

# Getting Started: Understand Your Impacts and Set Priorities

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# Introduction

- Before you begin identifying and implementing projects, you need to make sure that you **set the right priorities for your business.**
- A project that is very successful at one company may not be a good fit at another.
- That's why it's important to first **understand the full environmental impact** of your products, your facility , and your company.
- Then, you will be able to set priorities , objectives, and targets that make sense for your business.



## Example

- DuPont, operating in an energy intensive industry, set a goal of further reducing its energy use. Even though it had already cut energy use to pre-1990 levels while growing 40%, DuPont initialized a new "Bold Energy Plan." The Plan included 245 projects and cost \$50 million, but saves the company \$50 million annually.<sup>1</sup>

<sup>1</sup>Winston, Andrew. "Green cost cutting." Harvard Business Press. Excerpt from *Green Recovery: Get Lean, Get Smart, and Emerge from the Downturn on Top*. Aug 2009.



# Getting Started

- In this lesson, you will learn
  - How to **apply the concepts of environmental footprints and life cycle thinking** when looking at your products and company
  - How to **determine the environmental impacts** of your product, facility, and company
  - How to use information about those impacts to **set priorities, objectives, and targets**
  - How an **Environmental Management System** is key to the success of your environmental program



# Environmental Footprint

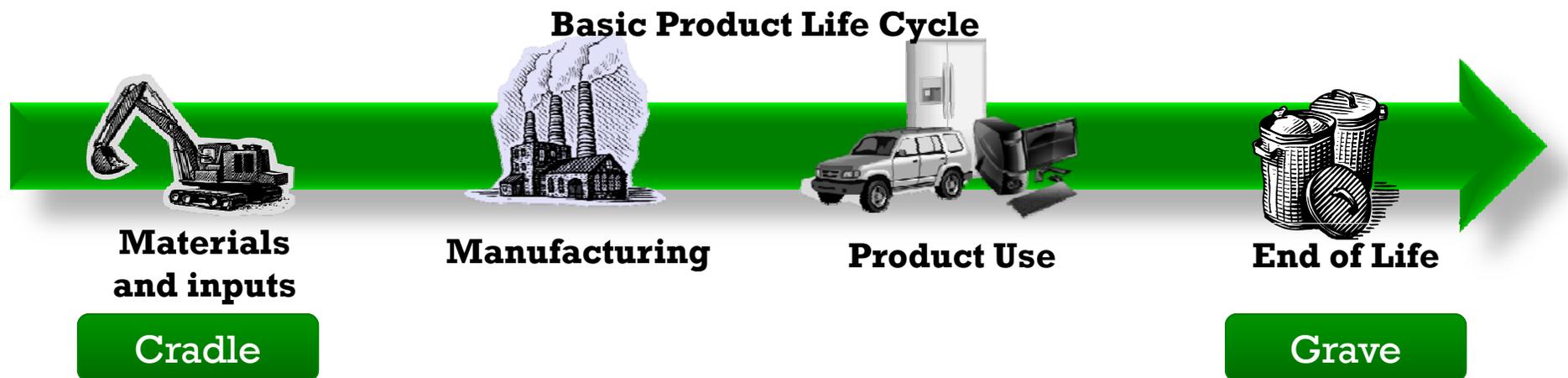
- You hear the word “footprint” a lot when talking about environmental impacts.
- Think of an environmental footprint as the total **impact someone has on the environment because of their consumption of energy, water, materials, etc.**
- The smaller the footprint, the lower the impact is on the environment.
- You have an individual footprint, but your company also has an environmental footprint.
- You can also talk about footprints relative to specific impacts like a “carbon footprint” or a “water footprint”



# What is Your Company's Footprint?

When beginning to think about where you should focus your efforts, it's tempting to start with the impacts within your operations or just within your facility. But **the effect of your product or service doesn't stop at the factory gate.**

You need to think about the entire **Life Cycle** of your product, taking a **cradle to grave** approach from the inputs used to make your product to the impact it has when it is disposed of at the end of its life.



