Implementation of Sustainable Manufacturing Standards

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Sustainable Manufacturing Standards and Infrastructure

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Topics

- Regulatory Programs
- Case Study
- Tools – LCA
- Voluntary Programs
- Lessons Learned

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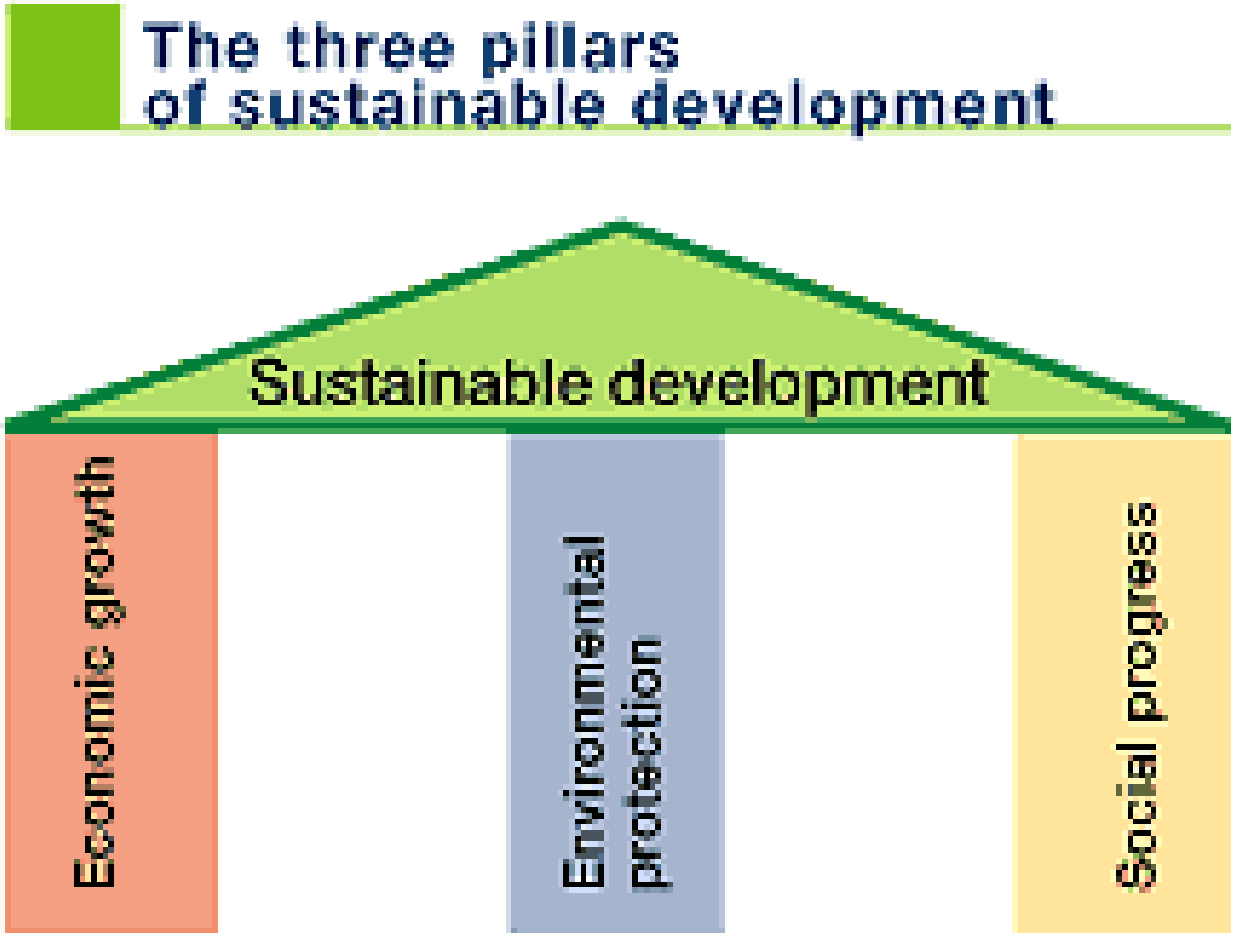
Sustainability



http://www.vda.de/en/service/jahresbericht/auto2002/auto+umwelt/u

Environmental Requirements

- **Waste**
  - Atmospheric emissions
  - Aquatic discharges
  - Land contamination
- **Resource Usage**
  - Energy
  - Materials
  - Water
  - Land
- **Product Life Cycle**

