“Greening the Corporation”

Will O’Brien
December 2009
"What we take for granted may not be here for our children." - Al Gore
Objectives

To increase understanding of

- sustainability > environmental footprint
- the impact of business on the environment
- leadership challenges > environmental sustainability
- strategies to balance environmental sustainability and economic viability
- sustainability as a driver of innovation
- sustainability practices related to operations management
- examples of corporate leadership
- National government and industry trends
- additional information
- opportunity to change our world
Definition: Sustainable Development

Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future. Far from requiring the cessation of economic growth, it recognizes that the problems of poverty and underdevelopment cannot be solved unless we have a new era of growth in which the developing countries play a large role and reap large benefits.

*Our Common Future*, 1987
The Brundtland Commission
(UN World Commission on Environment & Development)
Environmental Footprint

An *environmental footprint* is a measure of the amount of resources consumed and the amount of pollution; e.g., greenhouse gas and waste created by an entity and by the firms that serve the entity, usually summarized by the equivalent area of land needed to assimilate these impacts.


Examples:


Xerox’ Sustainability Calculator [http://www.betanews.com/article/How_big_is_your_environmental_footprint_asks_Xerox/1206561464](http://www.betanews.com/article/How_big_is_your_environmental_footprint_asks_Xerox/1206561464)

Weyerhaeuser [http://www.betanews.com/article/How_big_is_your_environmental_footprint_asks_Xerox/1206561464](http://www.betanews.com/article/How_big_is_your_environmental_footprint_asks_Xerox/1206561464)
Business Has Traditionally Assumed an Infinite Capacity Planet

- Business principles based on assumption of infinite natural resources and waste absorption capacity
- “The concept of multiple industries collaborating on a ‘whole systems’ approach, recycling each other’s outputs into inputs is completely antithetical to the cult of the individual and the pioneer myth that so deeply characterizes American corporate culture.”*  
- US antitrust legislation has not allowed “collaboration”

*Oliver Kellhammer, MBA Student, Bainbridge Graduate Institute
Industrial Pollution
What is in a Landfill?

- 22 billion disposal diapers in landfill/year
- 100 million cell phone put out of service/year
- 2 million tons of e-products disposed/year
- 63 million computers in the U.S. became obsolete in 2005
- Circuit boards - lead & cadmium
- Flat screen & switches - mercury
80% of Toxic Wastes are from Electronics Products

- The electrical and electronic waste (WEEE) law, in 2005, EU authorities introduce legislation for free take back of waste goods by final owners and ensure that equipment producers are responsible for financing the collection, treatment, recovery and disposal of all waste.
  - 30% of Fortune 500 companies’ business are in Europe
- Silicon Valley Toxics Coalition
- Oregon Natural Step
- Zero-waste Coalition
- Green IT
Industrial Ecology

Industrial ecology focuses on the redesign of manufacturing. The design idea is to mirror production in nature. Nothing in a production process is "waste" and everything that comes out of the process is either a product for sale or an input for another manufacturing process. Another term for this is cradle-to-cradle manufacturing.
Old Model of Production

$ Resource Feedstock
$ Labor
$ Energy

Process

$ Product for sale
$ Government Regulated Waste Product
$ Health impact on workers, decrease in performance, or eventual liability
$ Waste cost externalized to society or natural capital

Entropy

Time
Some of the systemic problems

- Dealing with regulated waste is a direct cost to the business.
- Un-regulated waste is an indirect cost to your employees, your customers, and you.
- At best, waste is an inefficiency, a missed opportunity.
- On a planet, resources are finite if not replenished via cycles.
- An effect of waste and the effect of toxins there-in, is to systemically drive up the cost of feedstock, labor, and energy over time.
- The resulting scarcity, or perception of scarcity, increases conflict.
Industrial Ecology Production Model

$ Feedstock → Process → $ Consumer Product for sale

$ Labor → $ Waste

$ Energy → $ Waste

Another Process, or your own feedstock

Time
Systemic Benefits

- Does not externalize costs to society, your employees, you or your family
- Increased efficiency
- Decreased, or eliminated costs of dealing with regulation
- Decreased site acquisition problem due to “NIMBY’s”
- Preserves resources and can reduce conflict
- Increases innovation in yours and other’s businesses
- May give rise to new product lines or services
- Reduces costs
- Increases revenues
There are a number of steps in approaching Industrial Ecology projects. The best source of information I have found is:

*Industrial Ecology*

By

And the excellent book from 2002, by William McDonough & Michael Braungart.

