

# **Lean and Green: Building the Lean Sustainable Company for Competitive Advantage**

By  
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# Sustainability in the News

- Wal-Mart
- GE
- Al Gore, Tony Blair and Climate Change
- Katrina
- Water Shortages
- Socially Responsible Investing
- Bono
- Bill & Melinda Gates
- Nobel Peace Prize



# Top Reasons For Increased Focus on Sustainability by Companies

(Source: 2007 Conference Board study of 18 major corporations. )

1. Reputation, brand
2. Stakeholder pressure (esp. customers)
3. Reduce waste (and costs), increase productivity
4. Employee morale, motivation and recruitment
5. Peer pressure (competitors, high-visibility companies)
6. Marketing opportunities
7. Publicity on climate change



The background is a solid dark blue color. Overlaid on this are numerous thin, diagonal lines in a slightly lighter shade of blue. These lines originate from the top right corner and fan out towards the bottom left, creating a sense of motion or depth. The lines vary in thickness and spacing, adding a dynamic texture to the background.

# What is Sustainability?

# Digging Deeper into the Definition of Sustainability

- Intuitive definition

# Digging Deeper into the Definition of Sustainability

- Intuitive definition



- General definition



# General Definition of Sustainable Development- UN Brundtland Commission (1987)

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

# General Definition of Sustainability-

## Triple Bottom Line

(Elkington 1997)

Meeting the bottom line of not just economic (financial) performance, but social and environmental performance as well.



# General Definition of Sustainability-

## Dow Jones Sustainability Index

“A business approach to creating shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments.”

# General Definition of Sustainability- 2R's (Blackburn 2007)

- Respect: respect for people and other living things
- Resources: the wise use of economic and natural resources

---for the purpose of promoting the long-term well-being of the organization and society.

# 2Rs Aspects of Lean

## ■ Respect

- Seeking input from customers about what they value
- Transparency of performance to aid improvement
- Involvement of employees, supply chain
- Enlisting operators in Total Productive Maintenance (TPM) (design, selection, correction, and maintenance of equipment)
- Addition of safety to the 5S steps (sort, set in order, shine, standardize, and sustain)

## ■ Resources

- Reducing wastes from the value stream, establishing a continuous flow process that “pulls” from upstream steps

# Lean “Wastes”

## Common

Complexity

Labor

Overproduction

Over processing

Space

Defects

Time/waiting

Movement

Inventory

## EHS- related

Materials (use & waste)

Energy (use & waste)

Unsafe acts

# Digging Deeper into the Definition of Sustainability

- Intuitive definition



- General definition



- Expected organizational behaviors

# **A Corporate Commitment to Sustainability**

## **(A Sample Sustainability Policy)**

It is within the best interests of our company and society as a whole that our company move along the path to sustainability. To that end, we will strive to achieve the following vision of performance:



### **1. Economic success: the wise use of financial resources**

#### **a. Company Economic Prosperity**

Our business is positioned to survive and prosper economically.

#### **b. Community Economic Prosperity**

We are helping our community survive and prosper economically.

## 2. Social responsibility: respect for people

### a. Respect for Employees

We treat our employees in a respectful, fair, non-exploitative way, especially with regard to compensation and benefits; promotion; training; open, constructive dialogue with management; involvement in decision-making; working conditions that are safe, healthy and non-coercive; rights of association, collective bargaining and privacy; employment-termination practices; and work-life balance.

### b. Diversity, Fair Hiring Practices

We promote diversity and use hiring practices that are fair, responsible, non-discriminatory, and non-exploitative for our employees, board members, and suppliers.



### c. Responsible Governance

We manage our risks properly, use our economic power responsibly and operate our business in a way that is ethical and legal.

### d. Respect for Stakeholders

We are transparent, respectful and fair to local populations, investors, suppliers and other stakeholders outside our organization who may be affected by our operations. We work collaboratively with our communities to enhance the well-being of others.

### e. Fair Dealing With Customers

We are honest and fair with our customers, competing fairly for their business, respecting their privacy, and providing them safe and effective products and services under the conditions we promise.

### 3. Environmental responsibility: respect for life; the wise management and use of natural resources



#### a. Resource Conservation

We conserve our use of natural resources to the extent practicable.

#### b. Waste Prevention and Management

We reduce to the extent practicable the volume and degree of hazard of the wastes we generate from our operations, and handle them in a safe, legal and responsible way to minimize their environmental effects.

#### c. Environmental Risk Control and Restoration

We minimize the risk of spills and other potentially harmful environmental incidents, restore the environment where damaged by us, and enhance it to better support biodiversity.

#### d. Supply Chain Impacts

We work with others in our supply chain to help assure environmental impacts and risks associated with our products and services are reduced and properly controlled.

#### e. Collaboration With Communities

We collaborate with our communities to protect and improve the environment.



# Digging Deeper into the Definition of Sustainability

- Intuitive definition



- General definition



- Expected organizational behaviors



- Common sustainability topics

# Examples of Economic Topics

Sales	Debt and interest	Community donations
Profits	Wages	Taxes
Dividends	Market share	Tax subsidies
Cash flow	Retained earnings	Local purchasing
R&D investment	Liabilities	Credit rating
Capital expenditures	Brand strength	Return on investment

# Examples of Social Topics

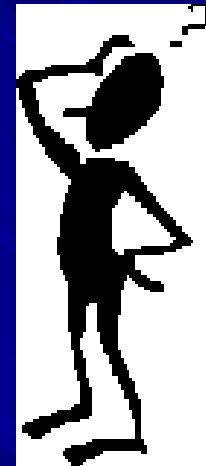
Ethics	Workplace safety	Employee shared values
Product usefulness	Corporate governance	Employee work-life balance
Product quality	Employee relations	Human rights (security policies, etc.)
Product safety	Product labeling	Fair advertising and labeling
Union relations	Board diversity	Impacts on local cultures
Producer responsibility	Supplier diversity	Employee diversity
Consumer privacy	Employee privacy	Employee training and development
Emergency preparedness	Non-discrimination policies	Employee wellness programs
Child labor	Community outreach	Employee assistance programs
Forced labor	Employment	Employee turnover
Disciplinary practices	Transparent public reporting	Employee layoff policies
Flexible work options	Dependent care benefits	Anti-sexual harassment policies
Charitable donations	Bribery and corruption	Political contributions
Antitrust practices	Securities regulation	Helping the disadvantaged
Occupational health	Industrial hygiene	Food product nutrition
Bioterrorism	Worker violence	Support for community services
Indoor air pollution	Indigenous rights	Access to healthcare by the poor
Legal compliance concerning the above topics		

# Examples of Environmental Topics

Waste disposal	Air pollution	Water pollution
Chemical spills	Greenhouse gases	Ozone-depleting substances
Water conservation	Energy conservation	Natural resource usage
Pollution prevention	Recycling	Biodiversity
Packaging reduction	Soil contamination	Product take-back
Natural habitat restoration	Wetlands protection	Wildlife conservation
Animal rights	Product energy use	Customer disposal of products
Precautionary Principle	Spill prevention	Renewable energy and materials
Endangered species	Soil erosion/depletion	Environmentally sensitive design
Compliance with environmental laws and permits		

# Sustainability vs Other Terms

- Sustainable Development
- Sustainable Growth
- Social Responsibility/ CSR
- Corporate (Global) Citizenship
- Corporate Responsibility



# Some Observations About Business and Sustainability



- Sustainability is not about one thing.
- The business case for sustainability is really the business case for a process that looks at sustainability trends and issues and prioritizes among the opportunities and threats to an organization to select those for action that contribute the most value.