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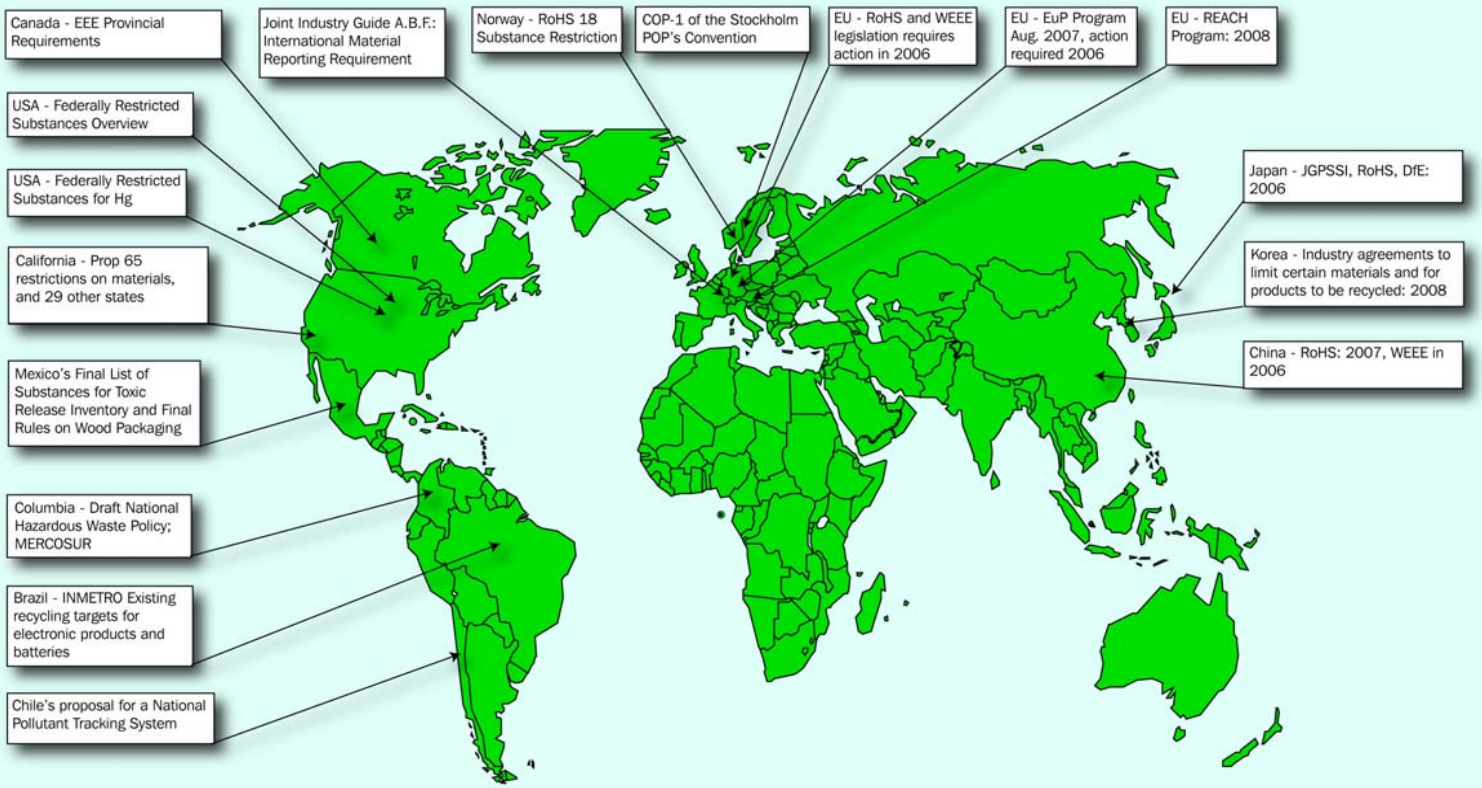
Environmental Protection

Environmental requirements are spreading beyond the EU, driving the need for sustainable, global environmental compliance programs.

