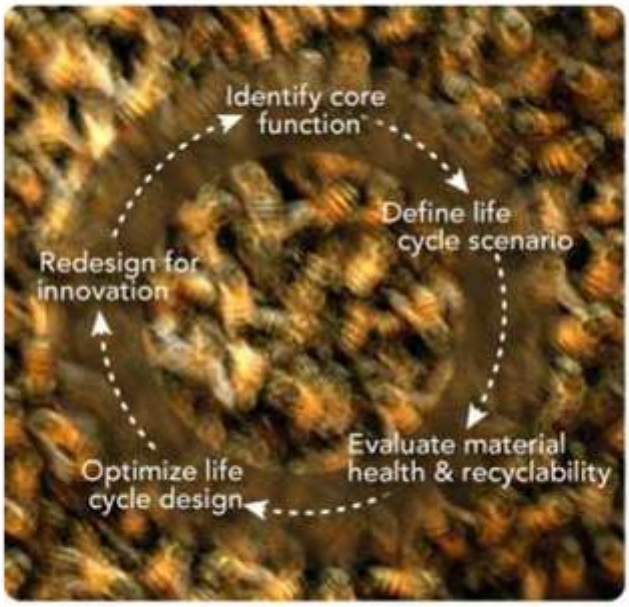
Warranty: 12-year, 3-shift

General Dimensions

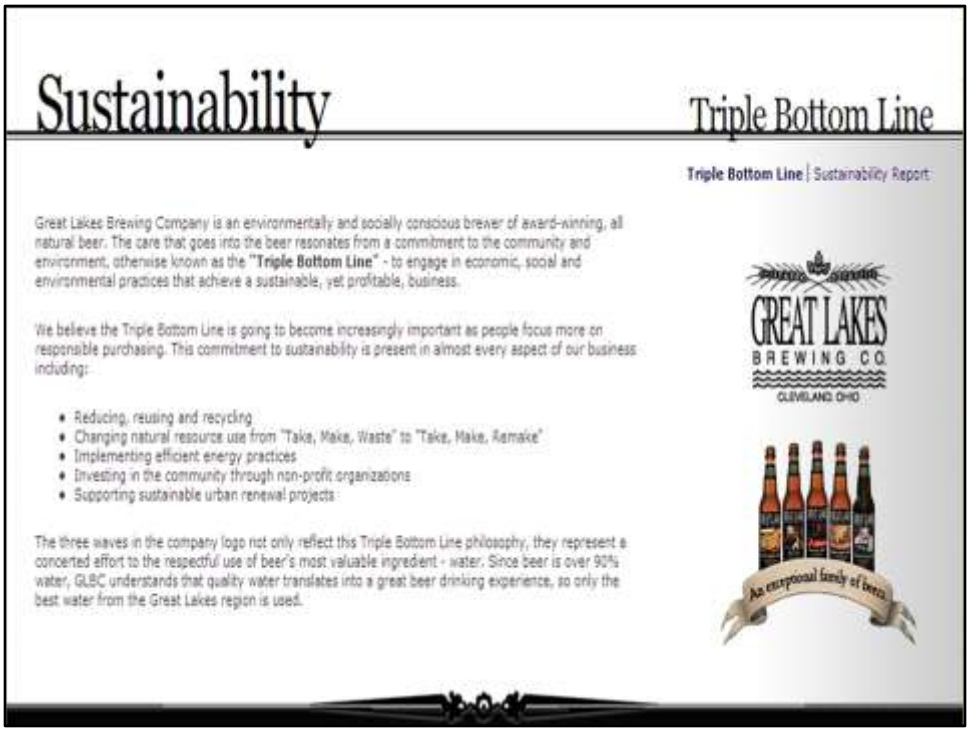
A height: 44 in.
B width: 29.5 in.
C depth: 15.5–18 in.