**Let's discuss how you would think about impacts across the life cycle.**



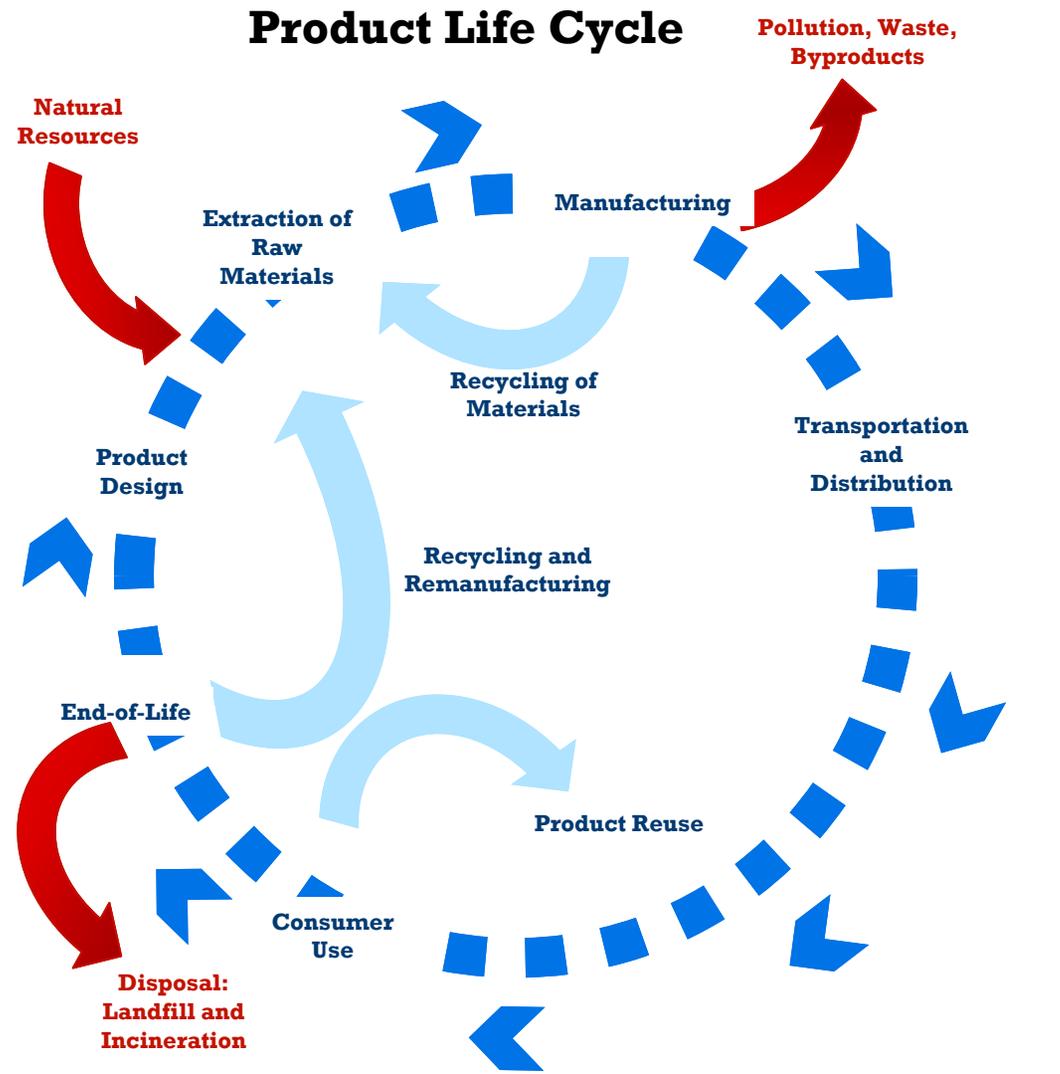
# Life Cycle Thinking and Management

**Life Cycle Thinking** means looking beyond the manufacturing process to examine the impacts of the product over its complete life cycle, from the design of the product, the natural resources and materials, through manufacturing and use, to end of life.

A product life cycle is shown to the right.

The UN defines **Life Cycle Management** as *“a product management system aiming to minimize environmental and socio-economic burdens associated with an organization’s product or product portfolio during its entire life cycle and value chain.”*<sup>1</sup>

Let’s take a closer look at these ideas and how they differ from life cycle assessment.

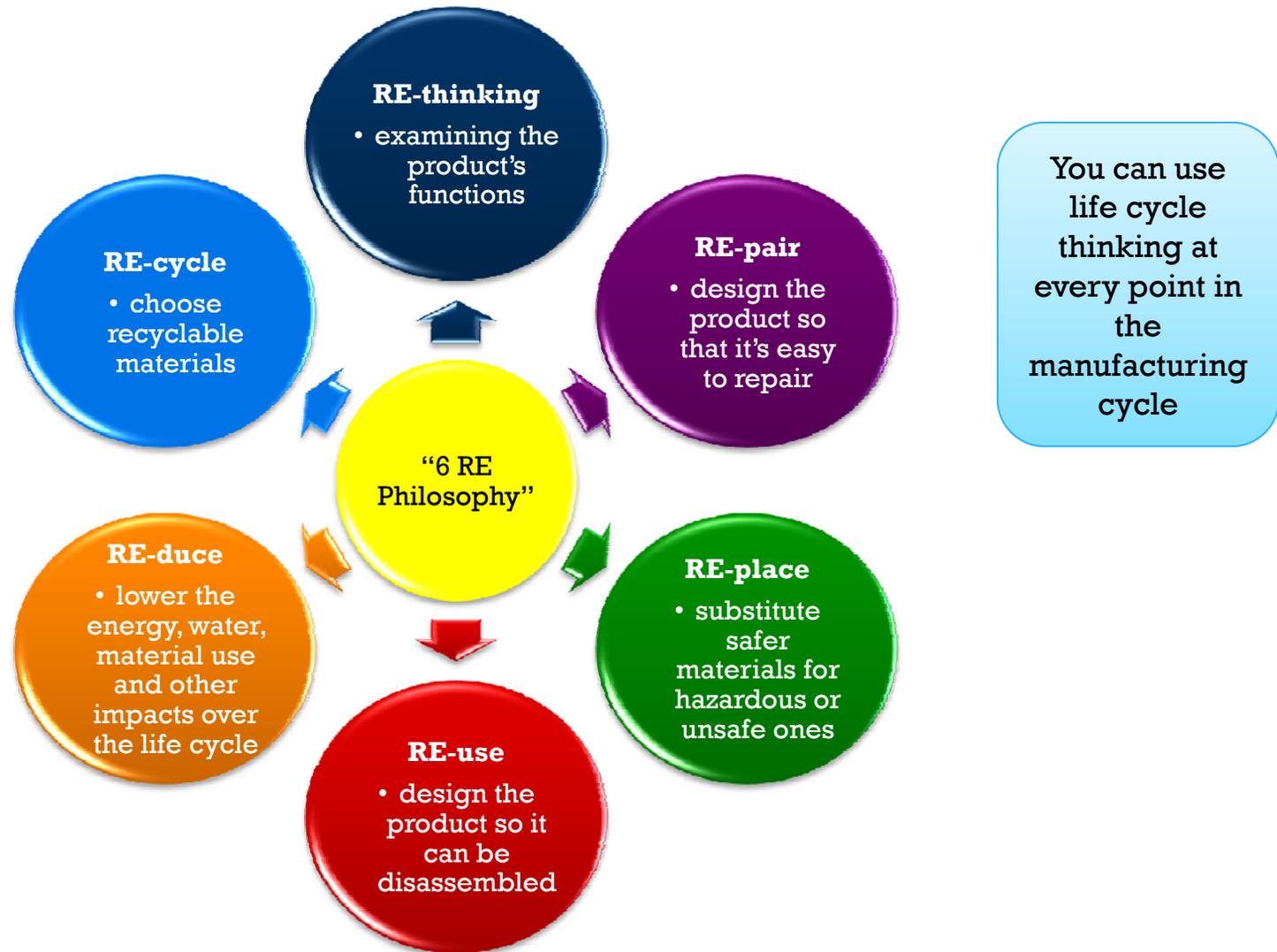


<sup>1</sup> UNEP “Life Cycle Management: A Business Guide to Sustainability”



