

Environmental Management System (EMS)

Environmental Management System is one of the most efficient ways to reduce an organization's environmental impact. All organizations can benefit from implementing an Environmental Management System (EMS), regardless of size, geography, industry, or stage of its environmental journey.

The Purpose of an Environmental Management System

An environmental management system is a framework designed to help organizations monitor, control, and continuously improve their environmental performance.

1. Organizations can utilize the framework as an organizing principle to structure their environmental strategy.
2. An EMS is geared to help organizations identify, manage, monitor, and control their environmental performance in a holistic manner.
3. By implementing an EMS, an organization will consider all environmental issues that are relevant to its operations.
4. Ensure necessary controls and third-party auditing to ensure compliance with statutory requirements and increase leadership and employee involvement in sustainability.

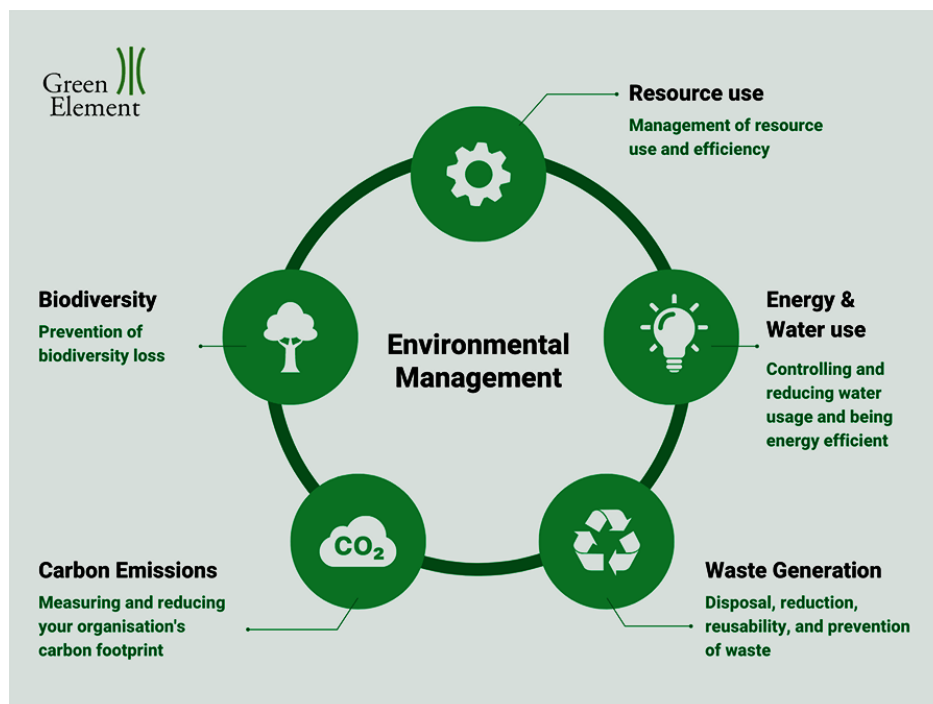


Figure 1: Elements considered when implementing an Environmental Management System.

ISO 14000 Family of Standards

The ISO 14000 family of standards provides practical tools for companies and organizations of all kinds looking to manage their environmental responsibilities. The ISO 14000 family of standards is comprised of 23 standards which can be broken down into seven categories: EMSs, environmental auditing, environmental labeling, environmental performance evaluation, life cycle assessment, environmental management vocabulary, and environmental aspects in product standards. ISO 14001 is the world's most recognized framework for environmental management systems (EMS), where helps organizations both to manage better the impact of their activities on the environment and to demonstrate sound environmental management.

ISO 14001:2015

- ISO 14001 is the most recognized standard within environmental management and the most widely used in the world, with over 420,000 ISO14001 certifications issued each year.
- The standard is published by the International Organization for Standardization (ISO), an international body that creates and distributes standards that are accepted worldwide.
- It provides a solid framework for implementing an environmental management system, rather than establishing environmental performance requirements.
- It is beneficial to follow the framework of this standard when implementing an EMS, even if you do not wish to certify.
- The ISO14001 certification encourages the use of the “Plan Do Check Act” (PDCA) methodology; an iterative cycle tasked with achieving continuous improvement in an organization’s environmental performance.

