DEDICATED TO MAKING A DIFFERENCE

Eco-efficiency tool box

Learning unit C: implementing eco-efficiency

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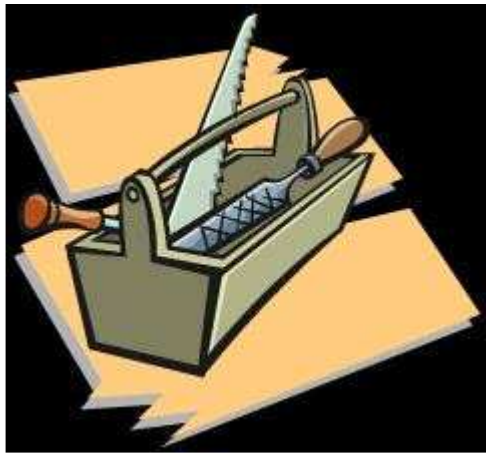
Learning objectives

- Become familiar with existing tools and emerging tools and what they do
- Learn a few of the tools in further detail
- Recognize how a particular tool may be applied (or adapted) within different business decisions



Structure

- Overview
- Description of common tools
- Quiz
- Responses
- Discussion

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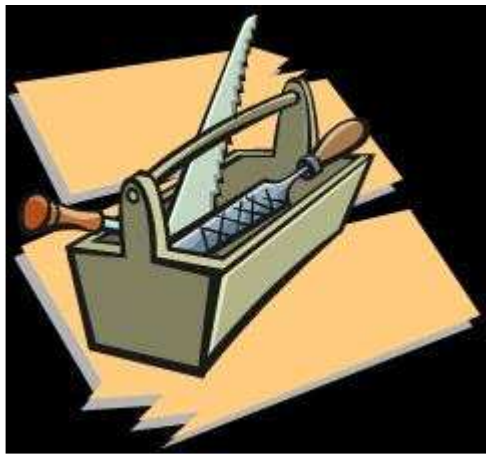
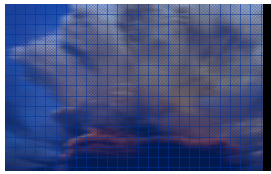
Tools for eco-efficiency

- Sustainability mindset has led to an explosion of concepts and tools
- Academics, NGO's, consultants, industrial researchers all working on solutions
- Result is a proliferation of tools with some overlap
- This can create confusion in the marketplace of ideas – but this is understandable – living in a beta/VHS/DVD/digital world – the winning approach is evolving



Labeling concepts and tools may be an impediment – the key is to understand the problem you are trying to solve and select the appropriate tool for the job and/or modify tools as needed

