What is Cleaner Production?

Terminology and Examples

Cleaner Production, often abbreviated as CP, refers to the application of preventive environmental strategies applied to processes, products and services to increase the overall efficiency and reduce risks to humans and the environment.

CP involves the conservation of raw materials and energy, the elimination of toxic raw materials, and the reduction in the quantities and toxicity of wastes and emissions.

For product development and design, such as the industries in the Upper Awash basin, Cleaner Production involves the reduction of negative impacts throughout the life cycle of the product: from raw material extraction to final disposal.

Cleaner Production examples include:

- Steel corporation: Using treated wastewater to reduce waste and water consumption
- Textile company: Insulation of steam pipes to reduce energy costs
- Paint company: switching from spray paint to powder methods in order to reduce risk on health hazards
- Pharmaceutical factory: conventional coating of tablets substituted by neocota systems to reduce exposure to isopropyl alcohol.

Benefits of Cleaner production include:

- Lower production costs
- Increased (export) market posistion
- Increased profitability
- Reduced long-term liability (companies can face that many years after pooution has been generated)
- More efficient use of energy and raw materials
- Reduced risk of health hazards
- Motivated staff members

Example: Cleaner Production in Ethiopia

The Ethiopian Cleaner Production Centre implemented CP in more than 45 enterprises and ISO 14001 based Environmental Management System (EMS) in 12 enterprises. CP provides the techniques while EMS provides the structure.

The Cleaner Production Centre initiated together with UNEP several CP programs. Between 2010 and 2012 the African Beverage Industries Water Saving Initiative was carried out, among others, in 4 Ethiopian breweries. This initiative was based on the outcome of a study which showed that African breweries are consuming 75 - 200% of water above the global bench-mark and focussed on saving water and awareness raising.

Measures taken under this program included:

- Maintenance of the water dispensing line and standardization of all water flow meters
- Reparation of non-functional cooling systems
- Identifying and reparation of leakages
- Installation of control mechanisms on treatment and dispensing systems
- Recirculating cooling water of sugar dissolving pump
- Construction of 100m^3 rainwater Harvesting tank
- Reduction of water usage in toilets by reducing the volume per flush.
- Awareness raising activities such as training and poster dissemination

The results of the initiative (in terms of water saving) is presented in the table.

Company	Water use before the program hectoliter water / hectoliter beer	Water use after the program hectoliter water /hectoliter beer
Bedele Brewery	15.1	9.97
Dashen Brewery	9.69	7.96
Harar Brewery	8.08	7.1
Meta Abo Brewery	12.76	8.05

(Source: UNEP factsheet: African Beverage Industry Water Savings Initiative)

Industrial Ecology

A more holistic approach, which includes Cleaner Production is referred to as **Industrial Ecology**.

The study of Industrial Ecology aims at identifying and implementing strategies that reduce their environmental impact. Or in other words: the industrial cycle is viewed as a closed cycle, like for example a forest in which all waste products such as CO_2 and animal feces are converted into energy.

Industrial ecology combines multidisciplinary fields such as economics, engineering, sociology, technology and environmental sciences.

Example: Kalundborg Eco-industrial Park

A famous example is the Kalundborg Eco-Industrial Park in Denmark (See diagram). This industrial area, in which some of Denmark's largest