# Common Business Threats & Opportunities

Threats	Opportunities
<ul style="list-style-type: none"><li>-Legal</li><li>-Financial</li><li>-Reputational</li><li>-Competitive</li><li>-Operational</li></ul>	<ul style="list-style-type: none"><li>-Productivity, cost</li><li>-Employee relations</li><li>-Reputation</li><li>-License to operate, community appeal</li><li>-Sales, new markets, customer appeal</li><li>-Innovation, new products and services</li></ul>

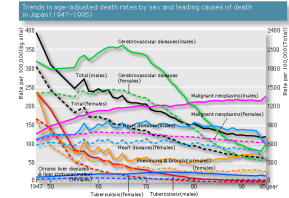
## Figure 6.5

### Sample SWOT Analysis for Sustainability Issues

Issue	Threat	Opportunity	Strength	Weakness	Possible Objectives
<p>Depletion of Fresh Water Resources</p> 	<p>1. Water shortage could jeopardize operations</p> <p>2. Some competitors have long-term water rights</p>	<p>1. Water conservation projects can save money, help secure supply</p> <p>2. More on-site water treatment and reuse are possible</p> <p>3. May be able to secure long-term water rights in some locations</p>	<p>1. Some water conservation projects underway</p> <p>2. Internal engineering expertise</p>	<p>No long-term water rights secured in some growth regions; some communities serving our factories have poor water supply infrastructure</p>	<p>Investigate water risks on site-by-site basis and develop actions to address them; consider more aggressive water treatment, reuse and conservation programs using internal engineers; explore possibility of securing long-term water supplies in high risk areas while respecting community needs</p>

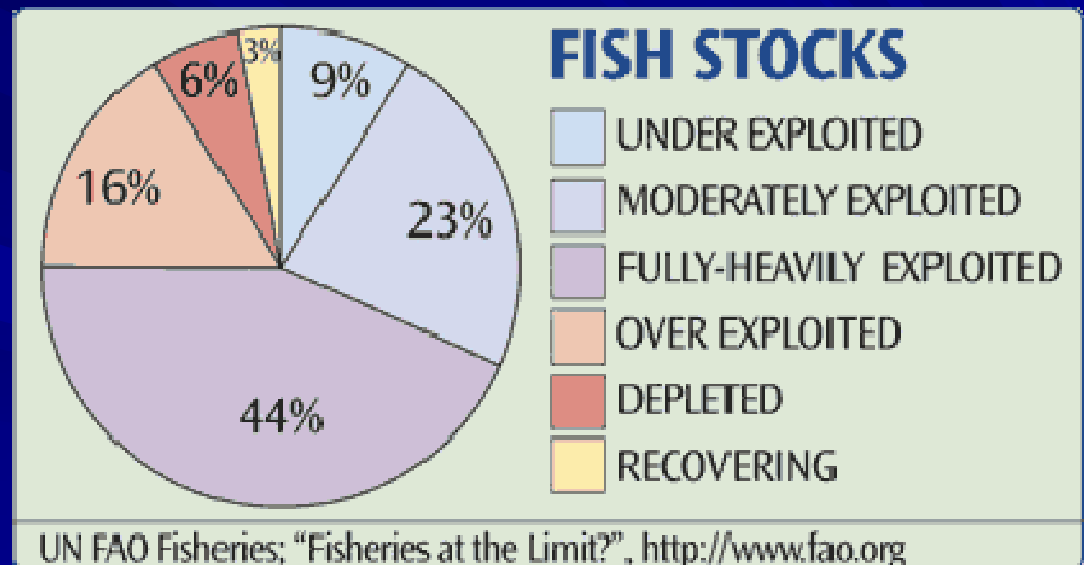
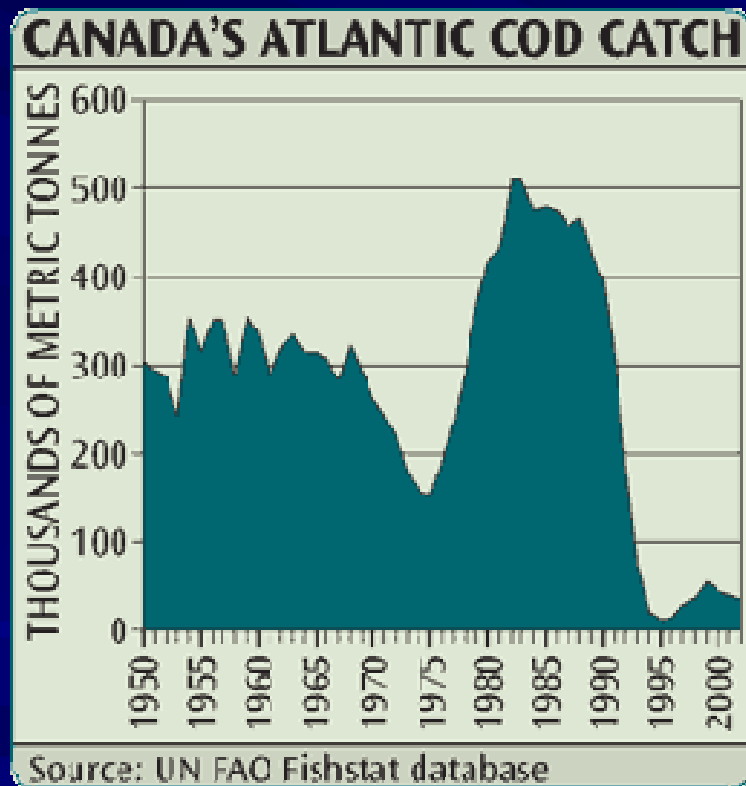


# Sustainability Trends



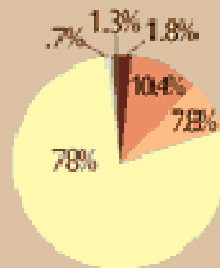
- Growth in Global Business Competition
- Opposition to Globalization
- Speed of Communications/ Digital Divide
- Widening Prosperity Gap (Health, Income, Services)
- Population Growth
- Increased Immigration; Lower Fertility in Industrialized Nations
- Education Needs for the Disenfranchised
- Urbanization
- Over-consumption of Resources
- Fossil Fuel Depletion
- Climate Change
- Deforestation
- Threats to Biodiversity
- Fresh Water Depletion/Water Contamination
- Wetlands Destruction
- Fish Depletion
- Coral Reef Destruction
- Spread of Hazardous Pollutants
- Declining Soil Quality
- Ozone Depletion
- Declining Corporate Credibility
- Extended Producer Responsibility
- Green Products
- Green Marketing/Labeling
- Green Product Certification
- Obesity
- Rise in Socially Responsible Investing
- Investor Concerns about Corporate Governance
- Increased Demands for Transparency/ Public Reporting
- Growing Power of NGOs/CSOs
- Increasing Global Terrorism

# Natural Fish Stocks: “The Last Great Buffalo Hunt”

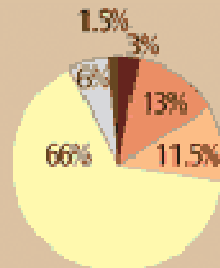


# 30% of Amphibians, 40% of Primates, All Elephants Endangered

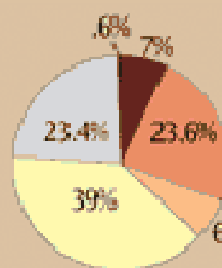
## SPECIES AT RISK OF EXTINCTION



AVES  
(BIRDS)

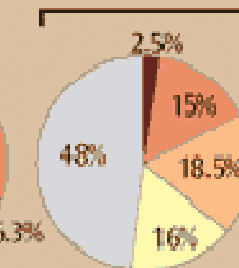


RODENTIA  
(RODENTS)

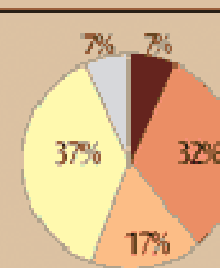


AMPHIBIA  
(AMPHIBIANS)

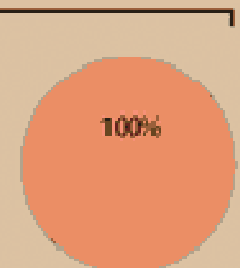
## HIGHLY EVOLVED MAMMALS - SOME WITH BRAIN SIZES CLOSE TO OR GREATER THAN HUMANS



CETACEA  
(WHALES, DOLPHINS,  
PORPOISES)



PRIMATES  
(LEMURS,  
MONKEYS, APES)