EU WEEE and RoHS are only the first wide-reaching regulations.



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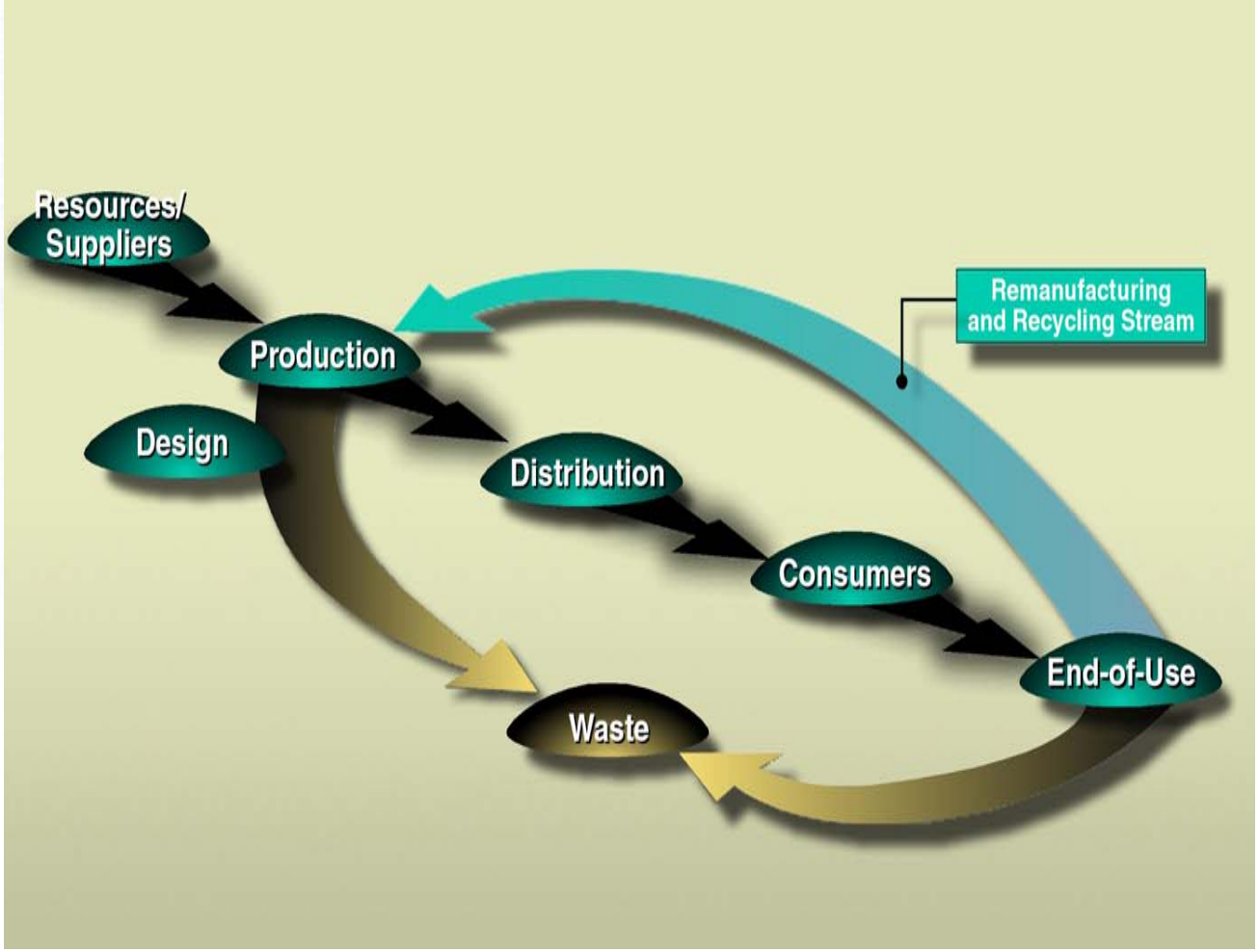
Sustainability in the Supply Chain