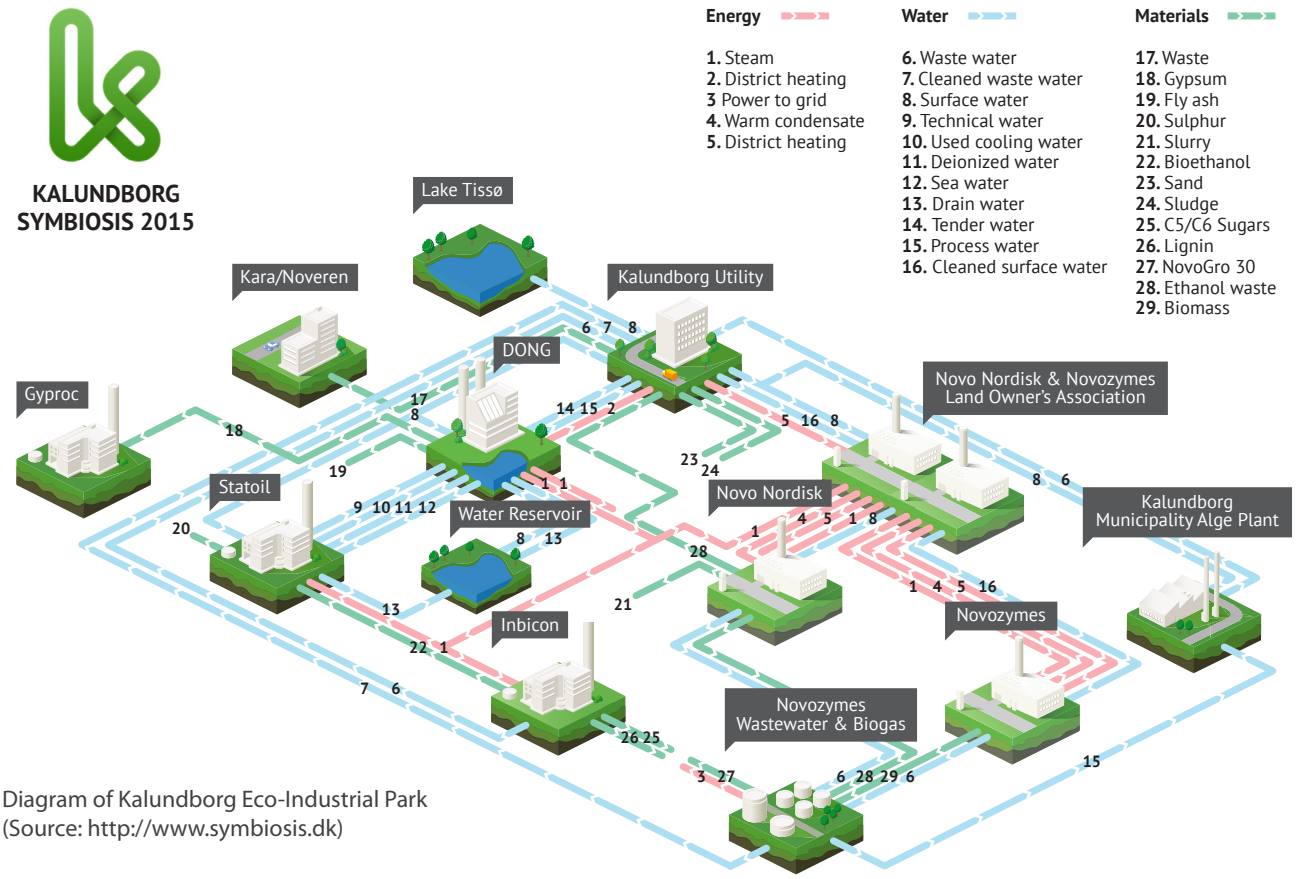

Diagram of Kalundborg Eco-Industrial Park
(Source: http://www.symbiosis.dk)

industries are located, is a symbiosis network between companies.

By-products from one industry serves as input (raw materials) for another. Surplus heat from the coal fired power plant provides 3500 local homes and a nearby fish farm. The sludge from the fish farm is sold as a fertilizer.

Steam from the power plant is sold to Novo Nordisk, a pharmaceutical and enzyme manufacturer, in addition to Statoil plant. Reusing heat reduces the amount of thermal pollution (degradation of water quality caused by changes in temperature) discharged to a nearby fjord.

Another by-product from the power plant is gypsum, which is sold to a wallboard manufacturer. This reduces the amount of open-pit mining. Fly ash and clinker from the power plant is utilized for road construction and cement production.

The industrial symbiosis evolved gradually. It started in the 1960s. As environmental regulations became stricter, firms were motivated to reduce the cost of compliance, and turn their by-products into economic products.

References & further reading

Websites

- Global Development Research Centre: www.gdrc.org/sustdev/concepts/02-c-prod.html
- Green Economy Coalition: www.greeneconomycoalition.org/know-how/eco-industrial-park-denmark
- Kalendborg Symbiosis: www.symbiosis.dk/en

Video

- What is Industrial Ecology: https://study.com/academy/lesson/what-is-industrial-ecology-definition-and-examples.html

Presentation

- Introduction to Cleaner Production concepts and practice, by APINI. [Available at: www.un.org/esa/sustdev/sdissues/technology/cleanerproduction.pdf

Articles

- UNEP: Water Utilisation in african Beverage industries: Current Practices and Prospects [Available at: www.unep.org/roa/docs/pdf/AfricanBeverage.pdf]
- UNEP report: African Beverages Industries Water Savings Initiative (ABIWSI) [available at: http://staging.unep.org/roa/Portals/137/Docs/ABIWSI%20fact%20sheets.pdf]