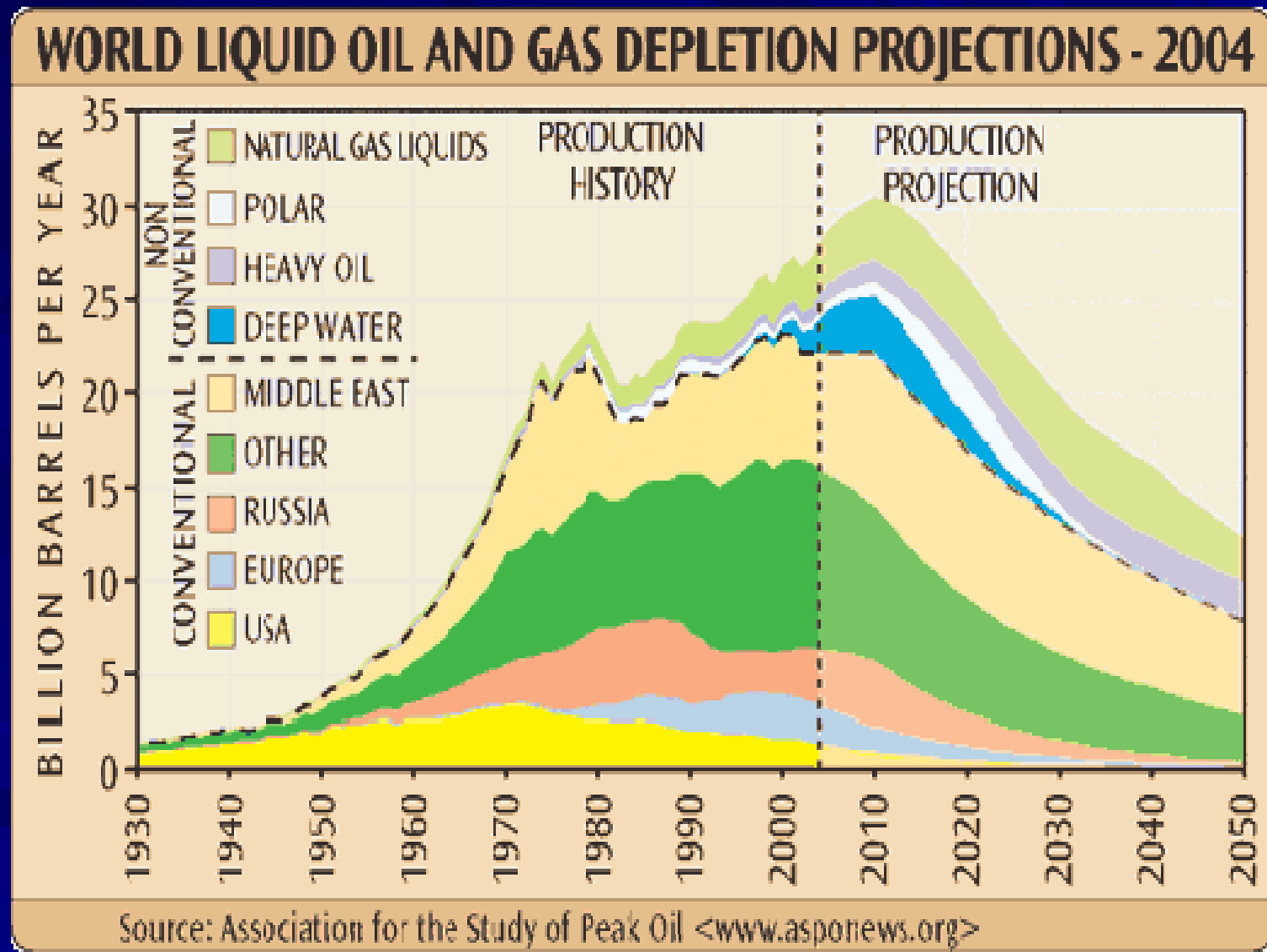
PROBOSCIDEA  
(ELEPHANTS)

APPROX. NO. KNOWN SPECIES	9,917	2,041	5,743	81	296	2
PER CENT EVALUATED	100%	100%	100%	100%	85%	100%
TOTAL NO. SPECIES AT RISK *	1,986	549	2,129	29	164	2

\* Includes IUCN Red List categories: critically endangered, endangered, vulnerable, lower risk/conservation dependent, and near threatened. Does not include low risk category. IUCN does not assess subspecies, which are more prone to extinction because they have smaller ranges and populations than full species.

Sources: IUCN Red List of Threatened Species; Summary Statistics, [www.redlist.org/info/tables.html](http://www.redlist.org/info/tables.html); Center for Biological Diversity, "A House on Fire", [www.anima.org](http://www.anima.org)