# Life Cycle Thinking

- The UN describes one way to include life cycle thinking as the “[6 RE philosophy](#)”<sup>1</sup>



<sup>1</sup> UNEP “Life Cycle Management: A Business Guide to Sustainability”



# Life Cycle Assessment

- You've probably heard of **Life Cycle Assessment or LCA**, “a technique to assess the environmental aspects and potential impacts associated with a product, process, or service”<sup>1</sup>
- There are three basic parts of an LCA:<sup>2</sup>

## 1. Inventory Analysis

- identify and quantify the inputs (materials and energy) and all the environmental releases

## 2. Impact Analysis

- assess or evaluate the total impact of the product on the environment

## 3. Improvement Analysis

- interpret the results to identify and implement opportunities to lower the environmental impact

Life Cycle Management and conducting a Life Cycle Assessment for your product are two very different things. **LCA is an advanced technique and is not necessary for getting started** with life cycle thinking.

<sup>1</sup> U.S. EPA, “Life-Cycle Assessment (LCA)”

<sup>2</sup> Garner, Andy and Keoleian, Gregory A, Ph.D. National Pollution Prevention Center for Higher Education, “Industrial Ecology: An Introduction.”



# Difficulties of LCA

Conducting a Life Cycle Assessment for even a simple product can be complicated and time consuming.<sup>1</sup>

## Typical Challenges in Conducting an LCA

Assessments require a lot of data and staff hours. The costs are often prohibitive, especially for smaller companies.

Data may not be available or may not meet data quality requirements.

It can be difficult to allocate materials and other inputs appropriately

Environmental impact data are often complex and difficult to understand

There is still a lot of work needed before LCA can be used easily and accurately. However, **you can still incorporate life cycle thinking** into your process.

<sup>1</sup> Garner, Andy and Keoleian, Gregory A, Ph.D. National Pollution Prevention Center for Higher Education, "Industrial Ecology: An Introduction."



# Basic Steps for Identifying Your Impact

Now that you have an understanding of what it means to look at environmental impacts throughout the product life cycle, you are ready to identify the specific impacts of your product, facility or company.

## 1. Examine your industry as a whole

- Understand the unique impacts your industry has and stakeholder concerns. Are there environmental problems associated with your industry? Are stakeholders worried about specific issues?

## 2. Identify where you are in the value chain

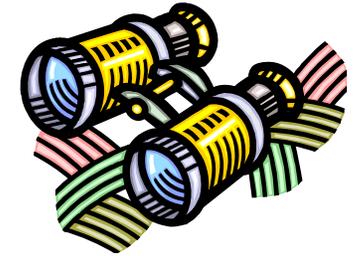
- Within your industry, where does your company lie in the value chain of the product? How does that affect the industry impacts that you can control or influence?

## 3. Conduct a self-assessment

- Assess your company (or facility) using metrics and get a baseline measurement. This will allow you to measure progress over time. Many companies focus on these inside the fence issues first, but it is important to understand them in the context of the first two steps.



# 1. Looking at your Industry



- A good first step in identifying your company's or your products' major impacts is to first look at the industry as a whole.
- The major environmental impacts for an industry will depend on the life cycle of the products.
- The impact may be from the extraction or processing of the materials used to make the product. It may come from the manufacturing process itself, how the product is used, or the disposal of the product.
- **What are the major environmental impacts associated with your industry? What impacts are stakeholders most concerned with?**

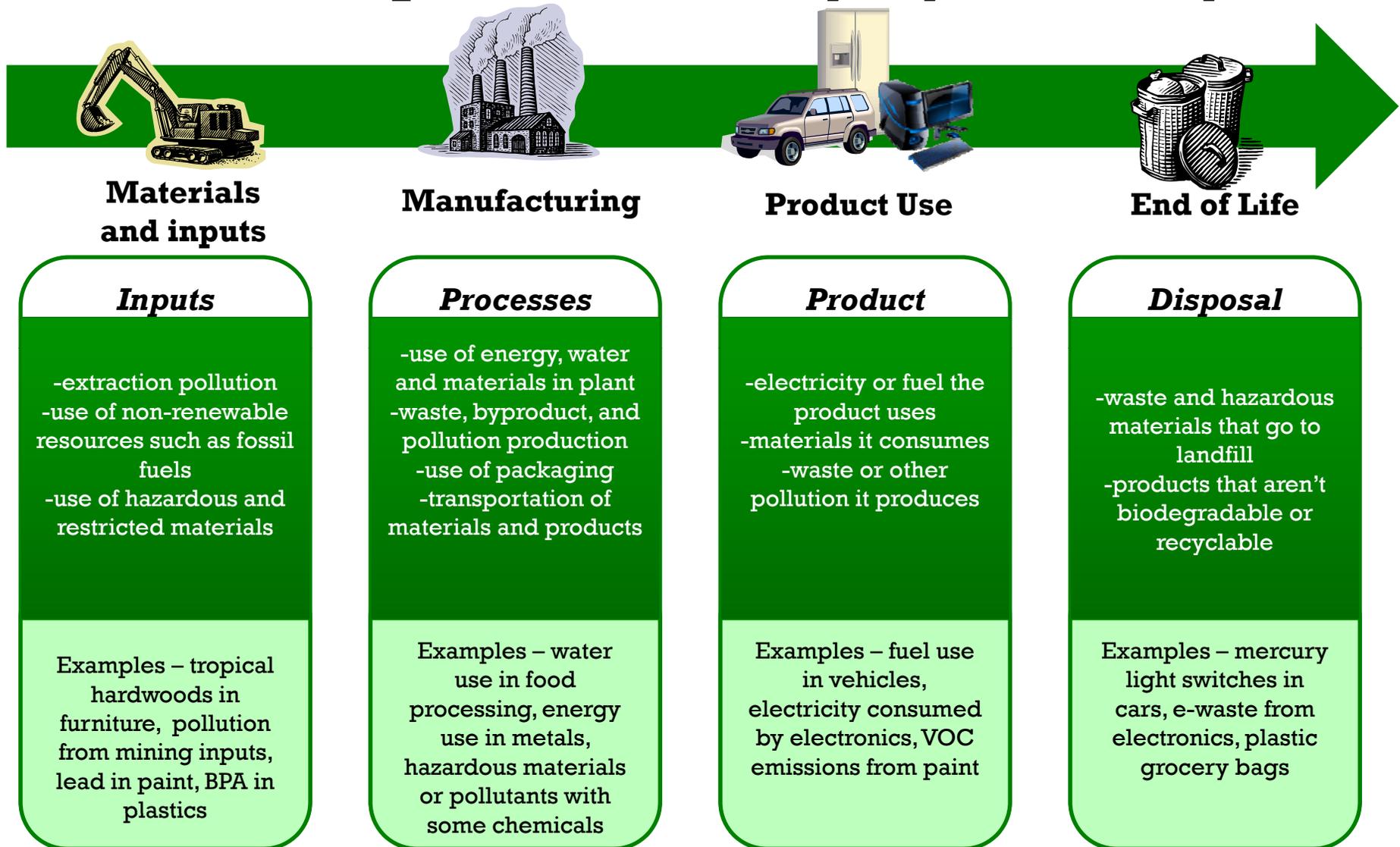
Check with your industry associations, other companies in your industry or other bodies to see if there is existing information on:

- Industry impacts
- Existing solutions
- Stakeholder concerns
- Upcoming regulatory issues

This can help you focus your efforts.



# How Impacts Can Vary by Industry



## 2. Where is your company in the value chain?

- Think about where your company is in your products' value chain.<sup>1</sup>
- What processes are upstream?
- What happens to the products after they leave your facility?
- What countries are involved in the value chain?
- **How does your company's place in the value chain affect the environmental impacts that you are responsible for or the ones you can influence?**
- One way of doing this is to create a process tree like this one that lays out each process in the product's life cycle and its related environmental impacts.

Upstream



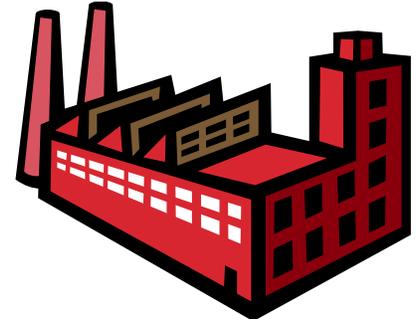
Downstream

<sup>1</sup> United Nations Environment Programme and Delft University of Technology "Design for Sustainability A Step-by-Step Approach."



# Impacts Outside Your Facility

- You may find that **much of the environmental impact of your products does not occur in your facility** but upstream and downstream from you.<sup>1</sup>
- These impacts, from your suppliers, customers and end users, can often hold opportunities to address your product's overall environmental impact.
- While it can be a challenge to control impacts from outside your facility, sometimes you will find that these are the impacts where you should focus your efforts.
- In the Accenture study, **88 percent** of CEOs said that companies should embed sustainability throughout their supply chains, but **only 54 percent said their companies had already done so.**<sup>2</sup>

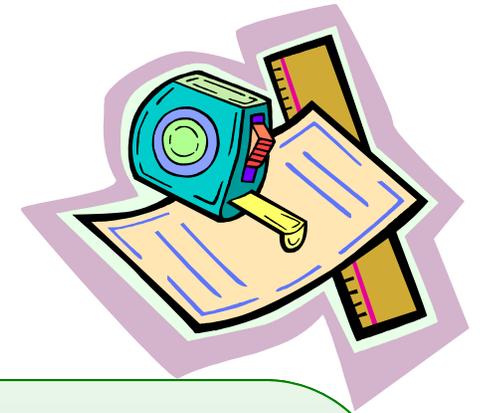


<sup>1</sup> UNEP Life Cycle Initiative "Life Cycle Management"

<sup>2</sup> Accenture and the United Nations Global Compact "A New Era of Sustainability: UN Global Compact-Accenture CEO Study 2010."



# 3. Measurement: Conducting a Self-Assessment



- In order to set environmental impact goals and know if you are making progress in meeting them, you will need to first get a baseline measurement of your company or facility impacts.
- There are numerous assessment tools and metrics sets that you could use.
- Metrics are designed for various purposes. It's important to choose metrics that fit your company's needs.

## Types of Metrics:<sup>1</sup>

- Individual Indicators
- Key Performance Indicators (KPIs)
- Composite Indices
- Material Flow Analysis (MFA)
- Environmental Accounting
- Eco-efficiency Indicators
- Life Cycle Assessment (LCA)
- Sustainability Reporting Indicators
- Socially Responsible Investment (SRI) indices

<sup>1</sup> "Eco-Innovation in Industry, Enabling Green Growth," OECD



# Types of Metrics or Indicators<sup>1</sup>

## Individual Indicators

- These measure single environmental aspects and can be grouped into sets

## Key Performance Indicators (KPIs)

- These are usually a limited number of indicators that are defined according to the goals of a specific organization.

## Composite Indices

- These synthesize the results of a group of individual indicators into a single metric or group of metrics

## Material Flow Analysis (MFA)

- This measures the flow of materials and energy through the steps of a production process

## Environmental Accounting

- Similar to financial accounting, this calculates environmental costs and benefits.