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Supply Chain Weakest Link

- Business Performance Management Forum Study (2009)
  - Most supply chain partners did not see linkage between environment and sustainability vs. operations
  - Most did not use any metric to measure sustainability
- Greening Consumer Electronics
  - ChemSec (the international Chemical Secretariat)
  - 7 industries collaborated with their supply chain to redesign products and develop new materials to comply with RoHS. Focus was on Br and Cl

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Restriction on Hazardous Substances

RoHS RESTRICTED SUBSTANCES	
Substance	**RoHS LIMIT: MCV** - ***Maximum concentration values***
Lead	< 0.10% = **< 1000 PPM**
Mercury	< 0.10% = **< 1,000 PPM**
Hexavalent Chromium	< 0.10% = **< 1,000 PPM**
Cadmium	< 0.01% = **< 100 PPM**
PBB and PBDE (Poly-brominated flame retardants)	< 0.10% = **< 1,000 PPM**

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Where Are RoHS Chemicals Found?

- Lead in solder or termination coating

- Plastic housing, PBB, PBDE, Cd, Pb

- Cd, Pb in plastic & Pb in electroplated coatings

- Pb, Cd, PBB, PBDE in plastic connector & cable insulation

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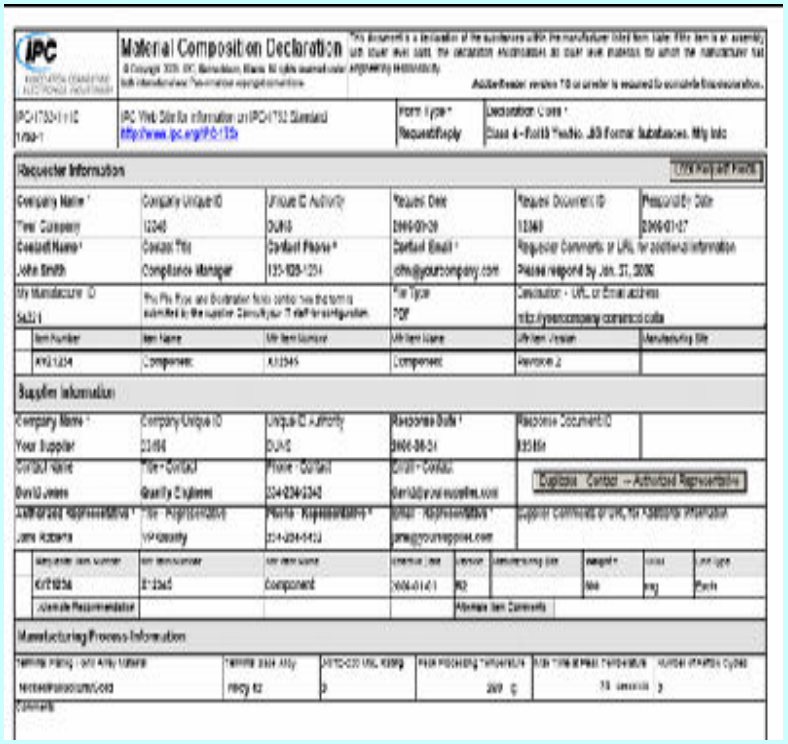
Approaches to Compliance

- **Self-declaration by manufacturers**
  - Products placed on market presumed to comply
    - Analyze parts list
    - Purchase RoHS compliant parts, subassemblies, products
    - IT - develop integrated data base
  - Enforced by market surveillance
- **Assure RoHS Compliant Accuracy** – industry standards on
  - compliance testing
  - quality testing/reliability
  - reporting formats
- **Manage All Data and Information**