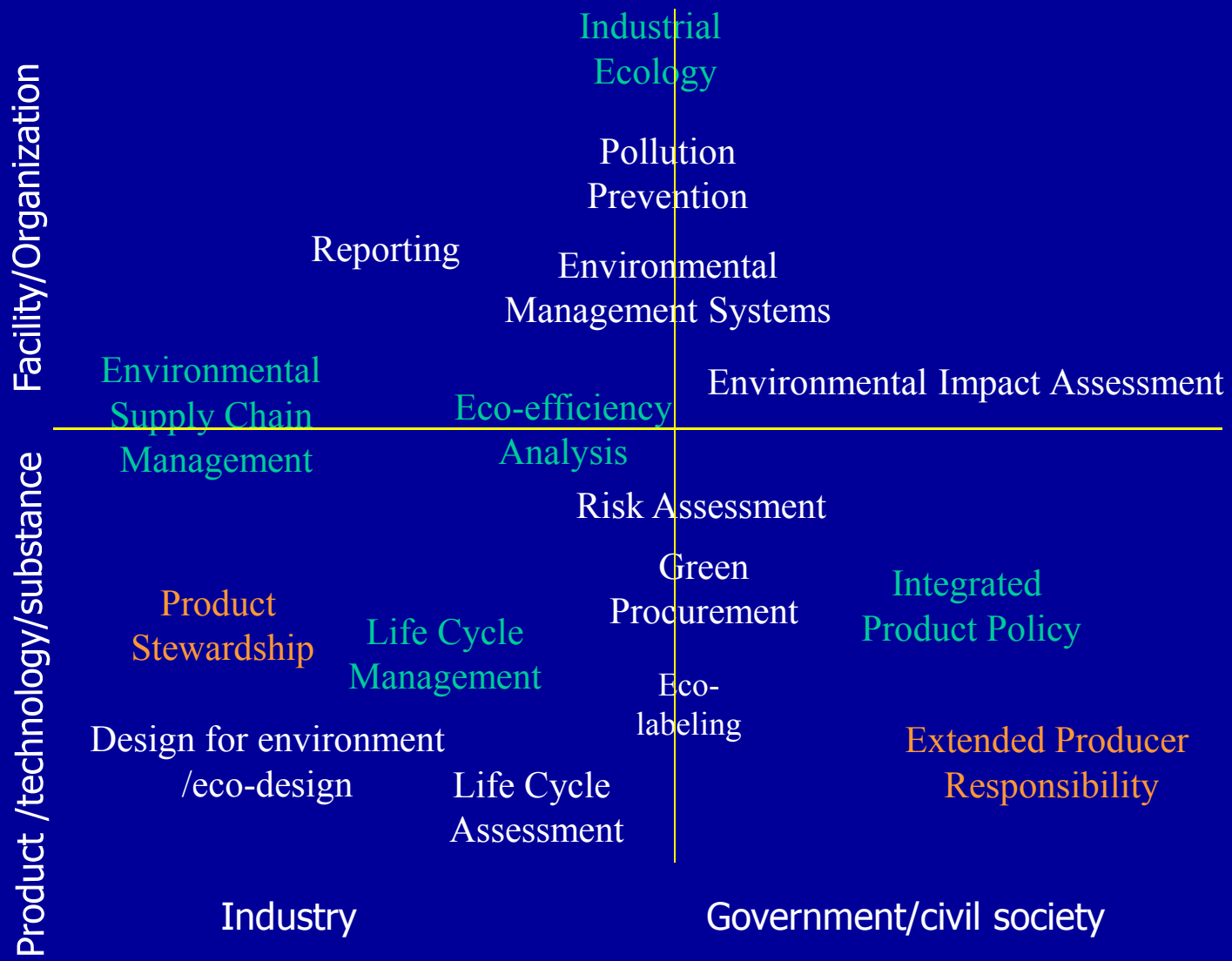


Typical tools for implementing eco-efficiency

- Organizational/Management
  - Environmental Management Systems
  - Stakeholder Engagement
  - Corporate Environmental Reporting
  - Life-Cycle Management
- Product Design & Development
  - Design for Environment
  - Eco-Efficiency Analysis
  - Life-Cycle Assessment
  - Environmental Risk Assessment
  - Integrated Product Policy (IPP)
- Suppliers/Purchasing
  - Environmental Supply Chain Management
  - Green Procurement
- Marketing and Communications
  - Corporate Environmental Reporting
  - Eco-Labelling
  - Stakeholder Engagement
- Production & Distribution
  - Eco-Efficiency Analysis
  - Industrial Ecology
  - Pollution Prevention
  - Life-Cycle Costing
- Facilities Management/Project Development
  - Green Building Design
  - Environmental Impact Assessment
  - Environmental Management Systems
  - Stakeholder Engagement

- Note - Some tools cross over (e.g., eco-efficiency analysis and stakeholder engagement could apply across all functions)