# Nearing Peak in World Oil Production



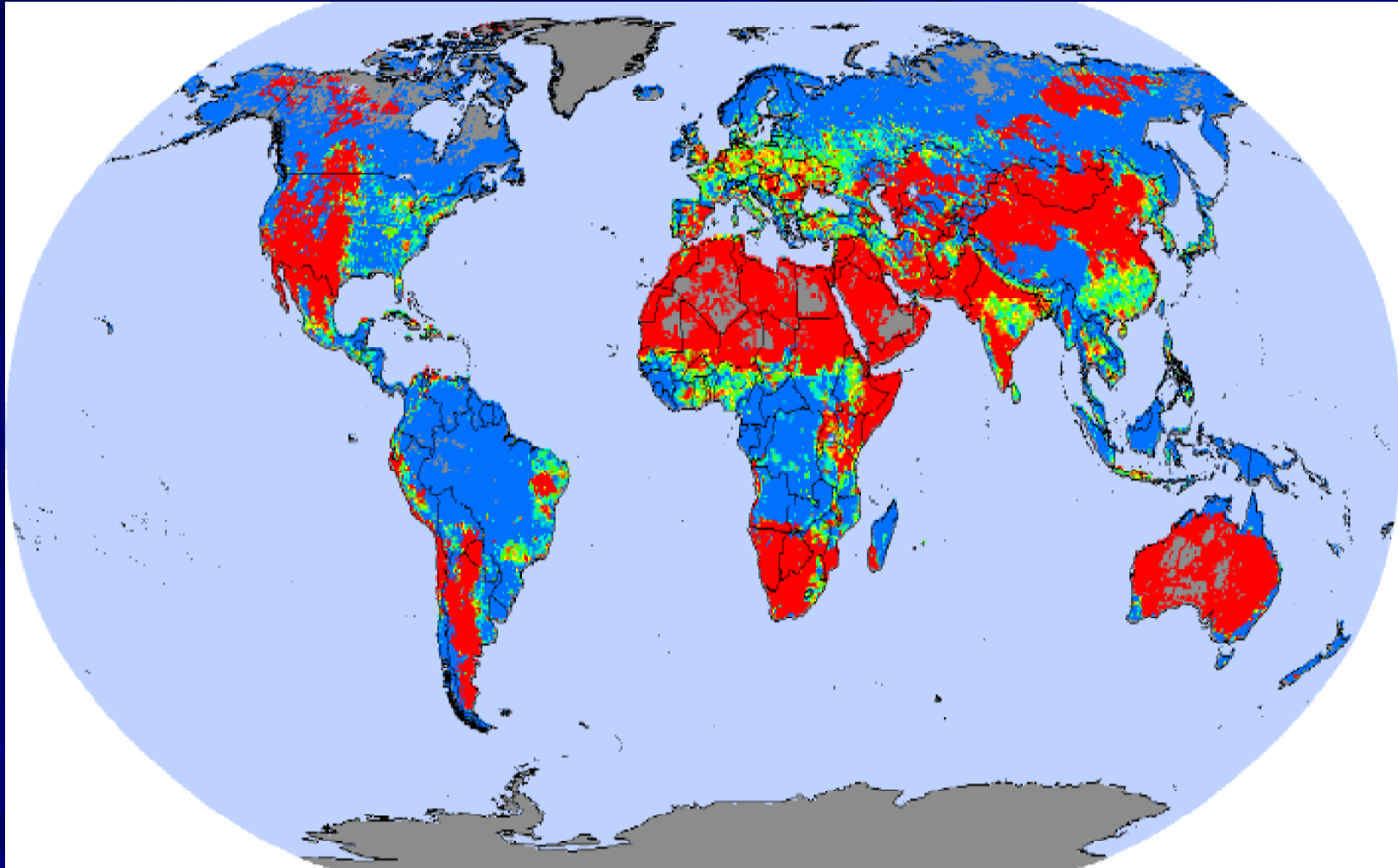
# Climate Change Visible



**SHRINKING CAP:** satellite views of the Arctic icecap, in 1970 (left) and 2003



# 40% of the World Will Live in Water-Scarce Regions by 2025



<0.5

Extreme  
Scarcity

0.5-1.0

Scarcity

1.0-1.7

Stress

1.7-4.0

Adequate

1000 m³/person/year

4.0-10

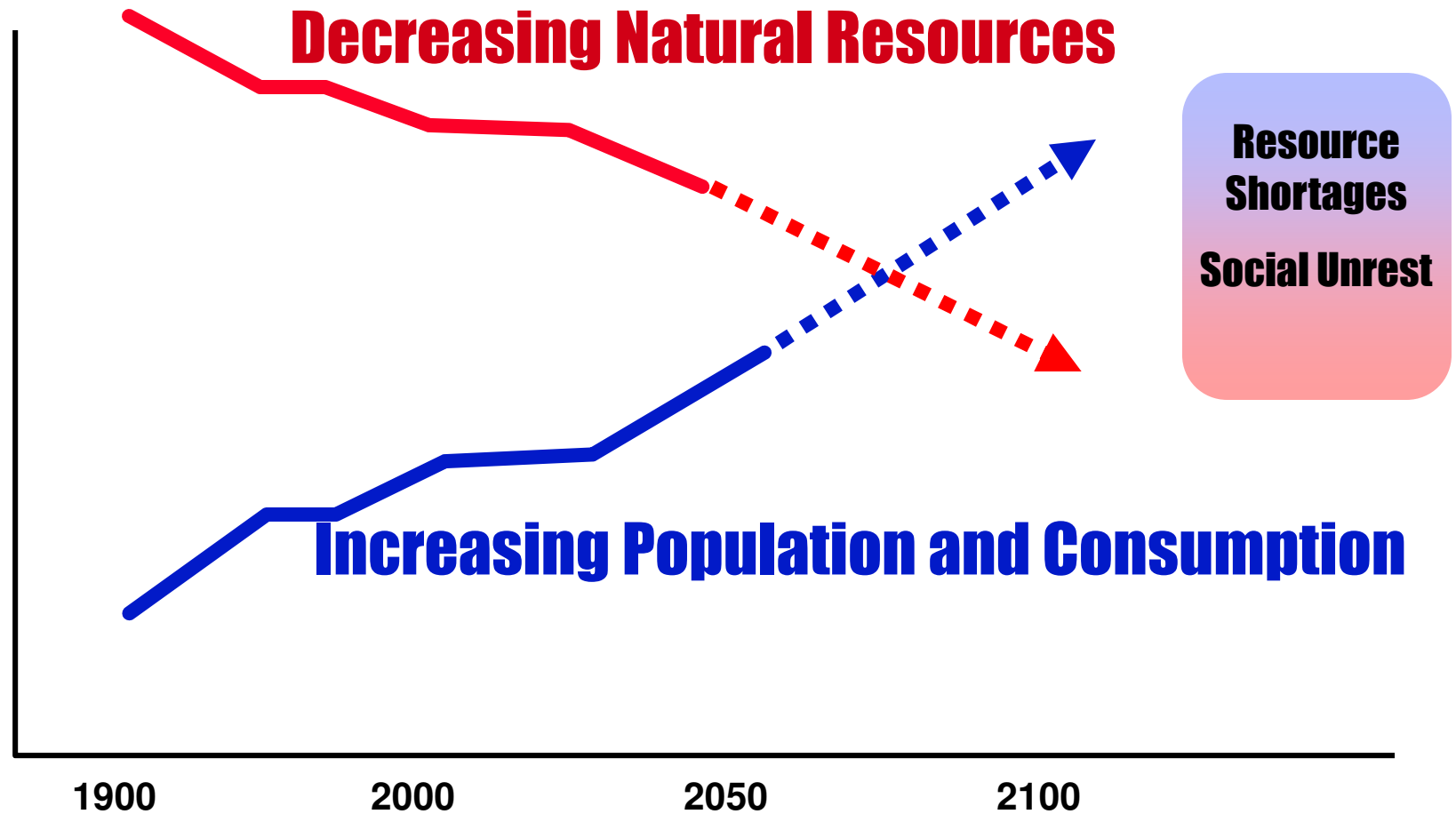
Abundant

>10

Surplus

Ocean/  
Inland Water

No Data



***The "Big Squeeze"***

# Factors Contributing to the Big Squeeze

## Use:

1. Resource consumption per person
2. Number of consumers

## Destruction:

3. Rate of waste of resources (inefficiency)
4. Rate of destruction of resources
5. Rate of contamination of resources

## Supply:

6. Rate of production/replenishment of resources
7. Rate of reuse/recycling of resources
8. Rate of introducing resource substitutes



# Using Lean to Address the Big Squeeze on Resources (and Environmental Impacts)

- Cross train Lean and EHS experts
- Involve EHS experts in Lean processes; include EHS, energy and resource flow data, metrics and objectives
  - Kaizen events for rapid process improvement
  - Production Preparation Process (3P) product and process design (reduce waste, complexity, equipment size, etc.)
  - Value stream mapping
  - Six Sigma
  - 5S (+Safety)

# Using Lean to Address the Big Squeeze on Resources (and Environmental Impacts)

- Incorporate EHS and other sustainability factors in Lean checklists
- Add traditional pollution prevention tools to Lean (e.g., process mapping and resource accounting)
- Track improvements in energy and resource usage and waste (and employee safety) achieved from Lean process

# Lean and Energy Conservation:

## Lean Can Help Identify Oversized Equipment (per EPA Energy Star Program)

- Building fans typically oversized by 60%
- Most chillers oversized 50-200%
- 50-85% potential energy savings from using right-sized energy-efficient motors with variable speed drives

# Companies Reporting Environmental Benefit from Lean

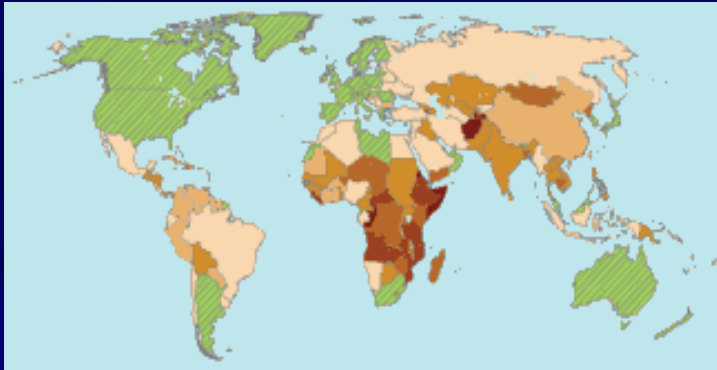
- Boeing
- General Motors
- Baxter
- Apollo Hardwoods Co.
- Canyon Creek Cabinet Co.
- Goodrich Aerostructures

See [www.epa.gov/lean](http://www.epa.gov/lean)

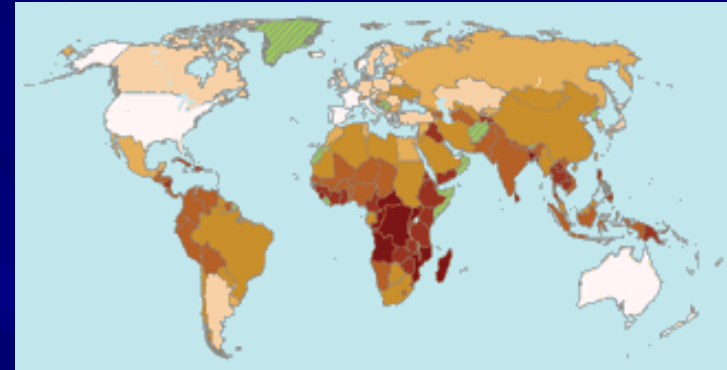
# Using Lean to Address Social Issues

# Global Malnutrition

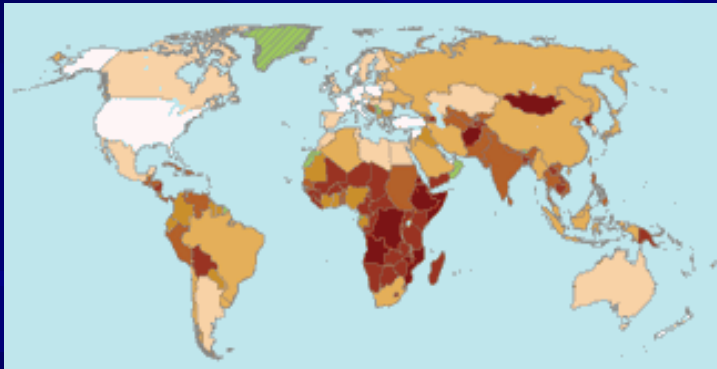
Percentage of population that is undernourished