CELLE CHAIRS **hermanmiller.com/celle**

By utilizing sustainable design principles products can be **quantifiably** produced that directly reduce the environmental, social and economic costs/impacts. Celle fits into the company's vision of sustainable design. Celle was developed using our Design for the Environment protocol, which establishes strict standards for recyclability, safe content, easy disassembly, minimal packaging, and minimal waste. It has earned MBDC Gold Cradle-to-Cradle certification for its achievement in environmentally intelligent design.



Similar approaches to **iSUSTAIN™, —ˮR⅓⅜‰⅝ to Cradle™, Design for the Environment** or other certification processes can be undertaken by any organization that is willing to fully assess the long and short term implications of their products and services.



Sustainability

Triple Bottom Line

Triple Bottom Line | Sustainability Report

Great Lakes Brewing Company is an environmentally and socially conscious brewer of award-winning, all natural beer. The care that goes into the beer resonates from a commitment to the community and environment, otherwise known as the **"Triple Bottom Line"** - to engage in economic, social and environmental practices that achieve a sustainable, yet profitable, business.

We believe the Triple Bottom Line is going to become increasingly important as people focus more on responsible purchasing. This commitment to sustainability is present in almost every aspect of our business including:

- Reducing, reusing and recycling
- Changing natural resource use from "Take, Make, Waste" to "Take, Make, Remake"
- Implementing efficient energy practices
- Investing in the community through non-profit organizations
- Supporting sustainable urban renewal projects

The three waves in the company logo not only reflect ths Triple Bottom Line philosophy, they represent a concerted effort to the respectful use of beer's most valuable ingredient - water. Since beer is over 90% water, GLBC understands that quality water translates into a great beer drinking experience, so only the best water from the Great Lakes region is used.

Great Lakes emphasizes reducing, reusing and recycling materials. Changing natural resource use from "Take, Make, Waste" to "Take, Make, Remake.“ Implementing efficient energy practices. Investing in the community through non-profit organizations and supporting sustainable urban renewal projects .

Sustainability

Other Sustainability Projects

ALTERNATIVE FUELS (STRAIGHT VEGETABLE OIL)
To help reduce our carbon footprint (well, tire tread), our beer delivery truck and "Fatty Wagon" shuttle bus run on straight restaurant vegetable oil—a 25% cleaner ride that produces 40% less soot than diesel.

REUSE OF SPENT BREWERY GRAIN
To us, the grains used to brew our exceptional beer are indispensable—local farmers raise livestock and poultry on a diet of brewery grains; Zoss the Swiss Baker uses the grains to produce our cracked barley beer bread and pretzels; and grains (along with paper, kitchen scraps and cardboard) are fed to worms, which then produce castings (top-of-the-line organic fertilizer) used to fertilize our Pint Size Farm.

RECYCLING
We recycle everything we can (even our recycling bins, if possible): cardboard, glass, plastic, steel/aluminum, paper, hops, yeast and brewer's barley. We print all newsletters, menus, beverage napkins and promotional items on recycled paper. And all our packaging includes recycled content. Our intention is to become a true zero waste Brewery.

BEER GARDEN
We renovated the outdoor Beer Garden to include a retractable "Roman Curtain" roof and other ecofriendly components. The Roman Curtain is a durable canvas roof that encloses the Beer Garden and retracts to allow use of this indoor/outdoor dining area all year. The Beer Garden also includes a radiant heat fireplace and floor, a straw bale wall and ten foot high sliding glass doors.

ENERGY EFFICIENCY
In the winter, our Brewery cooler brings in chilly outdoor air to cool the beer (thanks, Cleveland), while skylights and light sensors maximize natural light to minimize electricity use. In additon, GLBC received a grant for a solar thermal heating system as part of a larger energy efficiency upgrade. The Brewpub features 12 solar tube collectors and two water tanks that preheat water for brewing and restaurant use.

LOW-FILL BEER
We even think highly enough of our low-fill beers (unsellable bottles because they're not filled to the maximum level) to use them in a number of items including soups, marinades, sauces, chocolate truffles, sausages and soaps. In fact, our low-fill porters are sent to Mitchell's Ice Cream to make our exclusive Edmund Fitzgerald Chocolate Chunk Ice Cream.