## Eco-efficiency Indicators

- These use a ratio of environmental impacts to economic value created

## Life Cycle Assessment (LCA)

- LCA measures the environmental impacts of a product throughout its entire "life", from materials extraction to production, use and end-of-life

## Sustainability Reporting Indicators

- These indicators are used by companies to report sustainability performance to stakeholders

## Socially Responsible Investment (SRI) Indices

- These are used by the financial industry to compare the sustainability performance of companies.

For more information on various metrics, the Engineering Laboratory at the National Institute of Standards and Technology has built a [repository](#) of sustainable manufacturing indicators. The website includes analysis of publicly available indicator databases and categorizes various indicator sets.

<sup>1</sup> "Eco-Innovation in Industry, Enabling Green Growth," OECD



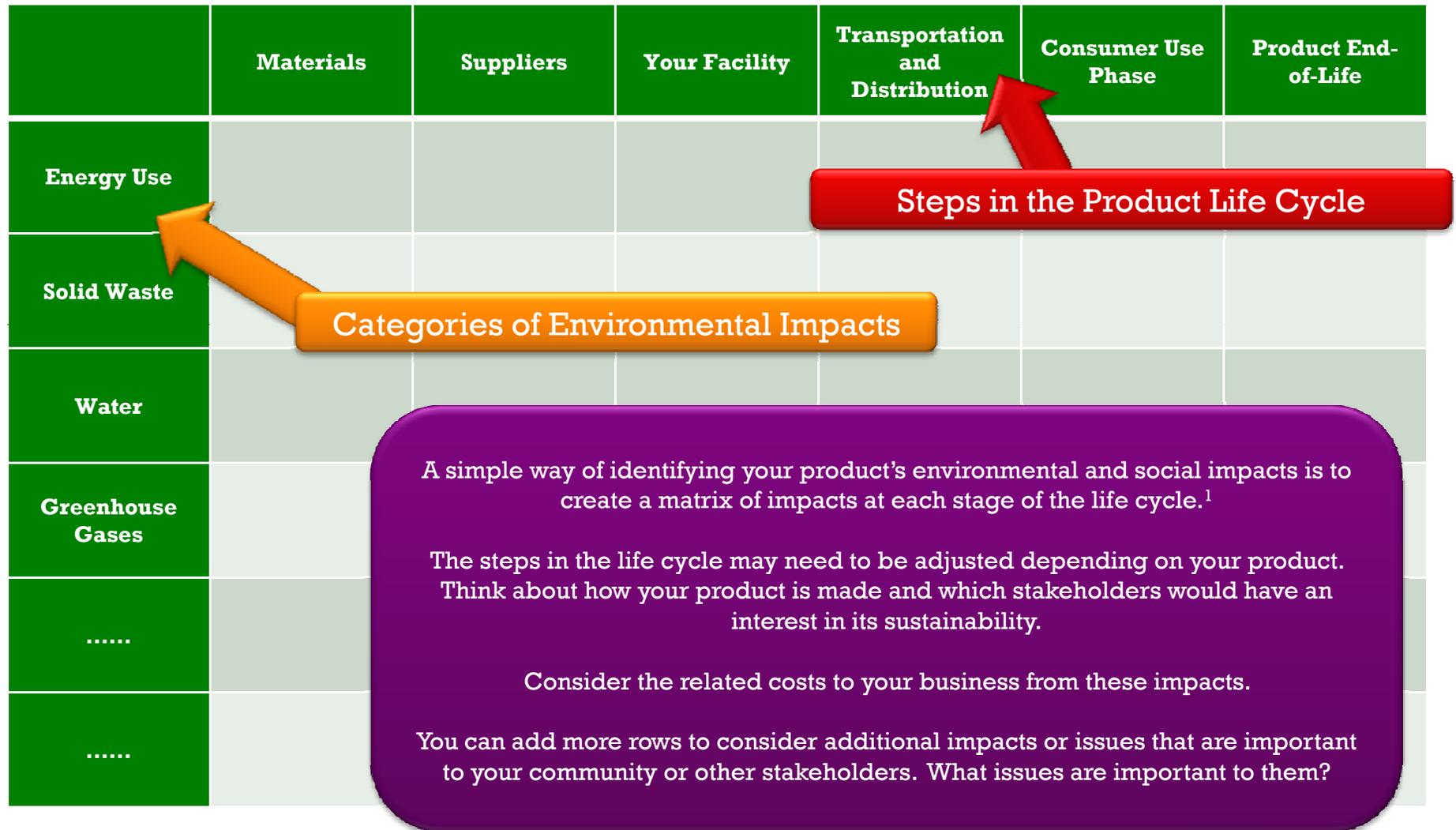
# Metrics and Assessment



- The Organization for Economic Cooperation and Development (OECD) has developed **a simplified toolkit for measuring environmental impacts** from your facility and products.
- The “**OECD Sustainable Manufacturing Toolkit**” was designed for use by small companies and non-technical experts.
- It includes 18 of the most important and commonly applicable quantitative indicators for environmental performance.
- It also includes a guide walking you through the steps to measure your performance.
- You can view this free toolkit [here](#).