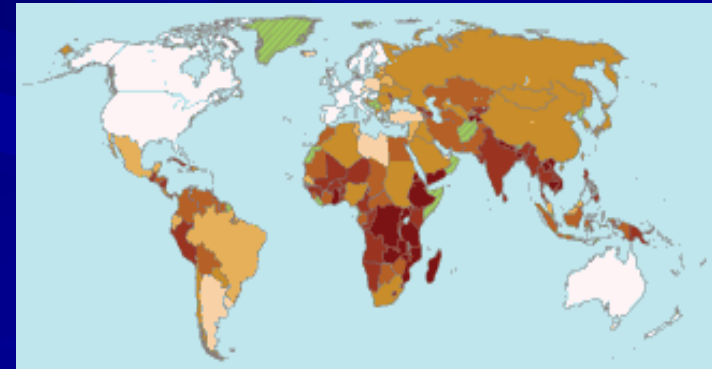
Daily grams of protein per person



Daily calories per person

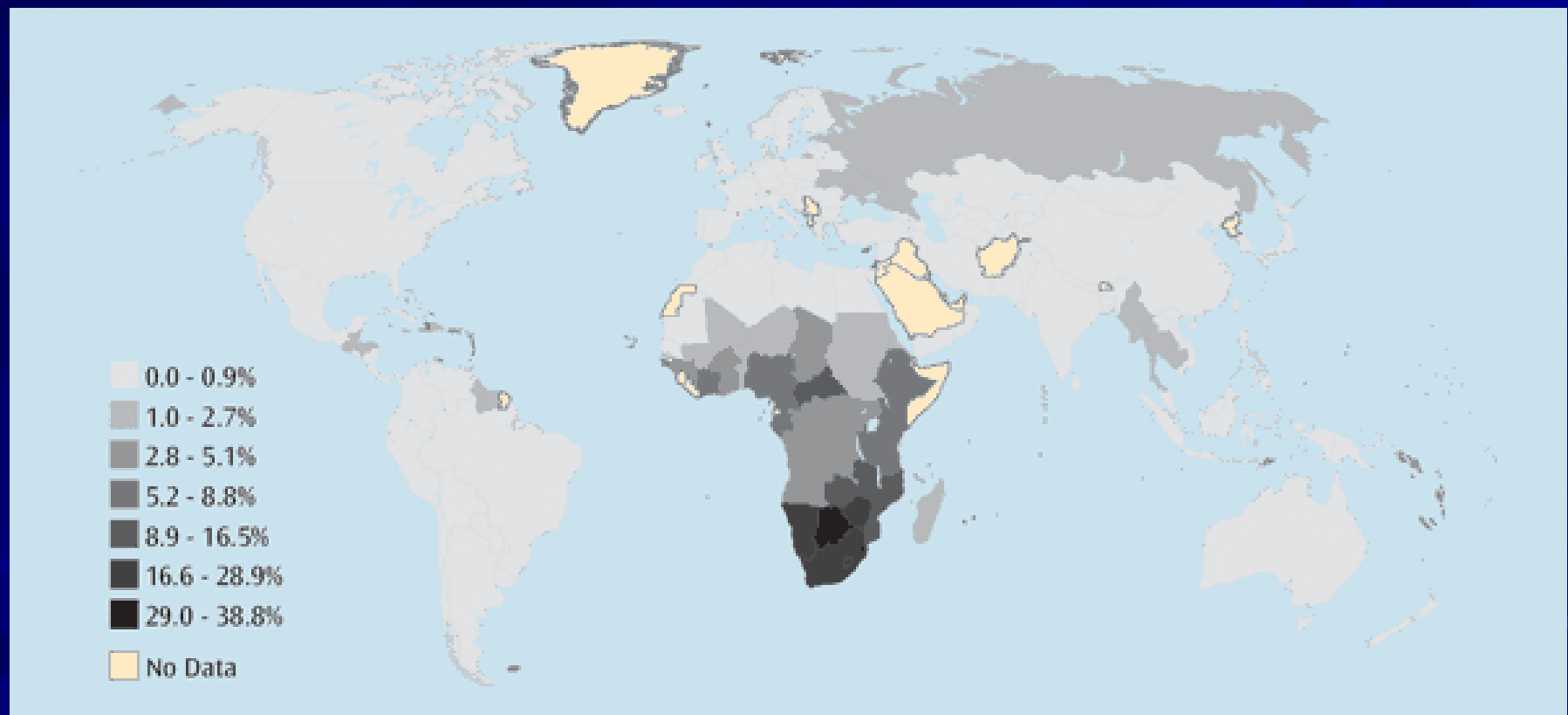


Daily grams of fat per person



% OF POPULATION UNDERNOURISHED	---	3-9%	10-18%	19-29%	30-41%	42-53%	54-75%	NO DATA
DAILY CALORIES PER PERSON	3395-3699	3091-3394	2786-3090	2481-2785	2176-2480	1872-2175	1566-1871	NO DATA
DAILY GRAMS OF PROTEIN PER PERSON	104-115	91-103	80-90	69-79	57-68	47-56	28-46	NO DATA
DAILY GRAMS OF FAT PER PERSON	122-164	99-121	84-98	69-83	51-68	37-50	11-36	NO DATA

# Percent of Population Aged 15-49 Living with HIV



# Applying Lean to Social Issues

1. Understand stakeholder needs, expectations (e.g. desired level of workplace diversity; health-care outcomes)
2. Objective: achieve desired results with the least amount of resources
3. Map the process (Value Stream Map)