Great Lakes Brewing- ALTERNATIVE FUELS (STRAIGHT VEGETABLE OIL)
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What is the SI (Sustainability Implementation) Program?

A peer-based, action focused, learning process that increases the rate you can learn new technologies and processes and the probability you will successfully implement what you learn. Develop relationships with other entrepreneurial leaders who will support you during and after the SI Program ends its journey. Learn a whole-systems design strategy that will transform your organization, inspire innovation and improve the quality of life in your community

E4S SI Group participants-
follow an implementation process and project framework that focuses on opportunities in **buildings, operations, products and services, markets, company culture and community.** The program spans **eight sessions** with participants meeting monthly to explore opportunities in areas such as **waste elimination, energy efficiency, green building and sustainable procurement.** Each group consists of 3-5 leaders from 7-10 businesses.

Most importantly, SI Group participants are setting the example for other businesses in the region. Mark Schwerdtfeger, a 2008 SI group member, achieved **outstanding waste reductions and cost savings at GOJO Industries in Akron** and is now directing sustainability implementation at Heinz Frozen Foods in Massillon. According to Mark, **GOJO Industries was able to reduce its overall solid waste generation 50 percent** by utilizing innovative approaches such as arranging by-product synergy. For example, GOJO works with The Little Tikes Company, which uses GOJO mixed plastic waste to produce playground equipment. **GOJO also saved $170,000** by donating previously land filled waste soap to the Akron-Canton Regional Foodbank. The annual cost of waste soap disposal had been $300,000. Toiletries such as soap and shampoo cannot be purchased with food stamps. By collaborating with the Foodbank, the product is repackaged and provided to Ohioans in need.

http://epa.ohio.gov/portals/41/CPQ/Spring2009.pdf

Entrepreneurs for Sustainability (E4S), a nonprofit economic development organization based in Cleveland, has attracted more than 6,600 leaders from all sectors of the economy who are interested in saving money, reducing their environmental impact and ensuring prosperity for the region.
In 2005, E4S launched a new learning program for business and organizational leaders who desired an integrated strategic plan for sustainability.

Here are a few key action items for Sustainable Cleveland 2019-

Advanced Energy Generation/Research and Commercialization, Green Building , Entrepreneurship in the Urban Core, Strategic Partnerships and Learning, Sustainable Business Innovation/Incubation, Transportation ,Vacant Land Use and Green Space, Waste to Profit, Water, and World Class Sustainable Education

Entire Summary of Initiatives Generated by the Sustainable Cleveland 2019 Summit-
Nearly 700 people participated in Sustainable Cleveland 2019, a three-day summit designed to generate an action plan to transform Cleveland's economy into a sustainable economy and the city into a green city on a blue lake. On the afternoon of day two, participants at the summit were asked to vote with their feet and join one of 20 subject-specific work groups. Participants were then asked, "How might we cultivate or advance..." the specific topic. Participants answered with 28 concepts. The following summaries were produced through the transcription of notes, flip charts, work sheets and large foam boards used during the Summit. Additional research and analysis of these ideas will be conducted, leading to the creation of the strategic action plan.
The following summaries were produced through the transcription of notes, flip charts, work sheets and large foam boards used during the Summit. Additional research and analysis of these ideas will be conducted, leading to the creation of the strategic action plan.
Advanced Energy Generation:
Form the Sustainable Cleveland Wind Accelerator to create the first utility-scale freshwater wind farm in the world, bolstering support for the pilot project and positioning Cleveland as the center of a nascent but potentially booming offshore wind industry in the U.S.
Create the "Solaraid", the most sustainable transit line in North America.
Create a 400MW combined heat & power plant and an industrial water management collection and reuse system.