*Cradle to Cradle: Remaking the Way We Make Things.*
But Business Can Provide Leadership
Leadership Challenges

• Enrolling/aligning stakeholders
• Managing an environmentally responsible enterprise:
  – Business strategy
  – Investment decisions
  – Change management of staff
  – Energy management
  – Innovation
  – Product design/ life-cycle management
  – Supply chain management
  – Waste management
  – Reporting: internally and externally
  – Marketing
Why is Business Part of the Solution?

• Business is focused on learning and change.
  – Change can and does happen relatively quickly

• Business is a global institution.
  – The challenges are fundamentally global in nature

• Business is the source of technological innovation.
  – Technology is the proximate cause of environmental impact

Dr. John Ehrenfeld, Director Emeritus, MIT Technology, Business and Environment Program
Sustainable Development for Business

• Sustainable development for business means

  “adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future” (International Institute for Sustainable Development 1994: 4).

• Sustainable business has interdependent economic, environmental, and social objectives (Triple Bottom Line)

• Long-term viability depends on integrating all three objectives in decision-making
Broad Strategic Objectives

**Society:**
- Increase employment
- Produce sustainable products
- Ensure clean environment

**Employees:**
- Continued employment
- Good working conditions
- Personal development

**Suppliers:**
- Continue business
- Develop supplier capability
- Provide transparent information

**Customers:**
- Appropriate product/service
- Consistent quality
- Fast delivery
- Dependable delivery
- Flexibility
- Acceptable price

**Stakeholders:**
- Economic value from investment
- Ethical value from investment

Center for Industrial Production
Aalborg University
Sustainability Drives Innovation
Sustainability Drives Innovation

Stages:

#1 Viewing compliance as an opportunity
#2 Making value chains sustainable
#3 Designing sustainable products and services
#4 Creating “next-practice “platforms

“Why Sustainability is Now a Key Driver of Innovation”, Harvard Business Review, 2009
Sustainable Entrepreneurship

Businesses that are “Green”

– Solar, Wind, Hydro, Geo-Thermal Power
– Recycling/Reprocessing
– Eco-Friendly Products
– Organic Agriculture
– “Green” Non-Profits
  • e.g., Sustainable Methods Institute
Examples of Sustainability Driving Innovation
Audi e-Tron

• Electric – 4 motors; 1 battery
• 313 horsepower
• All wheel drive
• 0 to 62 in 4.8 seconds
• Estimated range = 154 miles
Nokia “Green Phone”

Feb. 12, 2008, Mobile World Congress, Barcelona

“Called ‘remade’, the new phone, unveiled in a short video, is actually made of no new parts. Made entirely of recyclable materials like cans and tires, it clearly targets planet-conscious customers.”

Product Design

• Design for disassembly and remanufacturing
  – Modular product design
  – Snap fit, push fit instead of glue, screws

• Material choice
  – Non-toxic
  – Common material
Apple “Green Computer”

The casing is 100% recyclable. It features Apple's first mercury-free, arsenic-free display. The circuit boards are PVC and BFR free. The box will also include about half the packaging of the current Macbook line.
Steelcase's 'Think' chair

99% recyclable. It's made without benzene, lead, mercury or solvents. The $900 chair can be disassembled with basic hand tools in about 5 minutes.
Jan. 23, 2007 Tesco, the largest supermarket chain in Britain, has announced that it will begin labeling all 70,000 products on its shelves with the amount of carbon generated from the production, transport and consumption of those items.

http://www.terrapass.com/blog/posts/british-superma
Operations Management
Operations Management

• Business & Operations Strategy
• End-of-Life Product Management
• Quality & Environmental Management
• Energy Efficiency
• Environmental Management System (ISO 14001)
• Facilities Management
• Project Management
• Information Technology ("Green IT")
• Leadership in Energy & Environmental Design (LEED)
• Lean Manufacturing (JIT)
• Supply Chain Management
Timeline of Competitive Priorities

Cost
Quality
Delivery
Flexibility/Customization
Service
Sustainability

1950s 1990s 2000s
Operations Strategy

- Company will only do what makes economic sense
  - Given its concern for environment, company still to consider competition and bottom line

