

# **MCN-201 :**

# **SUSTAINABLE ENGINEERING**

## **Module 3**

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# Module 3

**Environmental management standards: ISO 14001:2015 framework and benefits**

**Scope and goal of Life Cycle Analysis(LCA),**

**Circular economy,**

**Bio-mimicking,**

**Environment Impact Assessment (EIA),**

**Industrial ecology and industrial symbiosis.**

## 5. Environment Impact Assessment (EIA)

- ★ The EIA is a tool that helps in identifying the environmental, economic & social impacts of a project before decision-making.
- ★ It aims to forecast ecological impacts at an initial stage during project planning & design, identify methods to minimize negative impacts, and outline projects to meet the local environment.

# Objectives of Environment Impact Assessment (EIA)



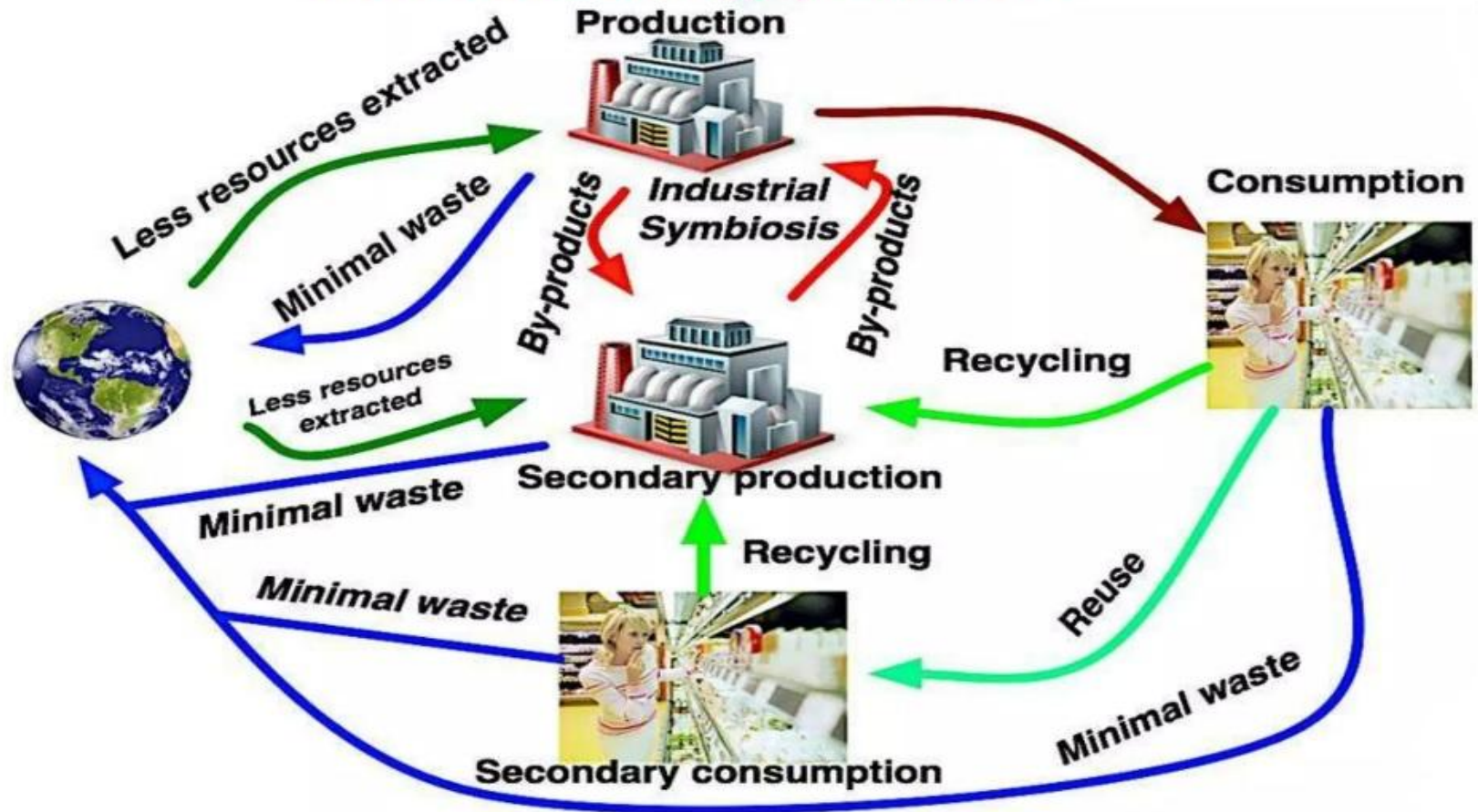
# Importances of Environment Impact Assessment

- ★ EIA links the environment and development so that development is safe for the environment and lasts for a long time.
- ★ EIA is a low-cost way to get rid of or lessen the bad effects of development projects.
- ★ EIA allows decision-makers to examine the environmental impact of development activities long before the project is implemented.
- ★ EIA encourages the use of mitigation methods in the development plan.
- ★ EIA makes sure that the plan for development is good for the environment and doesn't go beyond what the ecosystem can handle.