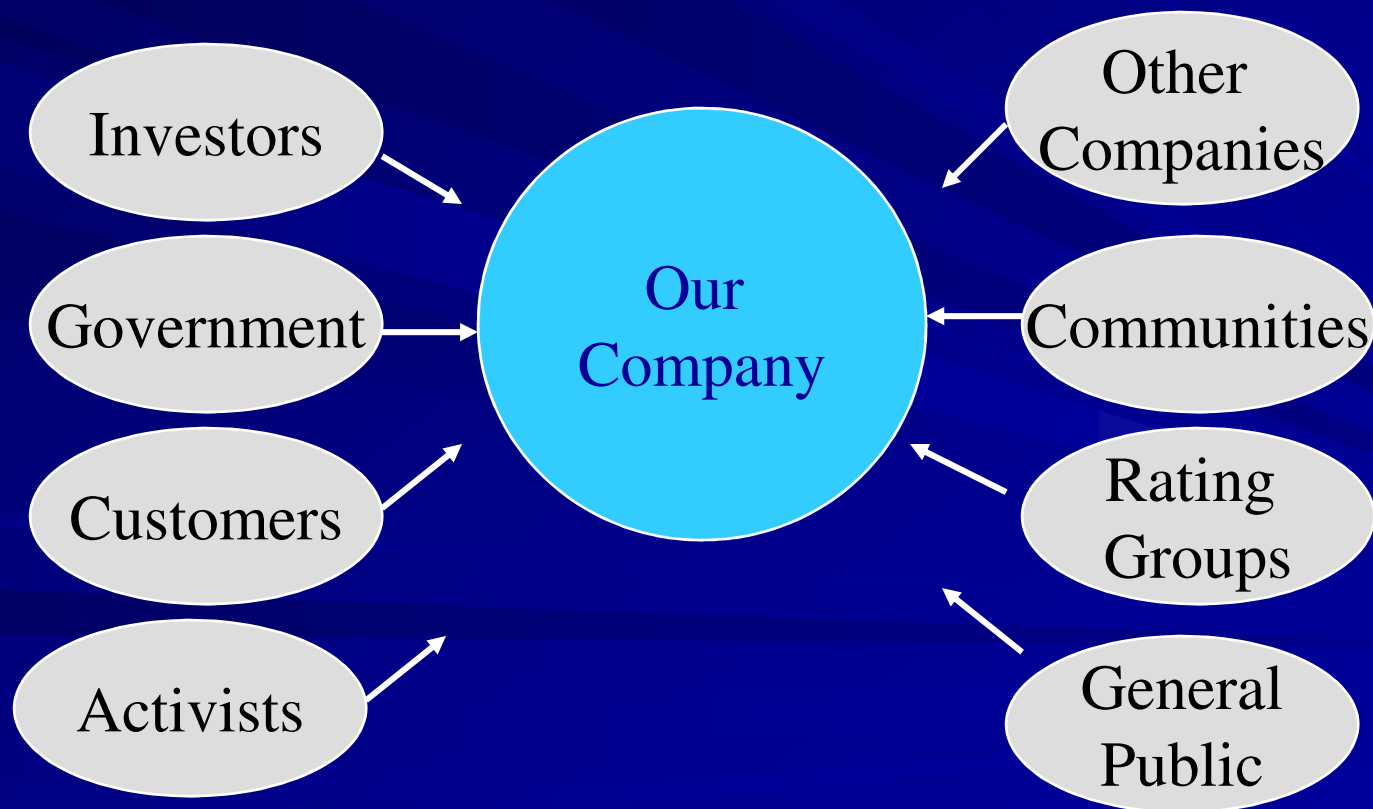
# Applying Lean to Social Issues

4. Establish metrics to identify degree of effectiveness of activities
5. Increase effective activities, avoid ineffective activities (wasteful)
6. Assure systems operate continuously to deliver expected level of performance to stakeholders
7. Apply across supply chain

# Two Benefits for Business in Proactively Seeking Sustainability

1. Securing the trust and loyalty of key stakeholders
2. Long-term financial viability

# Business Needs the Loyalty of Key Stakeholders to Be Successful



# Home Depot Supplier Social & Environmental Responsibility Program

- Access to audit
- Age requirements
- Forced labor
- Wages and working conditions
- Discrimination
- Emergency planning
- Environment, health and safety
- Freedom of expression and association
- Fraud prevention



# Wal-Mart Packaging Initiatives

- Environmental Sustainability Packaging Summit
  - 45 major packaging suppliers
  - 2,000 attendees
- Sustainable Packaging Value Network
  - 200 global packaging leaders from government, academia, NGOs, and industry
- 5% Packaging Reduction Goal
  - 60,000 suppliers
  - \$11 billion savings (\$3.5 billion to Wal-Mart)



# Wal-Mart's Sustainable Packaging Scorecard Criteria

- ✓ Greenhouse gas emissions during production
- ✓ Transportation
- ✓ Ratio of product to package
- ✓ Recycled content
- ✓ Recovery value of the package material
- ✓ Amount of renewable energy used during packaging production
- ✓ Cube utilization, or the efficient use of space in pallets and shipping containers
- ✓ Innovation
- ✓ OSHA injury rates



# Lean and Sustainability in the Supply Chain

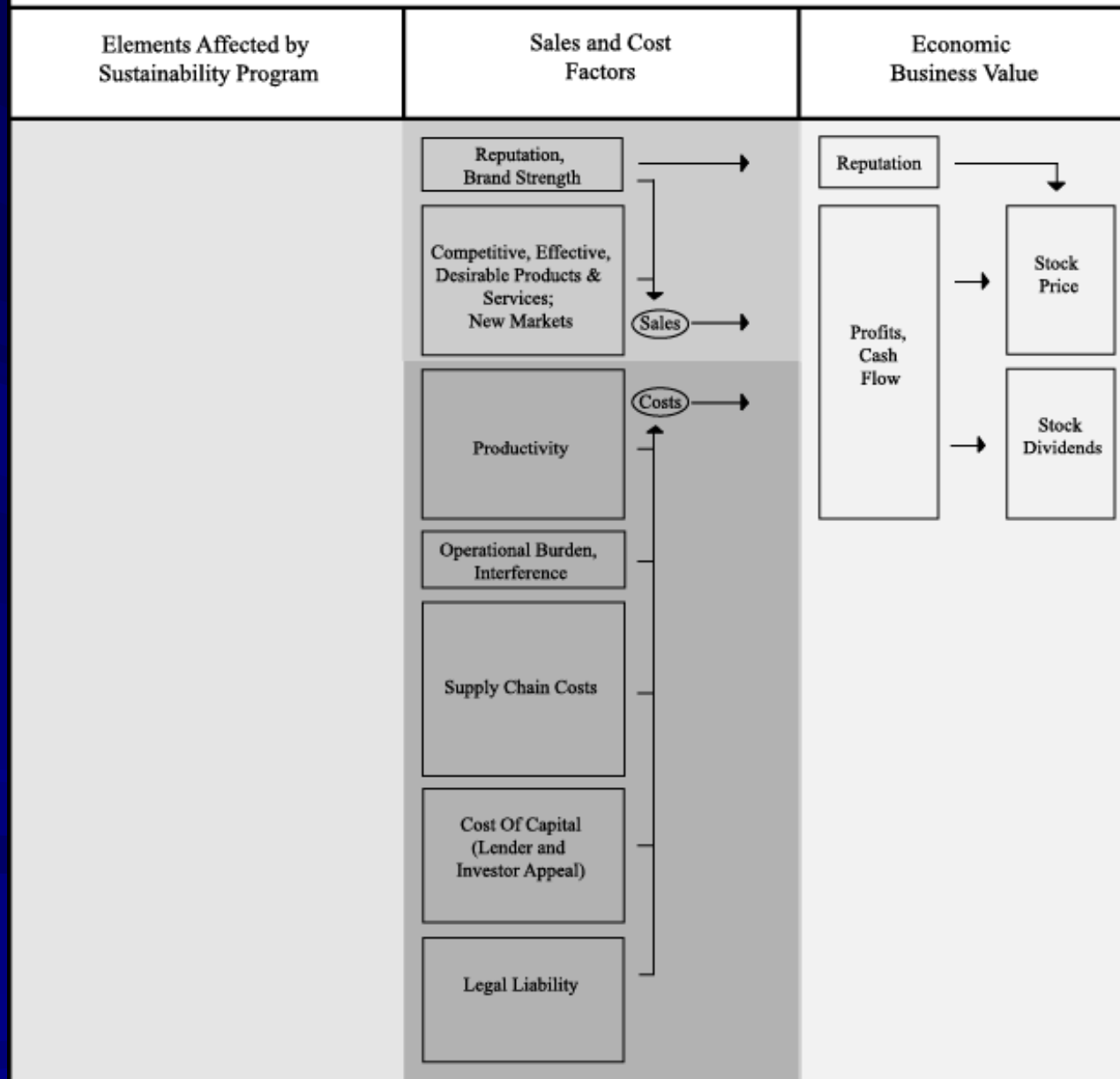
- Can only Lean operations 5-30% if suppliers and customers are not Leaned
- Need to exchange experts
- Green Supplier Network (EPA)