Create the Laboratories for Advanced Energy Commercialization (LAEC), pronounced "lake". It would be a hub where funding can be leveraged, existing and/or future relationships are developed, and where advanced energy products and services are incubated and commercialized. The lab would create a technology showcase to court buyers to the area/companies and the lab would be a leader in information dissemination.
Advanced Manufacturing and Materials:
Create a Global Center for Sustainable Design and Manufacturing that would function with a hub-and-spoke network to create industrial symbiosis between businesses, promote research and development, and match research, design, and development of universities to markets.
Communications Campaign and Branding:
Build a solid communications plan with goals, phases and budget that will provide a common language, spread awareness, spur conversations about sustainability, help to market Cleveland as the green city on a blue lake both locally and nationally and create a positive reputation of a city that has turned itself around from the city where the river burned.
Engage 1.6 Million:
Create a campaign that engages the entire region in creating a green city on a blue lake. The campaign will create common messaging and do community outreach through one-on-one interactions, social networking, the education system and community organizing. The campaign will create a messaging campaign based on "The Year of _____", like the Chinese Zodiac, but around a sustainability focus like recycling, local food, transportation, etc. "The group would create programs and specific actions with individuals, families, schools, businesses and others so that they may work together towards the transformation to a sustainable community."
;
Promote green building through stringent energy codes and benchmarks, education and awareness, incentives and retrofitting thereby creating new jobs. Proposed goals are set to retrofit 100% buildings for 50% energy reductions, 50% of buildings to be retrofitted to net zero, 25% of buildings to be retrofitted to be energy producers and for new construction to meet LEED standards or equivalent.
Health:
Transform our community from a focus on sick-care to a focus on well-care by identifying and aligning the extensive health resources in the community, encouraging widespread engagement, filling resource gaps, increasing efficiencies and improving access, particularly through technology infrastructure
;
Support the development of a sustainable regional food system with six possible local food projects: 1) GROWHIO, a non-profit organization with a mission of supporting small business development, fostering community engagement and marketing and branding; 2) Increase Community Supported Agriculture (CSA); (3) Developing community kitchen(s) and incubator; (4) Support and mobilize 10,000 new farmers in 10 years; (5) Create year-round food production with the development of greenhouses and hydro/aquaponic gardens; and (6) Strengthen the food distribution network.
Metrics of Success:
Create a scoreboard for sustainability to define sustainable goals, benchmarks, and create a baseline; develop measures and incentives to quantify the sustainable success of transportation, business growth, waste, energy and education; and report out to the community.
Post-Summit Momentum:
Develop a post-summit structure, with input from community leaders and organizations, to help implement all of the initiatives from the summit, provide regular feedback and report to the community the progress that is made from the summit. Although the "Center" would have accountability for keeping Sustainable Cleveland 2019 projects and events on schedule and within budgets, many of the projects and events will originate from indigenous community groups.
Public Compact:
Create a public compact that individuals and businesses can join. The compact, proposed as "The Cleveland Promise", will set forth the vision and direction that the city will take to create a green city on a blue lake. Individuals and organizations will sign on to these principles and also make a pledge to what individual actions they will take to make Cleveland a more sustainable city.
Social Capital:
Create a protocol to foster collaborations between government, business, education, community, and other institutions to create a more sustainable community. The protocol would consist of a curriculum that has a school-feel to it but would immerse people into projects.
Social Entrepreneurship in the Urban Core:
Develop, CLEVA, an online platform that would connect citizens interested in investing in Cleveland to opportunities to invest in socially and environmentally responsible Cleveland businesses. Citizens interested in investing in local businesses through CLEVA would view projects online and could invest in a project through making a payment directly to CLEVA. CLEVA would then transfer funds to financial partners to make loans. Eligible businesses would then be granted loans and would pay back the loans to the financial partners. The financial partners would transfer the funds back to CLEVA and CLEVA would repay citizens. Citizens would then have the option of reinvesting the funds in another CLEVA project, thus continuing the CLEVA circle.
Strategic Partnerships and Learning:
Create an international BETA site for sustainable innovation working with sister cities around the world to foster partnerships and collaborations in science, business and industry, education, medicine and healthcare, and social and cultural areas; and to bring sister cities to the 2010 sustainability summit in Cleveland.
Create a green neighborhood alliance/campus by fostering strategic partnerships between schools, community gardens, local businesses, libraries, and police forces. Students in a local school would grow produce in an on-site urban garden, sell it to a local business, and use the produce in school meals. The local library and police forces would generate support by informing the public and interacting positively with neighborhood youth.
Create the Great Lakes Sustainable Cities Ning Network to facilitate inter-city sharing of best practices, coordinate with other local social networking groups.
Sustainable Business Innovation and Incubation:
Raise $100 million through individual donations and community support to create the Regional Sustainability Fund, a self-sustaining fund that would make grants, loans and investments in new large-scale sustainable ventures.
Create the Global Sustainability Cooperative, a physical structure that will act as a hub for sustainable technology businesses, an incubator program, eco-friendly consumer product retailers, and locally grown food outlets like restaurants and gourmet food stores. It would act as a catalyst to bring emerging sustainable technologies to market as well as spark innovations through the connections and collaborations formed by the companies within the facility. The Global Sustainability Cooperative would not simply be a group of companies within a building, but an integral part of the sustainability movement in Northeast Ohio by connecting and inspiring innovations in the sustainability industry.
Create the Cleveland Sustainable Business Growth Initiative to foster sustainable economic growth by educating, connecting and inspiring businesses in Cleveland, recognizing businesses for their sustainable achievements, highlighting successes through major trade publications and helping to translate sustainable benefits from business to home.
Transportation:
Promote sustainable transportation by focusing on public transportation, rail, bicycles, and pedestrian friendly development, including advocating for the implementation of current adopted plans (Citywide Bike Plan, 2010 Active transportation Campaign, and Complete Streets Guidelines). For public transportation, the group will work to create real-time scheduling for buses and trains. For bicycles, the group will promote expediting the towpath trail and finishing the downtown bike station. For rail, the group will advocate for the 3Cs rail project, to support connecting the Amtrak station to the new convention center, and also to create light-rail in Cleveland.
Vacant Land Use and Green Space:
Use our social, technical and administrative capitals to facilitate the development of available vacant parcels into contiguous, revitalized land areas with continuity amongst air, water, and soil resources that enables neighborhood access and enhances the health, education, and welfare of Greater Cleveland's residents. This would be achieved in part by developing a long-range action plan and helping to facilitate several projects of scale in line with our mission, including the Towpath Trail, Re-Imagining Cleveland projects, and Cleveland Job Corps Center pilot project.
Waste to Profit:
Create the Wastelepedia Center: a processing transfer station that takes waste from residential, commercial and industrial sectors with the goal of zero waste by 2019. The Center would be a repository for reusable materials, divert and track at least 2019 tons of waste per year, attract and promote local artist business development through local material reuse, and support the local economy through local business development.
The Regional Zero Waste Collaborative: Designed to support the development and implementation of policies and practices that create a zero waste economy in Northeast Ohio by 2019; investigate best practices from other regions; and plan a symposium for 2010 that will outline a blueprint developing a zero waste economy in this region.
Recycling Center/Waste-to-Energy Center
Water:
Create Cleveland Water "Works" that will work towards the goals of clean water, education and lakefront development. Specific projects to help spur lakefront development by reassessing old plans and helping to develop new plans, develop best practices for water management, including stormwater management, and helping to develop the Freshwater Institute that would focus on education, research and economic development opportunities.
World Class Sustainable Education:
Create a living system for education with design principles that build on current prototypes, amplify existing networks, and empower students as agents of change, while infusing a culture of sustainability in all practice. Specific projects would focus on (1) increasing the number of graduates and (2) the development of a green campus. The green campus would include early education through university education, assets from the community such as libraries and community gardens and the buildings and campus would be built and powered using sustainable methods.