Table (1): The ISO 14000 Standards.**Structure of the U.S. Technical Advisory Group**

ISO 14001	Environmental management systems—Specifications with guidance for use
ISO 14004	Environmental management systems—General guidelines on principles, systems, and supporting techniques
ISO 14010	Guidelines for environmental auditing—General principles on environmental management systems
ISO 14011/1	Guidelines for environmental auditing—Audit procedures—Audit of environmental management systems
ISO 14012	Guidelines for environmental auditing—Qualification criteria for environmental auditors
ISO 14015	Environmental site assessments
ISO 14020	Goals and principles of all environmental labeling
ISO 14021	Environmental labels and declarations—Self declaration environmental claims—Terms and definitions
ISO 14022	Environmental labels and declarations—Self declaration environmental claims—Symbols
ISO 14023	Environmental labels and declarations—Self declaration environmental claims—Testing and verification
ISO 14024	Environmental labels and declarations—Environmental labeling Type I - Guiding principles and procedures
ISO 14025	Environmental labels and declarations—Environmental information profiles—Type III guiding principles and procedures
ISO 14031	Evaluation of environmental performance
ISO 14040	Environmental management—Life cycle analysis—Principles and framework
ISO 14041	Environmental management—Life cycle analysis—Life cycle inventory analysis
ISO 14042	Environmental management—Life cycle analysis—Impact assessment
ISO 14043	Environmental management—Life cycle analysis—Interpretation
ISO 14050	Terms and Definitions—Guide on the Principles for ISO/TC 207/SC6 terminology work
ISO Guide 64	Guide for inclusion of environmental aspects in product standards

Plan Do Check Act (PDCA) Methodology

The PDCA methodology is a four-step process geared toward carrying out desired change, with the key focus being on continuous improvement.

- **Plan** : Your organization will look to recognize and plan an environmental action.
- **Do** : After agreeing on your plan, you will carry out the planned action.
- **Check** : You will then review and analyze the performance of the planned action(s) and identify what you have learned from the process.
- **Act** : you should act .If your initial plan was not effective, you can go through the PDCA cycle again and adjust your plan and actions.

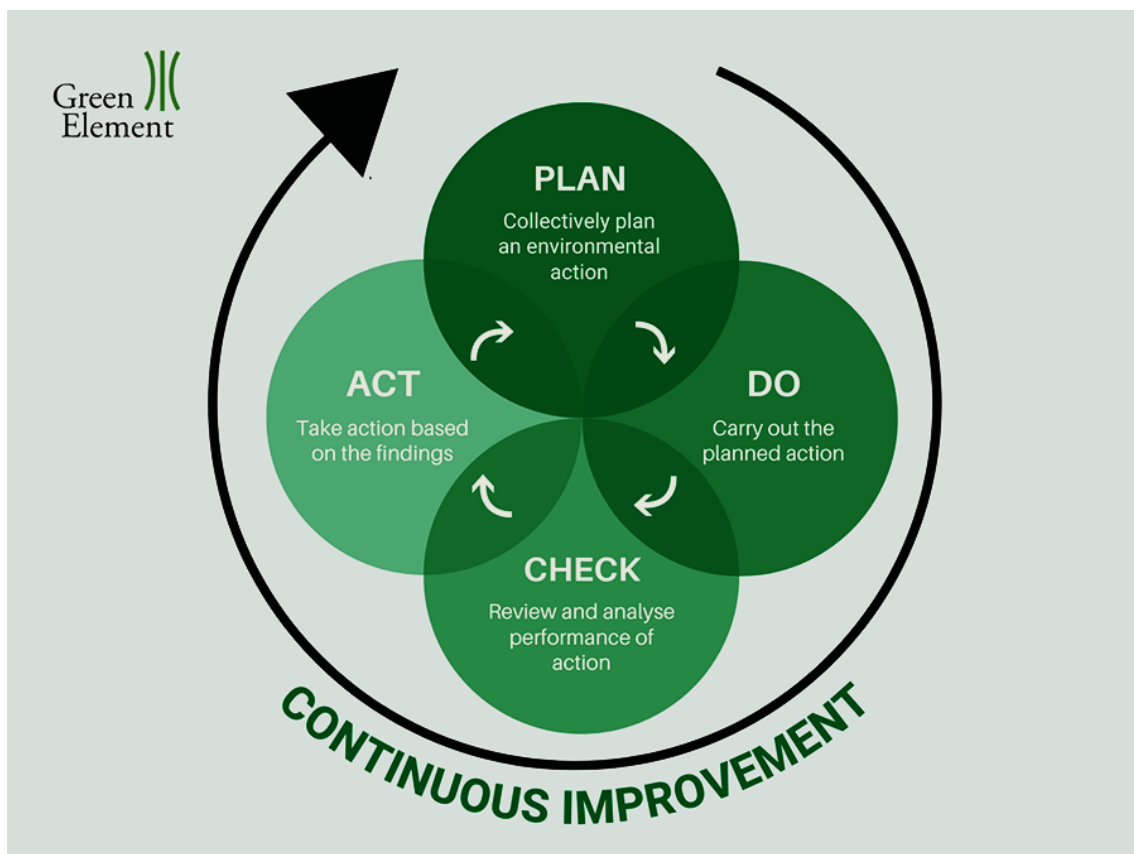


Figure 2: Plan Do Check Act Continuous Cycle.