## 6.Industrial ecology and industrial symbiosis.

- ★ The study of the flows of materials and energy in industrial and consumer activities, the effects of these flows on the environment, and the influences of economic, political, and social factors on the flow, use and transformation of resources.
- ★ The primary goal of industrial ecology is to promote sustainable development at the local, regional, national, and global levels.
- ★ IE is a dynamic system-based framework that enables management of human activity on a sustainable basis by:
  - Minimizing energy and materials usage
  - Ensuring acceptable quality of life for people
  - Minimizing the ecological impact of human activity to levels natural system can sustain
  - Maintaining the economic viability of systems industry

# Industrial Ecology processes



# Industrial Symbiosis

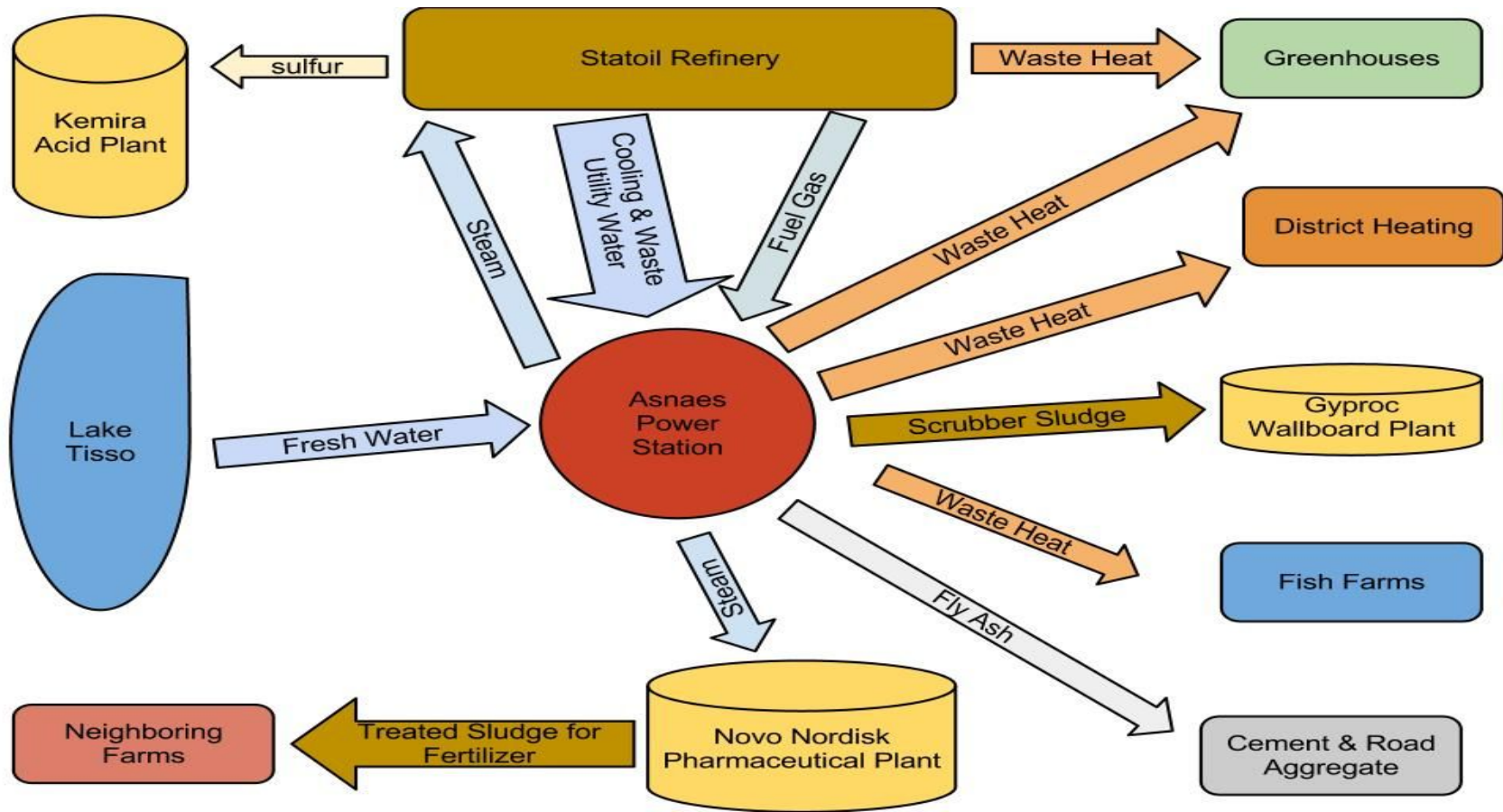
- ★ Industrial symbiosis is the process by which wastes or by-products of an industry or industrial process become the raw materials for another.
- ★ Application of this concept allows materials to be used in a more sustainable way and contributes to the creation of a circular economy.
- ★ It was first coined in 1989 to describe the collaboration of businesses in Kalundborg involves the physical exchange of materials, energy, water, and by-products among several organizations



# Eco-industrial Park

- A community of manufacturing and service businesses seeking enhanced environmental and resource issues including energy, water, materials, information, and natural habitat.





Kalundborg Eco-Industrial Park Symbiosis Map