Certificate of Compliance

IPC 1751/1752



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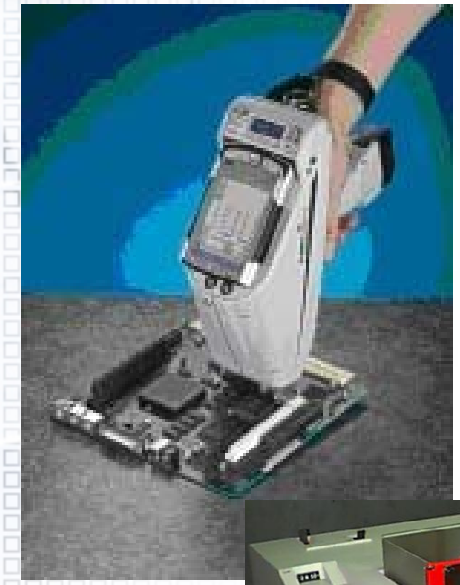
Testing Methods & Standards

Non-Destructive Tests & Destructive Tests



- **Remove solder joint**
  - Lead (Pb), atomic absorption spectrophotometer
- **Screw plating**
  - Chromium (Cr+6 vs. Cr+3)
  - ion chromatography
- **Flame retardants in cable**
  - Brominates; Infra-red spectrophotometer
- **IEC 62321 (12/2008)**

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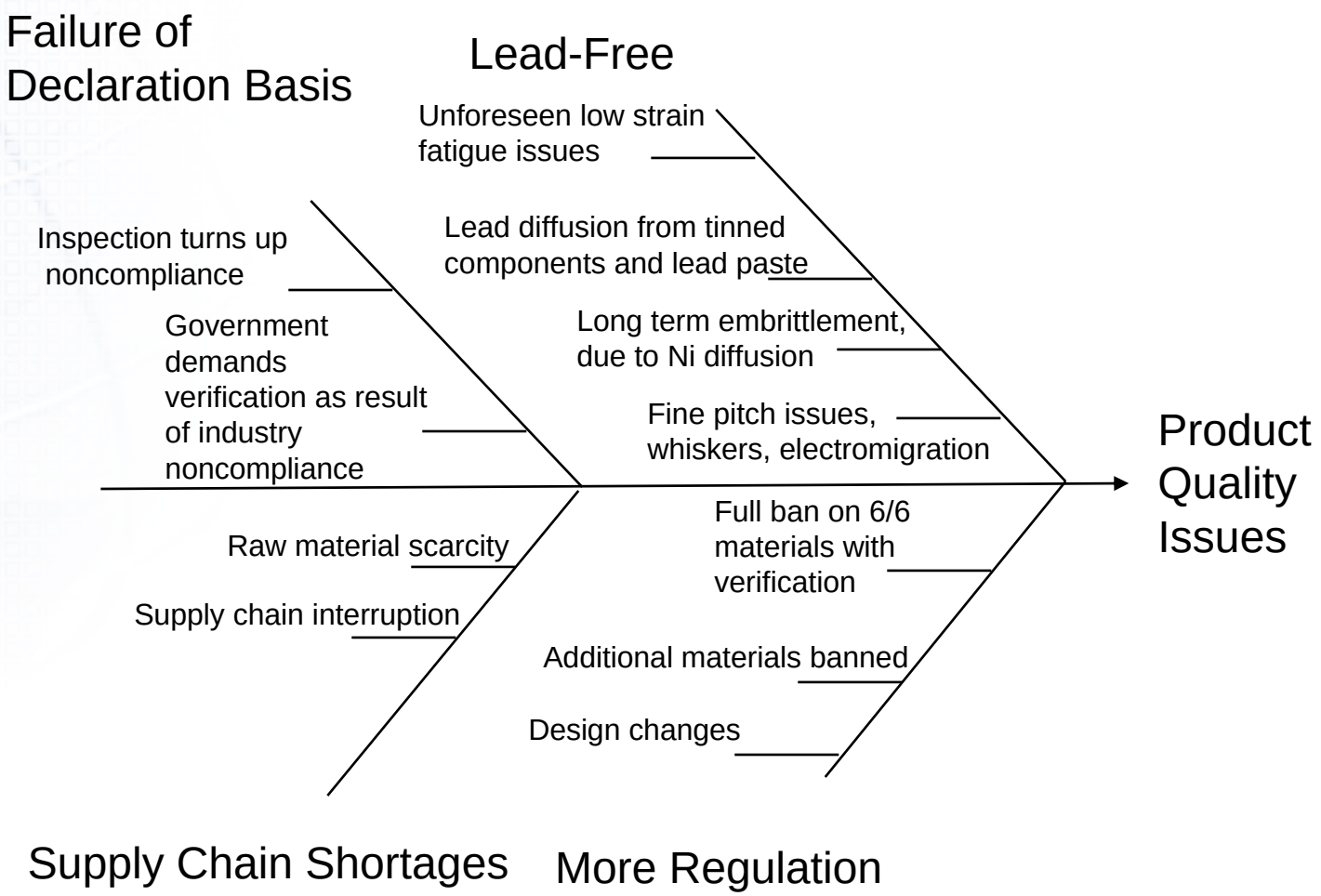
Fishbone Diagram—RoHS