Concept/tool positioning



Others

Precautionary principle

Ecological footprint

Eco-effectiveness

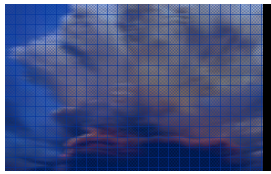
Factor 4/10

__ not widely applied as yet

__ well understood and applied

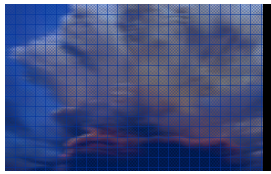
__ alternative views on responsibility

Source: Pollution Probe - Environmental Sustainability Policy Framework Project



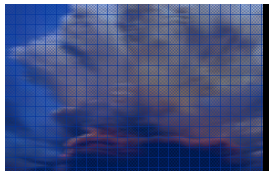
Observations on the tool box

- Adoption of tools being driven by:
  - Market factors (e.g. EMS in automotive, labelling)
  - Stakeholder expectations (e.g. reporting, stakeholder engagement)
  - Regulatory influences (e.g. pollution prevention, ERA, EIA)
  - Internal business factors including efficiency, cost reduction, innovation (e.g. DfE, LCA, Green Building Design)
  - Combination of the above (e.g. procurement, eco-efficiency)
- Tool box varies for different parts of value chain
- Culture, drivers, strategy, awareness all factors in adoption and depth of integration in organizations
- Tools apply at different levels (corporate, operational, product) and selection is specific to the organization
- Many tools have inherent value judgments and users need to be aware of this (e.g. eco-labels can reflect values of those who develop the selection criteria)



Business case

- Innovation – the application of a number of tools (DfE, LCA, Eco-efficiency Analysis) fosters development of new or alternative project, product or technology designs
- Improved stakeholder relations through better communication internally and externally around environmental issues, performance, projects and management practices
- Strengthened brand image and reputation as seen by regulators, the public, peers, employees and other stakeholders who recognize the value of the company's environmental efforts
- In many cases there is a clear and measurable reduction in operating costs
- Many companies attribute increased sales to the use of these concepts and tools
- Indirect savings are realized through the avoidance of environmental risk



Eco-efficiency tool box

Descriptions of common tools

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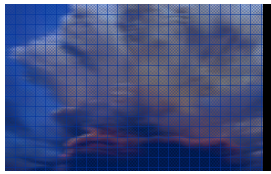
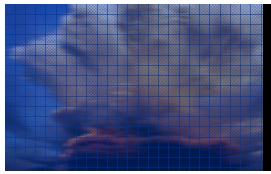


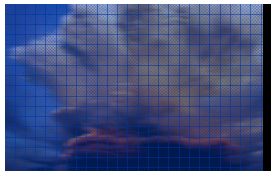
Life-Cycle Assessment (LCA)

- A decision-making tool to identify environmental burdens and evaluate the environmental consequences of a product, process or service over its life-cycle from cradle to grave
  - standardized by the International Organization for Standardization
  - forms the conceptual basis for a number of management approaches that consider a product across its life-cycle, covering resource acquisition, product manufacturing, product use, and end-of-life



LCA – key elements

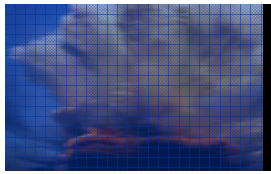
- Consideration of multiple life cycle stages
  - the physical sequence of operations in a product system, cradle-to-cradle or earth-to-earth
  - the primary stages are materials acquisition and processing, manufacturing, use and end-of-life disposal
  - within each of these stages, sub stages or unit processes are defined
- Consideration of multiple environment and resource issues
  - LCA studies expose trade-offs by analyzing significant inputs from the earth and outputs to the environment across the various life-cycle states
- An assessment or interpretation of the significance of the results
  - can vary from aggregation of data into a set of simple indicators to the consolidation of the data into a core set of indicators using a variety of weighting or scoring methods



When to apply LCA

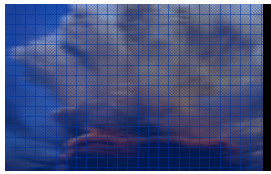
LCA can help decision-makers to:

- Identify unintentional impacts of actions (e.g. upstream GHG emissions that may offset perceived benefits of a new technology)
- Ensure consideration of all environmental media across the life-cycle (e.g. equal consideration of emissions to air, water and land during project construction, operation and decommissioning)
- Avoid shifting problems from one life-cycle stage to another, from one geographic area to another and from one environmental medium to another (e.g. ensuring an air pollution mitigation measure does not create a water pollution problem elsewhere in the system)
- Identify opportunities to improve the environmental and economic performance of the technology, project, product or service in question (e.g. identifying “hotspots” that need to be addressed)
- Communicate more effectively with stakeholders on the system wide consequences of project or technology options (e.g. to communicate full impacts and/or benefits of changes to a product system)



Design for Environment (DfE) or Eco-design

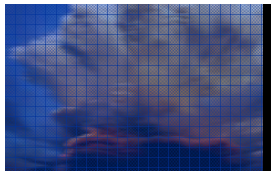
- The integration of environmental considerations into product and process design
  - Fundamental to DfE is the use of tools and practices that encourage environmental responsibility and simultaneously reduce costs, promote competitiveness and enhance innovation
  - DfE practices are meant to develop more environmentally compatible products and processes while maintaining (and in some cases even exceeding) price, performance and quality standards



DfE - key elements

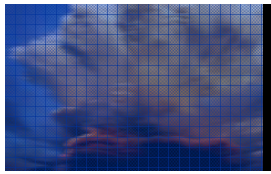
- Selection of low-impact materials
- Reduction of energy use
- Optimization of production techniques
- Optimization of distribution system
- Reduction of use phase impacts
- Optimization of initial lifetime
- Optimization of end-of-life system

- In addition, designers are encouraged to produce products which lead to less material use (e.g. dematerialization), to pursue shared product use (e.g. car clubs or rental services), to integrate product functions (e.g. combined scanner, printer, copier, fax), and to optimize functions (e.g. better design to reduce over packaging)



When to apply DfE/eco-design

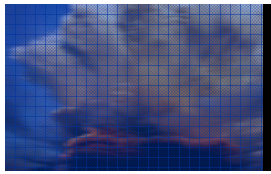
- At the front end of the product development process (e.g. at the planning and conceptual design phase)
- Often the design strategies are informed by prior analytical work on the life cycle cost and environmental impacts of the previous generation of products
- In innovation processes DfE may be used to inform product design (e.g. material selection) through the use of design checklists



Environmental labelling

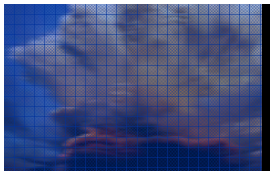
- A broad range of activities ranging from business to business transfer of product specific environmental information to environmental labelling in retail marketing

- The overall goal of eco-labelling is to encourage the demand for, and supply of, products and services that are environmentally preferable through the provision of verifiable, accurate and non-deceptive information on environmental aspects of products and services



Types of labelling

- “Seal of approval” eco-labelling programs through product category definition, development of award criteria and product evaluation
- Self-declaration eco-labels are based on a manufacturer’s self-declared claim about a product’s environmental performance
- Product declarations are informational labels that provide environmental data and information on a variety of measures or indicators

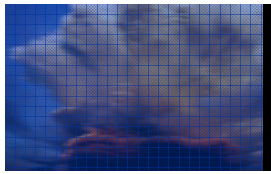


When to apply eco-labelling

- When communicating the environmental performance of the product or service is of value to customers or other important stakeholders

- The choice of which type of label to use should be informed by an understanding of your customer/stakeholder information needs

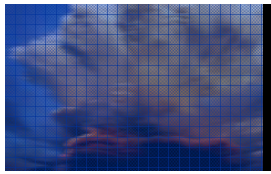
- Receiving or creating the label may involve a considerable amount of data collection