Complementary Systems and Tools

Growing industrial and government interest in energy and environmental management has led to the development of a number of concepts and tools that enable organizations to understand evaluate and manage the environmental implications of their operations, services and products. Some tools are :

1. Green procurement ;
2. Sustainable community planning ;
3. Life cycle management ;
4. Life cycle assessment ;
5. Sustainable design.

Life Cycle Assessment (LCA)

LCA is a technique that tries to identify, measure, and characterize different potential environmental impacts associated to each one of the stages of the life cycle Lof a product.

TYPES OF LCA

1. Cradle-to-Grave : is the full Life Cycle Assessment from resource extraction ('cradle') to use phase and disposal phase ('grave')
2. Cradle-to-Gate is an assessment of a *partial* product life cycle from resource extraction (*cradle*) to the factory gate (i.e., before it is transported to the consumer
3. Cradle-to-Cradle is a specific kind of cradle-to-grave assessment, where the end-of-life disposal step for the product is a recycling process.
4. Wheel-to-Wheel is the LCA used for transport fuels and vehicles.
5. Ecology-based is a methodology that quantifies the impacts of human activities on ecological resources and ecosystems.

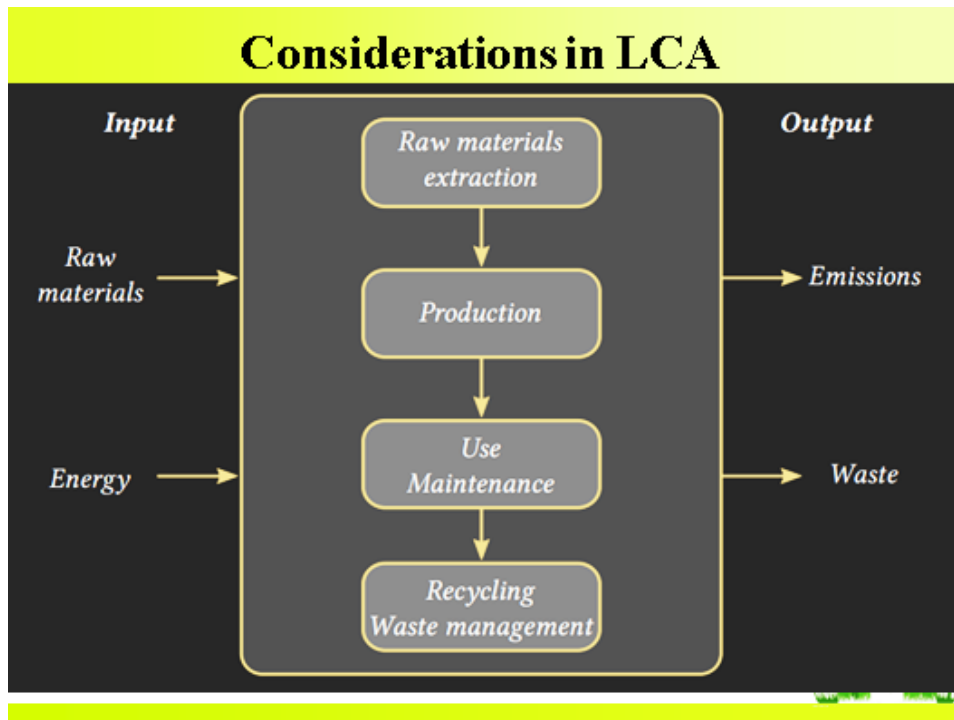


Figure 3: Considerations in LCA.

Steps of an LCA

1. Goal and Scope: Select product or activity Define purpose of study (comparison? improvement?) Set boundaries accordingly
2. Inventory Analysis: Identify all relevant inputs and outputs Quantify and add (At this stage, data are in terms of energy consumed, water usage, greenhouse gas emissions, solid waste produced, and the like.)
3. Impact Analysis: Determine the resulting environmental impacts (At this next stage, the previous data are translated in additional cancer rates, fish kill, habitat depletion, etc.)
4. Interpretation: Use value judgment to assess or decide in relation to the objectives of the study.

Advantages of performing LCAs:

- Companies can claim one product is better than another.
- LCA inventory process helps to narrow in on the area where the biggest reductions in environmental emissions can be made.
- LCA can be used to reduce production costs.
- Results of an LCA may qualify the product for an eco-label.