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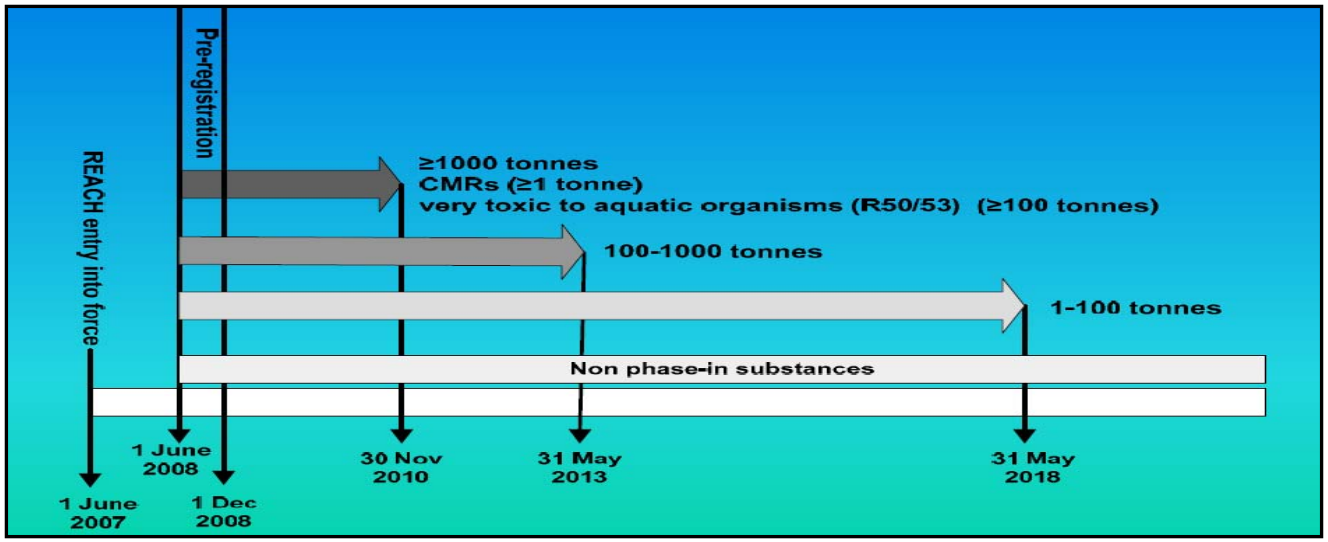
Other EU Requirements

EuP

REACH



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Wal*Mart - Case Study

- Sustainability Program
  - Sustainable Value Networks
- The Sustainable Product Index (SPI)
  - 1st Phase – Sustainability Product Index: 15 Questions for Suppliers
  - 2nd Phase – Wal*Mart Life Cycle Assessment (LCA) Consortium
  - 3rd Phase – SPI on products on the shelf for consumers to see and use in their buying decisions

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Phase 1 - 15 Questions for Suppliers

- Wal*Mart is asking “top tier” US-based suppliers to have answers to the questions available by October 1, 2009.
- Deadlines for lower tier suppliers and suppliers outside the US will be specified later.
- The questions reach up the supply chain and collect information on all factories used to manufacture product for Wal*Mart, whether the supplier owns it or not.