Cleaner production/pollution prevention

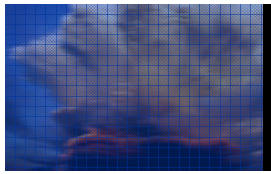
- The continuous application of an integrated preventive environmental strategy applied to processes, products and services to increase eco-efficiency and reduce risk for humans and the environment
  - For processes, cleaner production includes conserving raw materials and energy, eliminating toxic raw materials and reducing the quantity and toxicity of all emissions and wastes before they leave a process
  - For products, the strategy focuses on reducing impacts along the entire life-cycle of the product, from raw material extraction to the ultimate disposal of the product

Source: *Cleaner Production*, UNEP Industry and Environment, UNEP 1994



Cleaner production – key elements

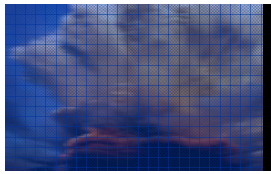
- Cleaner production is a broad term encompassing the following concepts:
  - Waste minimization and avoidance
  - Pollution should be prevented or reduced at the source whenever feasible
  - Environmental management
  - Substitutions for toxic and hazardous materials
  - Process and product modifications
  - Internal reuse of waste products



When to apply cleaner production

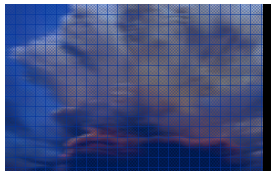
- When the company has set a strategic direction to improve the overall eco-efficiency performance of its products and processes

- Adopting a cleaner production approach involves considerable adjustment to decision-making across a range of business processes and functions



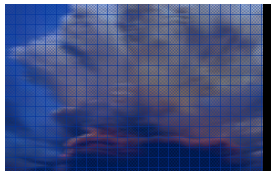
Green procurement

- The procurement of goods and services that have less impact on the environment (e.g. conserve energy, reduce waste, etc.) than other products or services meeting similar performance requirements



Green procurement – key elements

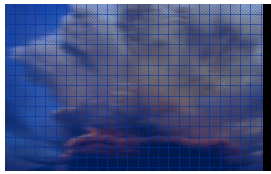
- Incorporate environmental considerations as part of the normal purchasing process
- Incorporate pollution prevention principles early in purchasing process
- Examine total multiple environmental impact throughout the product and service's life-cycle
- Environmental impacts should be compared when selecting products and services
- Comprehensive, accurate and meaningful information about the environmental performance of products and services should be collected in order to facilitate environmentally sound decision-making



When to apply green procurement

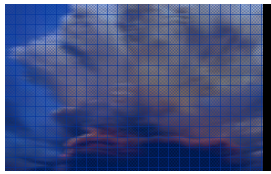
- When there is a clear opportunity to reduce risks, integrate broader cost considerations or leverage environmental performance through procurement

- Pursuing green procurement may involve adjusting tendering processes, altering contract language, training procurement officers and developing evaluation criteria and tools



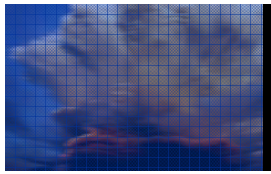
Environmental supply chain management

- A range of detailed environmental requirements companies (in particular manufacturers) are placing on their suppliers, including Environmental Management Systems and Design-for-Environment programs, restricted material lists, component take-back commitments, requests for life-cycle data and performance disclosures



ESCM – key elements

- Environmental supply chain programs are aimed at achieving:
  - Improved efficiency of energy
  - Appropriate materials – ensuring the supplier uses environmentally appropriate materials
  - Clean production – ensuring the supplier has safe and clean production practices in place
  - Optimize distribution and logistics to reduce environmental impact and cost
  - Responsible use – ensuring the “buyer” understands how to use the product or material responsibly
  - End-of-life stewardship – where the supplier takes back their product at the end of its useful life