# Understanding Your Product's Overall Impact

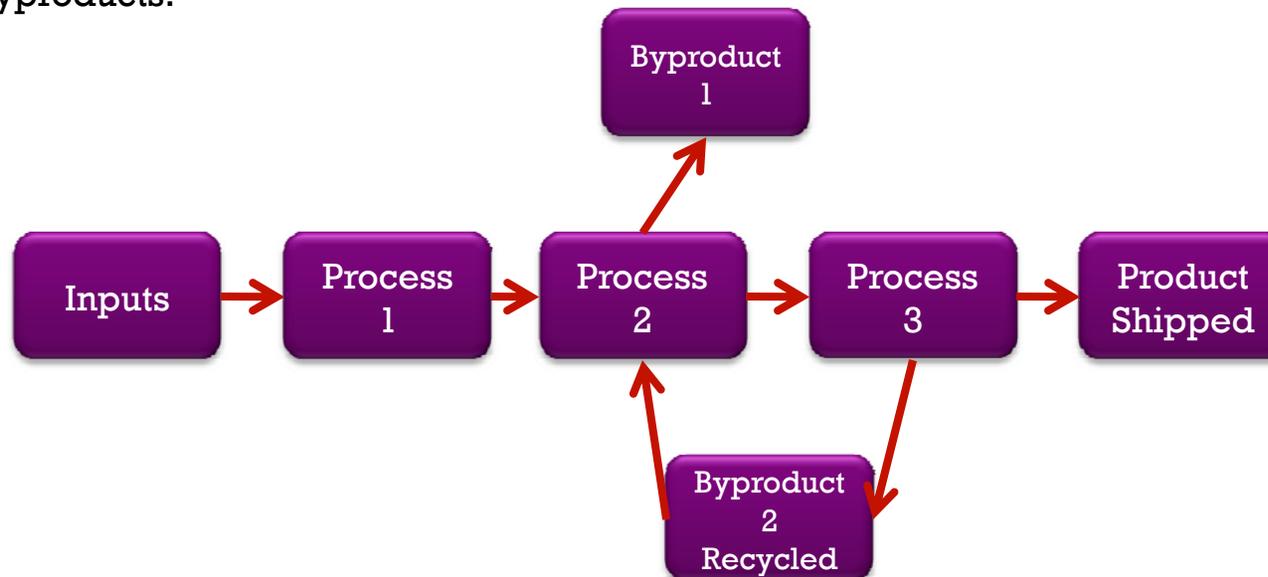


<sup>1</sup>United Nations Environment Programme and Delft University of Technology "Design for Sustainability A Step-by-Step Approach."



# Understanding Impacts Within Your Facility

- A good first step in understanding the impacts within your facility is to create a **Process Map or Process Flow Diagram** that maps the processes in your facility. Your facility may already have one you could start with.
- A process map will help you identify where and how your facility impacts the environment and where would be good areas to improve. It will also help you determine the effects to your business of any projects or changes to the process.
- Map **inputs, processes, machines, outputs, byproducts** – anything that is part of the process.
- For example, you shouldn't just include the raw materials, machinery and final product. You also need to include the energy, maintenance and labor that is used by the machinery and any wastes and byproducts.<sup>1</sup>



<sup>1</sup> EPA Small Business Division, "Practical Guide to Environmental Management for Small Business"



# Value Stream Mapping

- If your company already uses lean manufacturing practices, you can adapt your **value stream map (VSM)** to include environmental information. There are many ways to do this, and you can adjust the VSM technique to meet your needs.
- A traditional VSM doesn't include many environmental wastes including<sup>1</sup>:
  - The use of more materials, energy, water, or other resources than you need to meet the needs of the consumer
  - Pollution and emissions released into the environment
  - Hazardous materials that can hurt people or the environment
- Using a VSM can help you understand where your environmental impacts occur in each process, quantify resource use, and find the causes of any waste or inefficiency.<sup>1</sup>
- On the next slide we will see an example of how VSM can include environmental wastes.



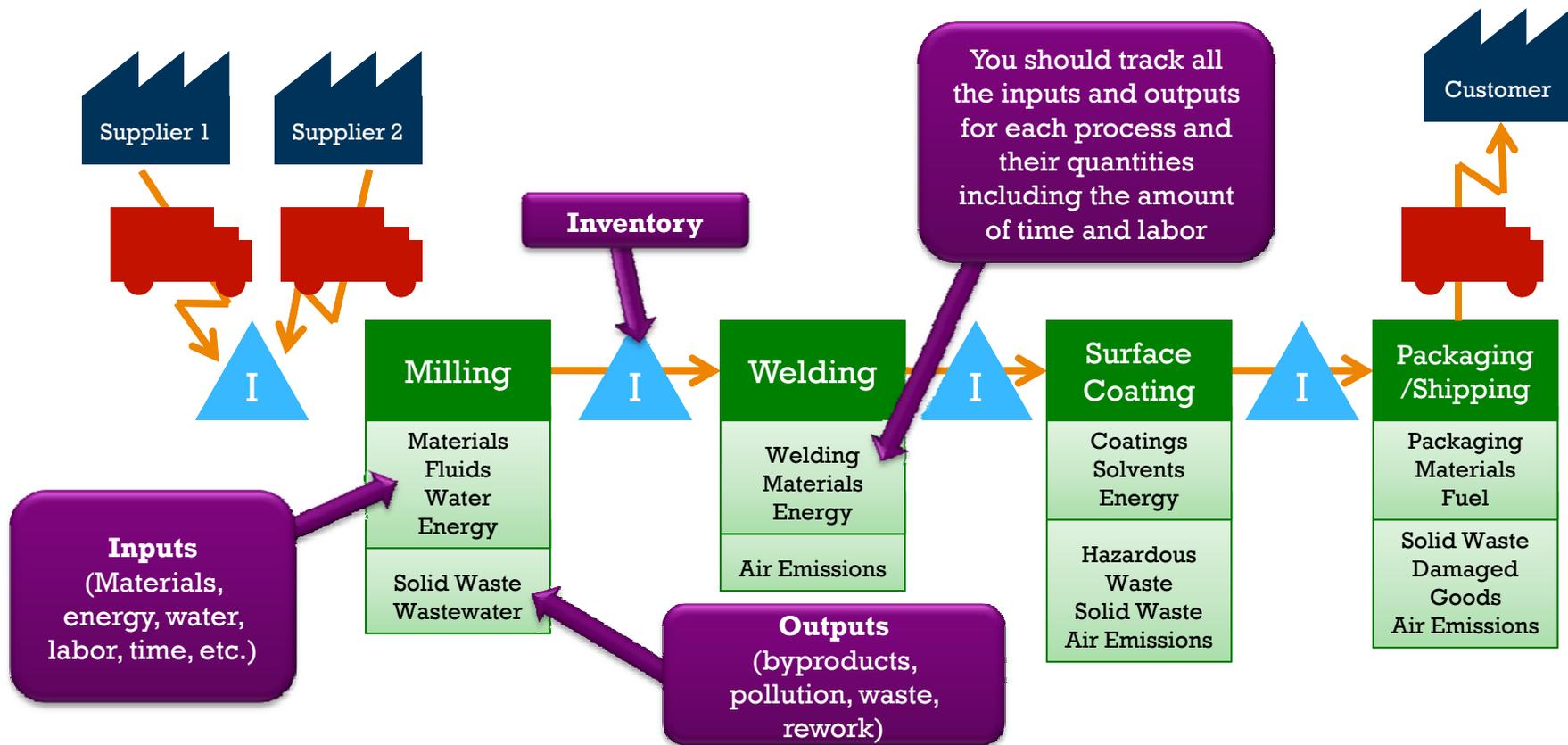
For more information on **how to integrate environmental data into value stream maps** and use them to identify opportunities for improvement please see the **[Lean and Environment Toolkit](#)** or **[this](#)** helpful guide from the Green Suppliers Network.