Walmart

1-800-331-0085 www.walmartstores.com

Sustainability Product Index: 15 Questions for Suppliers

Energy and Climate: Reducing Energy Costs and Greenhouse Gas Emissions

1. Have you measured your corporate greenhouse gas emissions?
2. Have you opted to report your greenhouse gas emissions to the Carbon Disclosure Project (CDP)?
3. What is your total annual greenhouse gas emissions reported in the most recent year measured?
4. Have you set publicly available greenhouse gas reduction targets? If yes, what are those targets?

Material Efficiency: Reducing Waste and Enhancing Quality

1. If measured, please report the total amount of solid waste generated from the facilities that produce your product(s) for Walmart for the most recent year measured.
2. Have you set publicly available solid waste reduction targets? If yes, what are those targets?
3. If measured, please report total water use from facilities that produce your product(s) for Walmart for the most recent year measured.
4. Have you set publicly available water use reduction targets? If yes, what are those targets?

Natural Resources: Producing High Quality, Responsibly Sourced Raw Materials

1. Have you established publicly available sustainability purchasing guidelines for your direct suppliers that address issues such as environmental compliance, employment practices and product/ingredient safety?
2. Have you obtained 3rd party certifications for any of the products that you sell to Walmart?

People and Community: Ensuring Responsible and Ethical Production

1. Do you know the location of 100 percent of the facilities that produce your product(s)?
2. Before beginning a business relationship with a manufacturing facility, do you evaluate the quality of, and capacity for, production?
3. Do you have a process for managing social compliance at the manufacturing level?
4. Do you work with your supply base to resolve issues found during social compliance evaluations and also document specific corrections and improvements?
5. Do you invest in community development activities in the markets you source from and/or operate within?

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Life Cycle Analysis

- **What are Goals of LCA?**
  - Compare and contrast
  - Comprehensive assessment of raw material production, manufacture, distribution, use and disposal including all transportation and environmental impacts
  - Evaluate and inform the design of a product
- **Commercial, Academic, Client-Specific**
  - ISO 14040, ISO 14044
    - TEAM™, WISARD
- **Compliance X-Sight (CX-S)**
  - Developed by Cantor Software
  - Management, analysis and reporting of recyclability and restricted substances
- **Life Cycle Management Analysis**
  - Incorporates environmental health, safety and recycling costs
  - Comparative decision making tool

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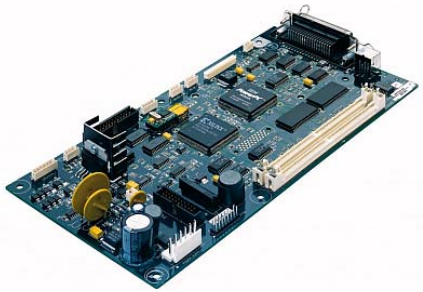
Voluntary Programs

- **Private Associations, NGO's**
  - Corporate Governance
    - Registration
    - Certification
    - Reporting (transparent)
  - Ranking (varies)
- **Vendor/Supplier Requirements**
  - Material Certifications
  - Specific product requirements, testing methods
  - Environmental Management Systems
- **Trade Associations**
- **Financial**
  - Equator Principles
  - SEC - focusing on climate change impact disclosure
  - Insurance - 2009 Climate Change Commission



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Voluntary Programs (cont.)