# Two Benefits for Business in Proactively Seeking Sustainability

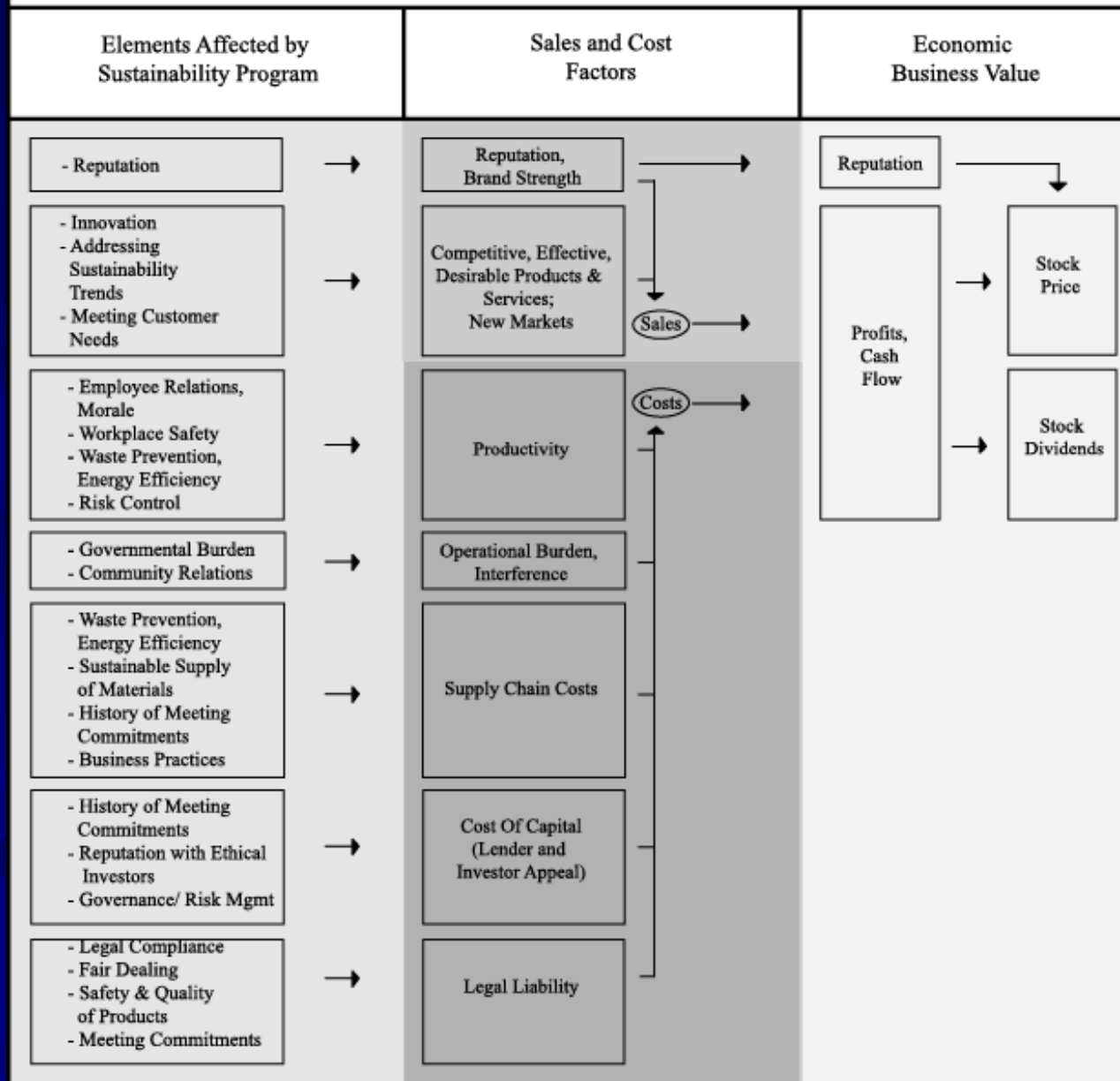
1. Securing the trust and loyalty of key stakeholders
2. Long-term financial viability



**Figure 3.1.**  
**Sustainability Benefits Help Determine**  
**Business Value: The Show-Me-the-Money Model**



**Figure 3.1.**  
**Sustainability Benefits Help Determine**  
**Business Value: The Show-Me-the-Money Model**



## Baxter's 2005 Environment and Safety Goals and Associated Savings Targets

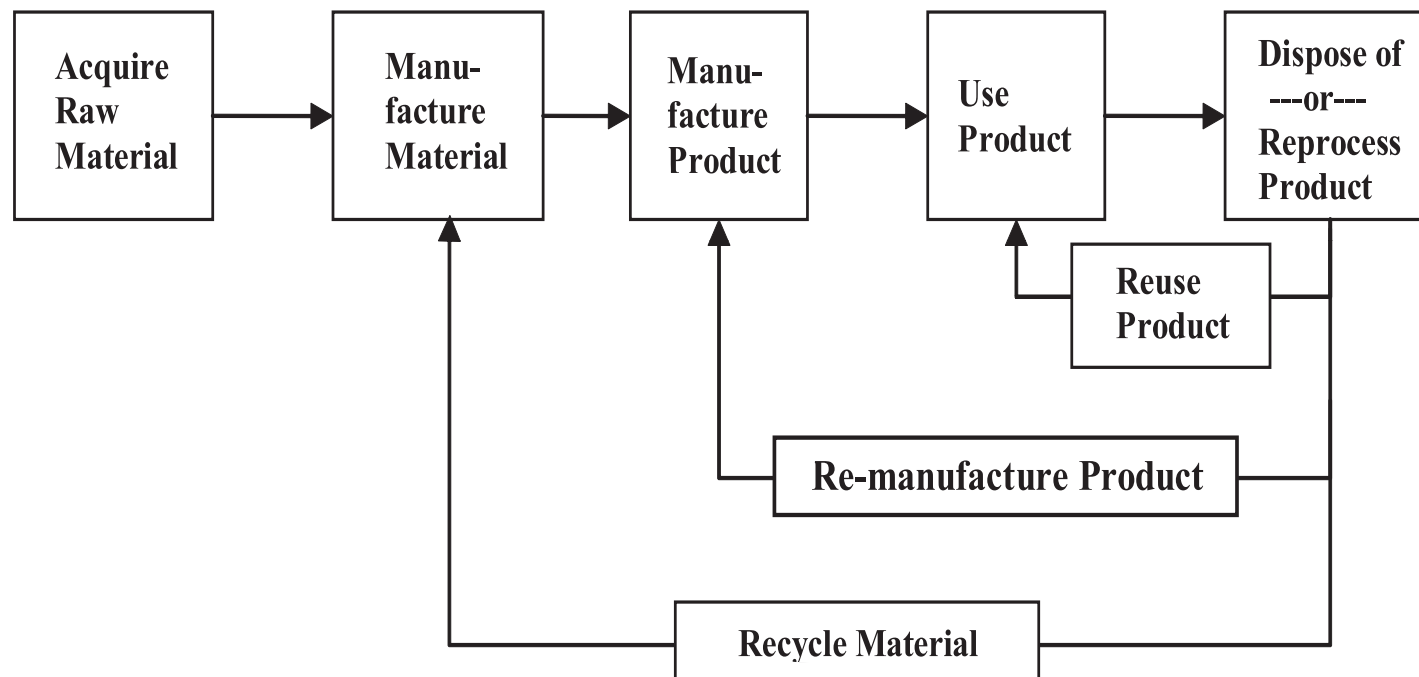
Parameter	Reduction Target (%)	Base Year	Target 2005 Savings and Cost Avoidance (\$ million)
Air toxic emissions per unit of production	80	1996	1
Hazardous and regulated waste generation per unit of production	35	1996	4
Nonhazardous waste per unit of production	35	1996	15
Energy use ( and associated greenhouse gas emissions) per unit of production	30	1996	30
Packaging materials per unit	20	1995	25
Employee work-related lost-workday cases per 200,000 work hours	60	1996)	25
Rate for all employee work-related injuries and illnesses per 200,000 work hours	50	1999}	
<b>TOTAL</b>			100

# Sustainable Products & Services

1. Improve the efficient use of natural and economic resources along the product life cycle
2. Provide greater respect and accommodation for the needs of people and other living things along the product life cycle



**Figure 3.3**  
**Life Cycle of a Product**



Large corporate customers are beginning to see the strategic importance of sustainability.

e.g., Wal-Mart vice president of strategy & sustainability

# Some Observations About Business and Sustainability



- Sustainability is not about one thing.
- The business case for sustainability is really the business case for a process that looks at sustainability trends and issues and prioritizes among the opportunities and threats to an organization to select those for action that contribute the most value.
- Integrating sustainability into high-level planning and execution is essential to driving it into the culture of an organization.