- Early-mover advantage
  - Look for better solution

- Service-based business model
  - chemical management services (Nortel)
  - floor-covering service (Interface)
  - leasing (Xerox)
  - printing service (HP)

fractal pattern, modular design
Quality Management

Projects per environmental concerns

<table>
<thead>
<tr>
<th>Environmental concerns</th>
<th>Percentage of projects</th>
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<tbody>
<tr>
<td>Resource depletion</td>
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<td>Global warming</td>
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<td>Human toxicity</td>
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<td>Others</td>
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</table>
End-of-life Product Management

1. Inspection
   - 60,000 sq ft Warehouse & Processing Center
2. Staging
3. Separation Technology
   - Silica/Pb
   - Polymers
   - fiberglass
   - Non Ferrous
     - Cu/Pb/Precious Metals
     - Aluminum
   - Ferrous
4. Pb/Silica Approx 90%/10%
5. Silica/Pb Approx 90%/10%

Separation Technology
Environmental Management System
ISO 14000- 14001

http://www.innovating-canada.com/iso14000.htm
http://www.youtube.com/watch?v=uCjK3lQhPDC
Facilities Management

http://www.fmlink.com/ProfResources/Sustainability/Articles/
Green Information Technology

“Going green — or the ability to be green — is definitely increasing in importance, not just from a power perspective but also from how we, as good corporate citizens, dispose of all this equipment and our electronic waste. We are all waking up to the realization that nothing, from electricity to the quality of the environment, is free or infinite.”

John Humphreys, IDC Enterprise Platform Group
Lean Manufacturing

Look at the “waste” and impact in the overall system

- Production process
- Inventory
- Material choice (recycled vs. virgin)
- Energy usage of the product
- Product impact on the local community

“Waste” is defined as anything more than absolutely necessary so any environmental residual is bad.
Facilities Design/Energy Utilization

Cooper and Omron takes the LEED™ in "green" design/build
LEED

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universally understood and accepted tools and performance criteria.

http://www.usgbc.org/
Project Management Institute (PMI) Code of Ethics & Professional Conduct:

“We make decisions and take actions based on the best interests of society, public safety, and the environment.”

“Respect is our duty to show a high regard for ourselves, others, and the resources entrusted to us. Resources entrusted to us may include people, money, reputation, the safety of others, and natural or environmental resources.”

www.pmi.org
Supply Chain

• Integrated international networks of companies process, produce and distribute products.
Benefits of Sustainable Operations

The application of sustainable operations can result in significant business benefits including:

- Greater operational efficiencies
- Cost reduction
- Quality image
- Opportunities for new and growing markets
- Conservation of the environment
- Positive publicity
- Respect from the local community
- Staff loyalty
Environmental Leadership Examples
Transforming Sustainability into Customer Value

- **Environmental Product Declarations**, **Life Cycle Assessments**
- **Social responsibility**

**ABB’s organizational structure**
- **Local**
- **Regional**
- **Global**
- **Customer centric**

- **“Baseline management”**: Implementation of ISO 14001
- **Environmental management**
- **Social policy dialogue**
- **Products**: Environmental Product Declarations, Life Cycle Assessments

- **1990**: ABB’s first Environmental Report
- **1994**: ABB’s first Sustainability Report
- **2000**: ABB’s first triple bottom line Sustainability Report
- **2002**: ABB’s first triple bottom line Sustainability Report
Examples of “Profitable Sustainability”
Wal-Mart

To be supplied 100% by renewable energy
- Existing stores 20% more efficient in 7 years
- New stores 30% more efficient in 4 years
- Fleet 25% more efficient in 3 years, double in 10 years

To create zero waste
- 25% reduction in solid waste in 3 years
- All private brand packaging improved in 2 years (right sized, reusable materials)

To sell products that sustain our resources & environment
- 20% supply base aligned in 3 years
- Preference given to aligned suppliers in 2 years
- Design and support Green Company in China
# Corporate Leadership Examples

<table>
<thead>
<tr>
<th>Company</th>
<th>Reporting Initiatives</th>
<th>GHG Reduction Programs</th>
<th>Climate Programs</th>
<th>Renewable Energy</th>
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[www.thecro.com/content/cro-responsible-ceo-year-award-nominees-2009](http://www.thecro.com/content/cro-responsible-ceo-year-award-nominees-2009)
Government & Industry Trends:

- Government:
  - China
  - European Union

- Information for Investors

- Sustainability Reporting
China & Environmental Challenges
Targets in China’s National Climate Change Programme

- Reduce 20% of energy consumption per unit GDP on the base of 2005
- Raise the share of renewable energy up to 10% of primary energy consumption
- Utilize coal bed methane up to 10 billion m³
- NOx emission from industrial sector keep at 2005 level
- Increase forest coverage up to 20% of ground
  - increase carbon sink by 50 million tons compared with 2005
- Estimated carbon dioxide mitigation will amount to 900-1400 million tons in 2010
Europe: Climate Change & Energy Efficiency

Regarding the GHG related link mentioned yesterday, here is the link to Europa.eu where very interesting information on member country GHG strategy tied to targets set through Kyoto is posted.