- **BSR** (Business for Social Responsibility) - a global partner for responsible business leaders.
- **CERES** (Coalition for Responsible Economies) - a leading U.S. coalition of environmental, investor, and advocacy groups working together for a sustainable future
- **CSER** (Corporate Social and Environmental Responsibility) - a responsible business approach that is committed to integrating environmental, social and ethical management into the overall business strategy (Triple Bottom Line)
- **The Future 500** is a non-profit organization that operates at the intersection of corporations and stakeholders
- **GEMI** (Global Environmental Management Initiative) - a non-profit organization of leading companies
- **The Natural Step (TNS)** - an international organization that uses a science-based, systems framework.
- **Responsible Care®** is an obligation of membership in the American Chemistry Council
- **WBCSD** (World Business Council on Sustainable Development) - a coalition of 150 international companies
- Sustainable Business Network

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Sustainability Metrics

- **AIChE** – Sustainability Working Group
- **Corporate Social Responsibility Network** - UK's leading CSR consulting group
- **Innovest Strategic Advisors Group** - investment research and advisory firm - TBL
- **International Institute for Sustainable Development**
- **Redefining Progress** - shift economy and public policy towards sustainability
- **Sustainability Reporting Programs** – Canada - sustainability reporting for consumers
- **The Global Development Research Center** - LCA
- **The Global Reporting Initiative** - sustainability guidelines
- **The Pioneer Group** - best practice forum
- **IEC** - QC080000 Certification
- **EPEAT** - Electronic Product Environmental Assessment Tool
- PEW Foundation
- **CDP** - Climate Disclosure Project

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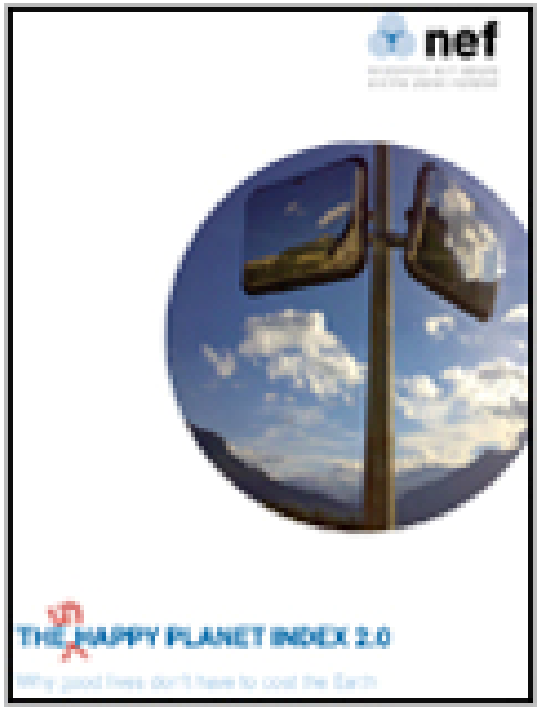
Economics

- **Triple Bottom Line Accounting**
  - **US**
    - U.S. Financial Accounting Services Board (FASB)
    - Generally Accepted Accounting Practices (GAAP)
    - US Council on Economic Priorities Social Accountability 8000
  - **Australia and UK**
    - Social and Ethical Accountability
  - **International Financial Reporting Standards (IFRS)**
    - SEC and FASB agree on moving from GAAP to IFRS
    - Getting to a TBL version of IFRS is years down the road.

Social Progress

- **International Commission on the Measurement of Economic Performance and Social Progress**
  - The Unhappy Planet Index (2009)
- **ISO 26000 Social Responsibility Standard (2010)**
- **AS8303/2003 Australian Standard**
- **BS 8900/2006 Sustainable Development**



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Lessons Learned

- **Supply Chain**
  - Supply chain may be unaware of requirements
  - Anticipate high failure rate during audits of product compliance against material declarations
  - Be prepared to assist in development of vendor requirements and support during development
  - Work with legal counsel on long-term contracts vs. new requirements
- **Standards**
  - Slow in coming
  - Lack of reference materials
- **Trade-offs implies three pillars are equal**
  - Nature is non-linear

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What's Needed

- **Systems Approach**
  - Integrated Product Program
- **Widespread Industry Alignment**
  - Global level
  - Regulations as catalysts
  - Material standards
- **Supply Chain**
  - Verifiable specifications
  - Implementable standards - integrated into operations
- **Green Procurement Criteria**
  - Define what a green product is and ensure it is part of the standard

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Thank you!

Questions?

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