# The Emergence of Sustainability Management System Standards

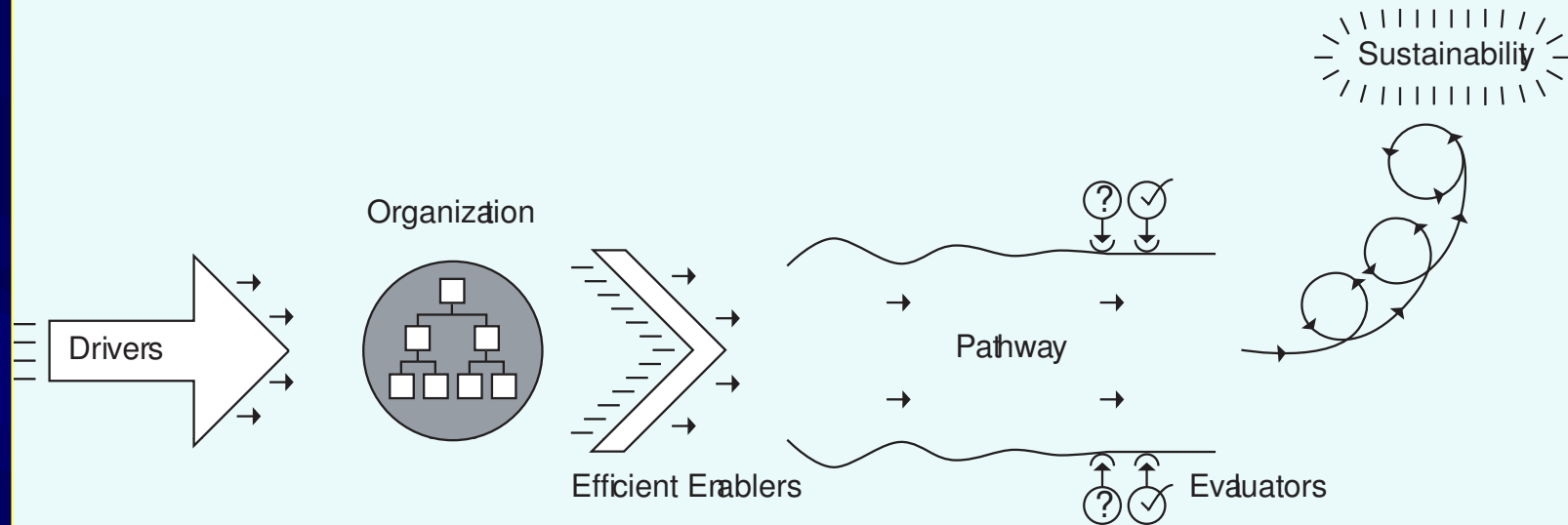
- ISO (26000, 9004, etc.)
- UK (SIGMA, BS 8900)
- Australia (AS 8000 series)
- Mexico (IMNC SAST 004)
- France (AFNOR Guide SD 21000)
- Austria (Guide ON-V 23)
- Int'l Finance Corp. (Env & Soc. Mgmt System)





# *The Sustainability Handbook– The Complete Management Guide to Achieving Social, Economic and Environmental Responsibility* (order thru [www.WBlackburnConsulting.com](http://www.WBlackburnConsulting.com))

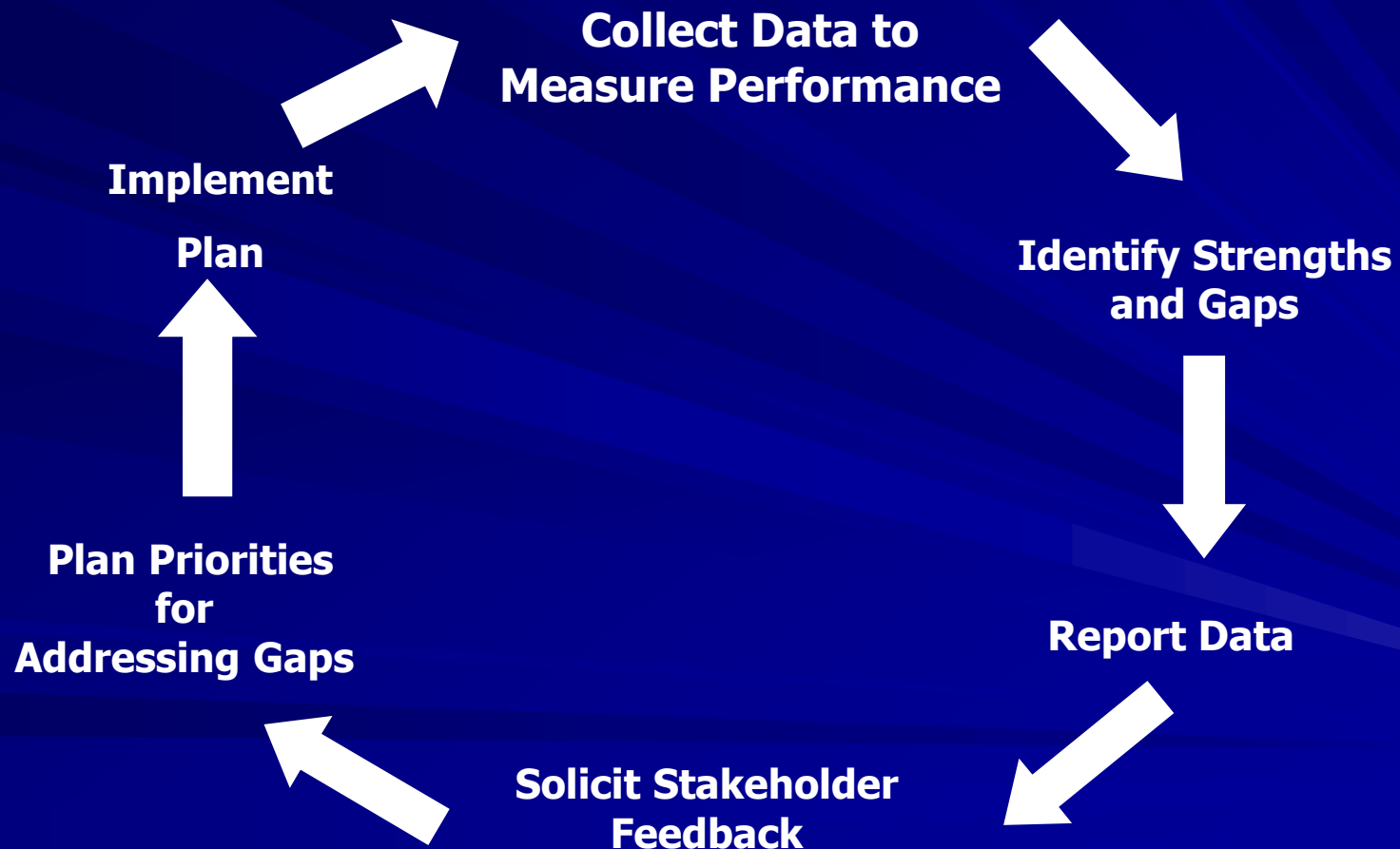
Figure 4.1 Sustainability Operating System (S.O.S.)



The Drivers	The Efficient Enablers	The Pathway	The Evaluators
<p><b>A champion/leader</b></p> <p><b>Approach for selling the organization on sustainability</b></p> <p><b>Accountability mechanisms</b></p>	<p><b>Organizational structure</b></p> <p><b>Deployment and integration</b></p>	<p><b>Vision and policy</b></p> <p><b>Operating system standards</b></p> <p><b>Strategic planning for aligned priorities</b></p>	<p><b>Indicators and goals</b></p> <p><b>Measuring and reporting progress</b></p> <p><b>Stakeholder engagement and feedback</b></p>

# Continual Improvement Cycle

(Sustainable quantum leap in performance)



# How to Do Sustainability at Universities: An Integrated Approach

- Administration (planning and leadership)
- Campus operations
- Curriculum
- Research; policy development
- Student activities
- Community outreach

# Lean and the SOS: Both TQM Based

- Lean: a production approach and set of methods to systematically identify and eliminate non value-added activity (helps realize a strategic opportunity and reduces risk/threats)
- SOS: strategic management framework

# Lean and the SOS: Both--

- Identify customer/employee/stakeholder expectations/ requirements (engagement)
- Require top management support
- Rely on good metrics
- Aimed at continual improvement, quantum leaps in improvement
  - *Kaizen* events
  - Production Preparation Process (3P) (similar to DfE)

# Lean vs. Sustainability: Some Tensions

- Economic benefits from Lean environmental and social improvements are often either not calculated or are trivial
- Environmental impacts of more frequent JIT transport trips
- Environmental compliance of combined waste streams
- EHS, fire/building code regulatory compliance and permitting of right-sized flexible mobile equipment, (e.g., painting, chemical dispensing and treatment, hazardous waste storage, parts cleaning, drying operations)

# Lean vs. Sustainability: Some Tensions

- Focus on the customer vs. all key stakeholders
- Value
  - Lean: time, \$, quality
  - Sustainability:
    - Time, \$, quality
    - Reputation
    - Ethical conformance
    - Legal compliance
    - Reducing social and environmental risk and lifecycle impacts

# Using Lean for Sustainability

- Broader definition of value in Lean
- Cross-train and team-up Lean and EHS and social experts
- Introduce EHS and other tools into Lean



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Phone: 847.530.4014

Book: *The Sustainability Handbook—  
The Complete Management Guide  
to Social, Economic and  
Environmental Responsibility*  
(See Web site)