<sup>1</sup>“Lean and Clean Value Stream Mapping,” Green Suppliers Network



# Value Stream Mapping Example

- Below is a **very simplified example** of a Value Stream Map with some environmental information. We will refer back to this example later.<sup>1</sup>
- You will want to begin by recording your processes' "**current state**" or how they function now. Later you can estimate a "**future state**"—what the system would look like in its idealized efficient form or after a particular sustainability project.



<sup>1</sup> Adapted from "Lean and Clean Value Stream Mapping," Green Suppliers Network, and "The Lean and Environment Toolkit," EPA.



# Setting Priorities

- Once you have identified your facility's environmental impacts, you **need to prioritize** which ones you will focus on.
- After selecting a few impacts to focus on, you need to understand what opportunities exist for mitigating or eliminating those impacts.
- You will learn more in the next lesson about identifying opportunities.

## Important Questions to Ask When Setting Priorities<sup>1</sup>

1. What are the most important impacts?
2. Where are there opportunities for projects to mitigate those impacts?
3. Does your company have the power to implement the projects to reduce the impacts?
4. Are the projects viable economically?

<sup>1</sup> UNEP "Life Cycle Management: A Business Guide to Sustainability"



# What Kinds of Environmental Impacts are Most Important?

It's advisable to focus on environmental impacts that:<sup>1</sup>

- Have a **large effect** on the environment or society
- Have **higher cost** implications to the company or consumers
- Are **important to stakeholders** (customers, employees, community)
- You have some **control** over



<sup>1</sup> United Nations Environment Programme and Delft University of Technology "Design for Sustainability A Step-by-Step Approach."



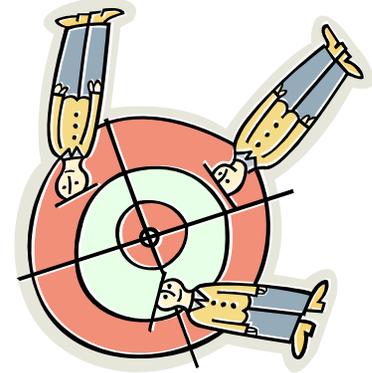
# Thinking About Your Stakeholders

- No matter what your company produces, you have a group of stakeholders that have an interest in what your company does.
- Where is your facility? What are the local issues that the **community** cares about?
- What do your **customers** care about? Are there environmental issues related to your products that are important to the customer?
- Are there issues your **employees** care about? They care about the company's environmental impact as well. There may also be workplace environmental issues at hand related to safety and the working environment.
- Are there **other stakeholders** that have an interest in your company's environmental impact? Non-Governmental Organizations (NGOs), the government, etc.



# Objectives and Targets

- Once you have set priorities, you can think about your objectives and targets.
- Objectives and targets should be<sup>1</sup>:



Quantifiable

Able to be tracked and measured at a reasonable cost

Able to be controlled by the company

Developed with people from relevant functional areas

Realistic

Relatively simple

Limited in number

Flexible rather than prescriptive

<sup>1</sup> NSF International. "Environmental Management Systems: An Implementation Guide for Small and Medium Sized Organizations."



# Objectives and Targets: Examples<sup>1</sup>

| Objectives                           | Targets  |
|--------------------------------------|--|
| Reduce water use.                    | Reduce water use by 10% this year.   |
| Reduce Energy Use                    | Reduce electricity use by 15% by 2014<br>Reduce natural gas use by 20% by 2015   |
| Reduce usage of hazardous materials. | Reduce solvent usage by 30%  |
| Improve employee engagement          | Hold monthly sustainability meetings<br>Publish quarterly sustainability report. |

<sup>1</sup> NSF International. "Environmental Management Systems: An Implementation Guide for Small and Medium Sized Organizations."



# Environmental Management Systems (EMSs)

Before you dive into a set of sustainability projects, it's important to implement an Environmental Management System if your company doesn't already have one.

*An EMS is a set of “management processes and procedures that allows an organization to analyze, control and reduce the environmental impact of its activities, products and services and operate with greater efficiency and control.”<sup>1</sup>*

An EMS allows for **continuous improvement** of your environmental performance by following a **Plan-Do-Check-Act cycle**.