Cleveland has a full-time Office of Sustainability to implement sustainable practices into all of the City's operations.

The Office of Sustainability Team-

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Cuyahoga County has also adopted sustainable operating principles, such as-

- Climate Stabilization Declaration
- LEED New Building Standard Resolution
- Energy Conservation & Efficiency, Waste Reduction and Recycling Plan
- Cuyahoga County 2005 Greenhouse Gas Inventory
- Vehicle Idling Reduction Guidelines

Sustainability as an Entrepreneurial Business Opportunity

Reprocessing and remanufacturing programs from **Ascent Healthcare Solutions** has saved its hospital partners more than $82 million in supply chain costs during the first half of 2009. The provider of healthcare resource sustainability services **said** this represents a 25 percent increase in savings over the first six months in 2008. In other news, healthcare providers are also seeking sustainability best practices through Practice Greenhealth.

In addition to cost savings, the reprocessing and remanufacturing programs have enabled hospitals to divert more than 2.5 million pounds (1,296 tons) of waste from local landfills during the first half of 2009, according to Ascent Healthcare.

RELATED STORIES

Caterpillar Expands Remanufacturing Offerings with New Facility

Ascent Reports Significant Sustainability Savings

http://www.ascenths.com/

Sustainability has also become a business sector of it's own. Entrepreneurs have begun to fill the niche of recovering and remanufacturing materials that would have been lost to landfills.

http://rosbycompanies.com/recycledmaterials.htm

Sustainability has created new business opportunities for the processing, marketing and resale of materials that were previously buried in landfills.

Where Can I Get Formal Sustainability Training?

- Colleges and University Programs
- Certification Programs
- Short Courses, Seminars and Conferences

There are a wide variety of options for advanced learning in sustainable business practices and principles the following slides outline just a few of the the many opportunities available.

The **first college in Ohio to offer a bachelor's degree in sustainability.** Corporate Sustainability Officer is one of the highest demand occupations today. Most corporations are looking to take advantage of the profitability of implementing sustainability best practices.

Many universities nationwide now offer sustainability programs which enable working professionals to increase their knowledge of best practices and principles.

Many Universities that do not offer “major” degree programs in Sustainability or Sustainable Business, will have individual courses or short programs.

This is only an example of one of the on-line training certification opportunities for sustainable business best practices. There are numerous college/university programs and non-profit oriented training opportunities as well.

This is just an example of the types of subjects covered in a sustainable business short course.

Recommended reading and references-

Natural Capitalism- http://www.natcap.org/

The Ecology of Commerce- http://browseinside.harpercollins.com/index.aspx?isbn13=9780887307041

Cradle to Cradle- http://www.mcdonough.com/cradle_to_cradle.htm

The Natural Step- http://www.naturalstep.org/

Environmental Management Accounting- International Guidance Document
http://web.ifac.org/media/publications/d/international-guidance-docu-1/international-guidance-docu-2.pdf

Confessions of a Radical Industrialist-- Profits, People, Purpose--Doing Business by Respecting the Earth
Ray C. Anderson and Robin White -
http://us.macmillan.com/confessionsofaradicalindustrialisthttp://us.macmillan.com/confessionsofaradicalindustrialist

We hope you have found this training useful and informative the above materials are provided if you wish to pursue further reading and research opportunities.

Questions???

Office of Compliance Assistance & Pollution Prevention

http://www.epa.state.oh.us/ocapp/ocapp.html

614-644-3469

ron.smith@epa.state.oh.us

If have questions or would like assistance with sustainability implementation and/or pollution prevention opportunities please contact:
Office of Compliance Assistance & Pollution Prevention (OCAPP)
http://www.epa.state.oh.us/ocapp/about.html
OCAPP is a non-regulatory office and is available to assist any Ohio company with more information on minimizing wastes.
The key references for this presentation are included in the previous recommended reading and reference slide. Additionally, most slides include the specific URL from which the slide information was derived.