- Progress Report on GHG:
  http://ec.europa.eu/environment/climat/gge_progress.htm

- Country Specific Profile, Plan and Projections:
  http://ec.europa.eu/environment/climat/gge_country.htm
Energy Efficiency - UK

![Energy Efficiency Rating Chart]

Very energy efficient - lower running costs
(92-100) A
(81-91) B
(69-80) C
(55-68) D
(39-54) E
(21-38) F
(1-20) G
Not energy efficient - higher running costs

UK 2005

Directive 2002/91/EC
Energy Efficiency in UK
Carbon Disclosure Project

The Carbon Disclosure Project is an independent not-for-profit organization holding the largest database of primary corporate climate change information in the world.

Thousands of organizations from across the world's major economies measure and disclose their greenhouse gas emissions and climate change strategies through CDP. We put this information at the heart of financial and policy decision-making.


www.cdproject.net/en-US/Pages/HomePage.aspx
Carbon Disclosure Project

Carbon Disclosure Project (CDP) results and reports

Find out how organizations and public sector bodies around the world are responding to climate change by taking a look at the individual corporate responses to CDP or by reading our reports. Our reports provide detailed analysis of the information supplied each year to CDP and indicate important trends and developments.

Read our reports
Global Reporting Initiative (GRI)

The Global Reporting Initiative (GRI) has pioneered the development of the world’s most widely used sustainability reporting framework and is committed to its continuous improvement and application worldwide. This framework sets out the principles and indicators that organizations can use to measure and report their economic, environmental, and social performance.

www.globalreporting.org/

2007 Global Reporting Initiative (GRI) Matrix
Dow Jones Sustainability Indexes (DJSI)

Launched in 1999, the Dow Jones Sustainability Indexes are the first global indexes tracking the financial performance of the leading sustainability-driven companies worldwide.

Corporate Sustainability is a business approach that creates long-term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments. Corporate sustainability leaders achieve long-term shareholder value by gearing their strategies and management to harness the market's potential for sustainability products and services while at the same time successfully reducing and avoiding sustainability costs and risks.

http://www.sustainability-index.com/
Opportunities to Learn & Additional Information
Genzyme Corporate HQ
Genzyme Center Tour

Genzyme Center > LEED Platinum Building

500 Kendall Street, Cambridge, MA 02142

Genzyme Center Tours Information: 617-768-9303

Email: genzymecentertours@genzyme.com

http://www.genzyme.com/corp/media/presskits_genzctr_leed.asp
Information Sources

Bentley Student Projects:

www.bentley.edu/sustainability/sustainability-news.cfm

Books:

- Anderson (1998), *Mid-Course Correction*
- Brown, Christopher Stephen. (2005). *Sustainable Enterprise*
- Cunningham, William P. (2007), *Environmental Science*
- Doppelt, Bob (2003) *Leading Change Toward Sustainability*
- Elkington (1997), *Cannibals with forks* (The “Triple Bottom Line”)
- Epstein, Marc (2008), *Making Sustainability Work*
- Esty, Daniel C and Winston, Andrew S. (2006), *Green to Gold*
- Galea, Chris (August 2004). *Teaching Business Sustainability*
- Hawken, Paul (1999) *Natural Capitalism*
- Holiday et al, (2002), *Walking the Talk*
- McDonough/Braungart (2002), *Cradle to Cradle*
- Meadows, Donella H. (1992), *Beyond the Limits*
- Willard, Bob (2002), *The Sustainability Advantage*
Strategic Sustainability Consulting

http://www.sustainabilityconsulting.com/
“World View”

Think globally > Act Locally > Impact globally

Understand challenges > Do what you can in: > Have a global impact
- your life
- your home
- your company
- your community

Chinese coal mine fires > I am powerless to > Do nothing
make any difference

My world view….one person can make a real difference.
LOVE THE EARTH

Anna Linde
Oct. 17, 2009