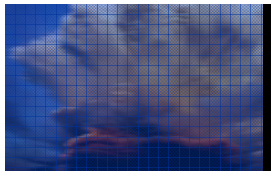


When to apply ESCM

- ESCM is most important when the suppliers' product or service is an integral component of your product or service (e.g. automotive supplier that provides entire subsystems of an automobile or contract manufacturers in the apparel industry)

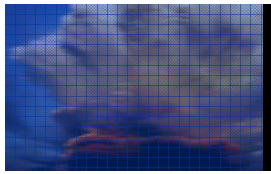
- Implementing ESCM may involve the development of evaluation and auditing procedures for existing suppliers as well as screening criteria for potential new suppliers

- Many companies form partnerships with key suppliers to improve eco-efficiency performance as it is in both their interests



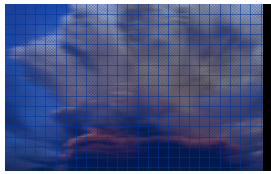
Environmental Management System (EMS)

- The organizational structure, responsibilities, practices, procedures, processes and resources for implementing and managing an organization's environmental affairs while ensuring conformity to its policies, standards and stakeholders' expectations



EMS – key elements

- The foundation of an EMS includes:
  - Purpose – an organization should have an identifiable purpose, which is usually stated as its goals and objectives and encapsulated in the organization's environmental policy
  - Commitment – there should be a sense of commitment and accountability among the people in the organization with respect to taking the appropriate action in support of the EMS
  - Capability – the organization should have the necessary resources (human, physical and financial) as well as the knowledge and skills to achieve the organization's environmental policy
  - Learning – the organization should strive to continuously learn to improve its own management and learning processes through monitoring and measurement of environmental performance, efficient internal and external communication as well as review of the EMS by senior management

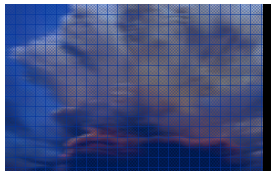


When to apply EMS

- When the systematic management of environmental issues is 1) of importance to customers, 2) critical to your business success, or 3) required to ensure common awareness and performance across your organization

- While there has been an increased awareness of EMS due to the creation of the international standard on EMS (ISO 14001) it is important to understand there are a variety of EMS's in use by industry such as Responsible Care in the chemical industry, the EU standard EMAS (Eco-audit and Management Scheme) and others

- Typically implementing an EMS requires: management commitment, active engagement and training at all levels of the organization, open communication with regulatory agencies, in-depth aspects and impacts assessment and energetic EMS champions



Life-Cycle Management (LCM)

"A flexible integrated framework of concepts, techniques and procedures to address environmental, economic, technological and social aspects of products and organizations to achieve continuous environmental improvement from a life-cycle perspective"

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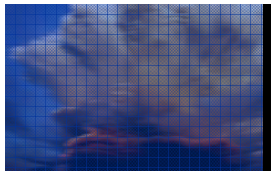
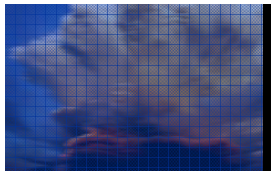
Source: *Life Cycle Management: Definitions, Cases Studies and Corporate Applications*. Society of Environmental Toxicology and Chemistry (SETAC), Working Group on Life Cycle Management.



LCM – key elements

- Understanding full product system
- See outside traditional boundaries
  - Beyond gates, after sales
  - Beyond compliance
- Determine drivers
- Take responsibility
- Manage it as a business initiative – integrate into business decision-making processes



When to apply LCM

- When you want to better understand the business risks and opportunities of upstream and downstream aspects of your activities and are ready to integrate consideration of these risks and opportunities into core business processes and functions

- Integrating life-cycle management considerations can involve applying a range of tools (e.g. LCA, DfE) but more importantly involves ensuring the organizational decision-making processes and measurement systems reflect and integrate life-cycle considerations (e.g. managers are responsible and accountable for ensuring life-cycle aspects of decisions are considered and acted on)