An EMS is an approach to environmental management that uses the Plan-Do-Check-Act quality improvement principles. It permeates an organization and allows that organization to develop an environmental policy, review progress, and maintain an environmental program.<sup>2</sup>

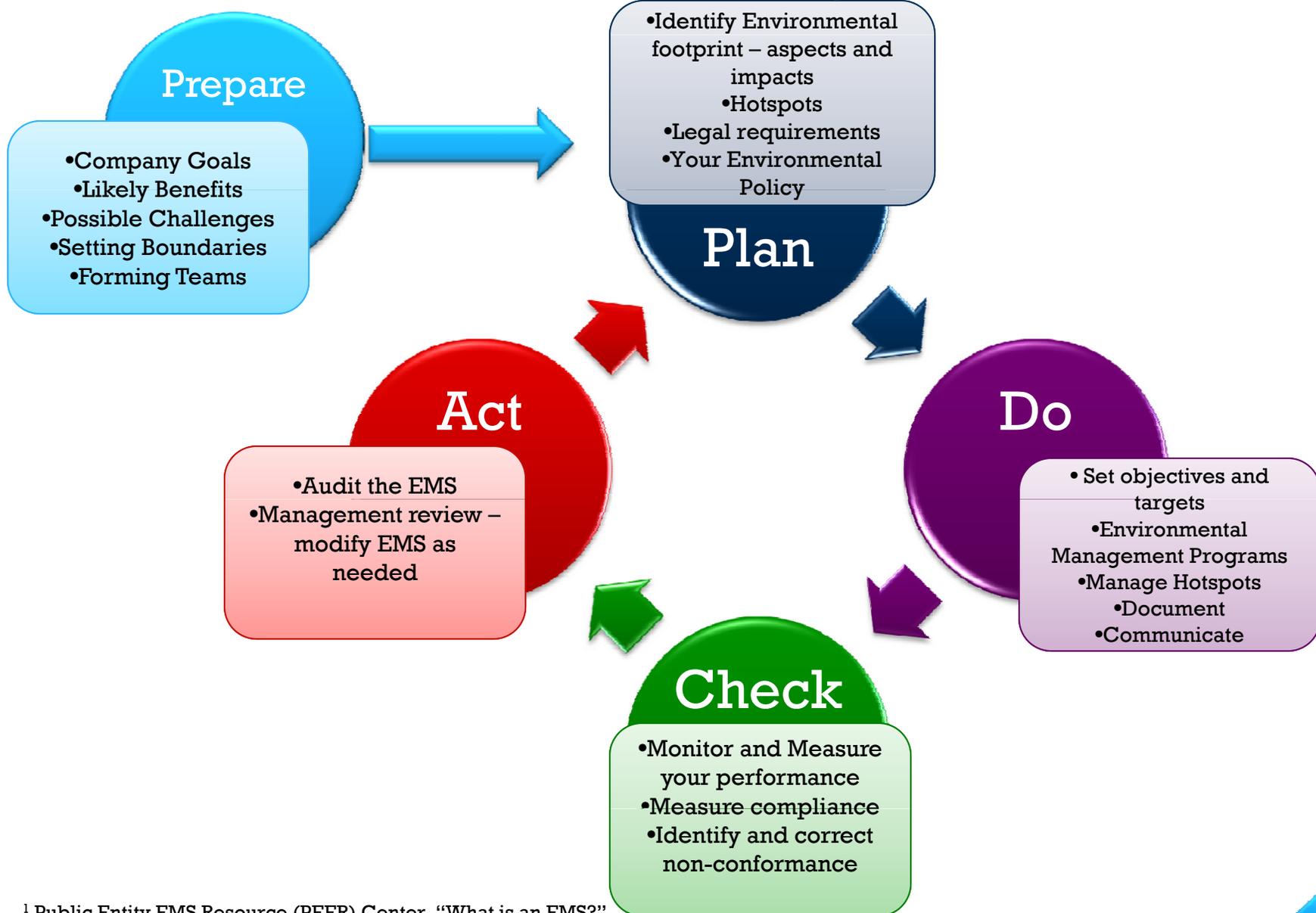
Implementing an Environmental Management System can be critical to the success of your environmental program.

<sup>1</sup> Public Entity EMS Resource (PEER) Center “What is an EMS?”

<sup>2</sup> EPA Small Business Division, “Practical Guide to Environmental Management for Small Business”



# Basic EMS Cycle<sup>1</sup>



<sup>1</sup> Public Entity EMS Resource (PEER) Center “What is an EMS?”



# The Environmental Policy



- An important early part of developing an Environmental Management System is the creation of your company's Environmental Policy.
- It is **how people will be able to understand your company's beliefs and commitments related to sustainability**. It should include information on how the company views sustainability issues in its decision making and how these issues are dealt with in the company's daily activities.<sup>1</sup>
- The environmental policy is the way you communicate your commitment to sustainability to your employees and external stakeholders. It drives the projects you undertake.<sup>1</sup>

## Guidance for Developing an EMS:

Here is an in-depth guide from NSF International on developing an EMS in small companies.

This workbook from the EPA can help you to both develop an environmental policy that's right for your business and document your Environmental Management Plan.

<sup>1</sup> EPA Small Business Division, "Practical Guide to Environmental Management for Small Business"



# Where to Go for Help



- UNEP's [Design for Sustainability](#) and [Life Cycle Management: A Business Guide to Sustainability](#) can be helpful reference guides as you attempt to identify your impacts and redesign products and processes.
- The OECD's [Sustainable Manufacturing Metrics Toolkit](#) has developed a toolkit for SMEs to help them measure the environmental impacts of their facility and products.
- The EPA's [Documenting Your Environmental Management Plan](#) can help you to both develop an environmental policy and program that's right for your business.
- This [implementation guide](#) from NSF International will also help you develop an Environmental Management System in your company.



# Getting Started - Checklist



- ✓ Utilize life cycle thinking. Look at your product's life cycle. Where are the major environmental issues? What environmental impacts are most important in your industry?
- ✓ Where do you fit into the value chain of your product? How does that affect your individual company's environmental issues?
- ✓ Conduct assessments of your company's or facility's environmental impacts.
  - You should first look at energy, water and materials use, greenhouse gas emissions, pollution, waste and by-products produced
  - Break the facility down into processes to analyze. If you use lean, you can incorporate this into Value Stream Maps
  - Get a baseline measurement of your impacts using appropriate metrics



## Search

- How-to guides
- General information
- Metrics/Assessment Tools
- Technical Assistance
- Training Opportunities

- ✓ Focus on impacts that are large, costly, important to stakeholders, and somewhat controllable.
- ✓ Set priorities based on your analysis
- ✓ Implement an Environmental Management System

