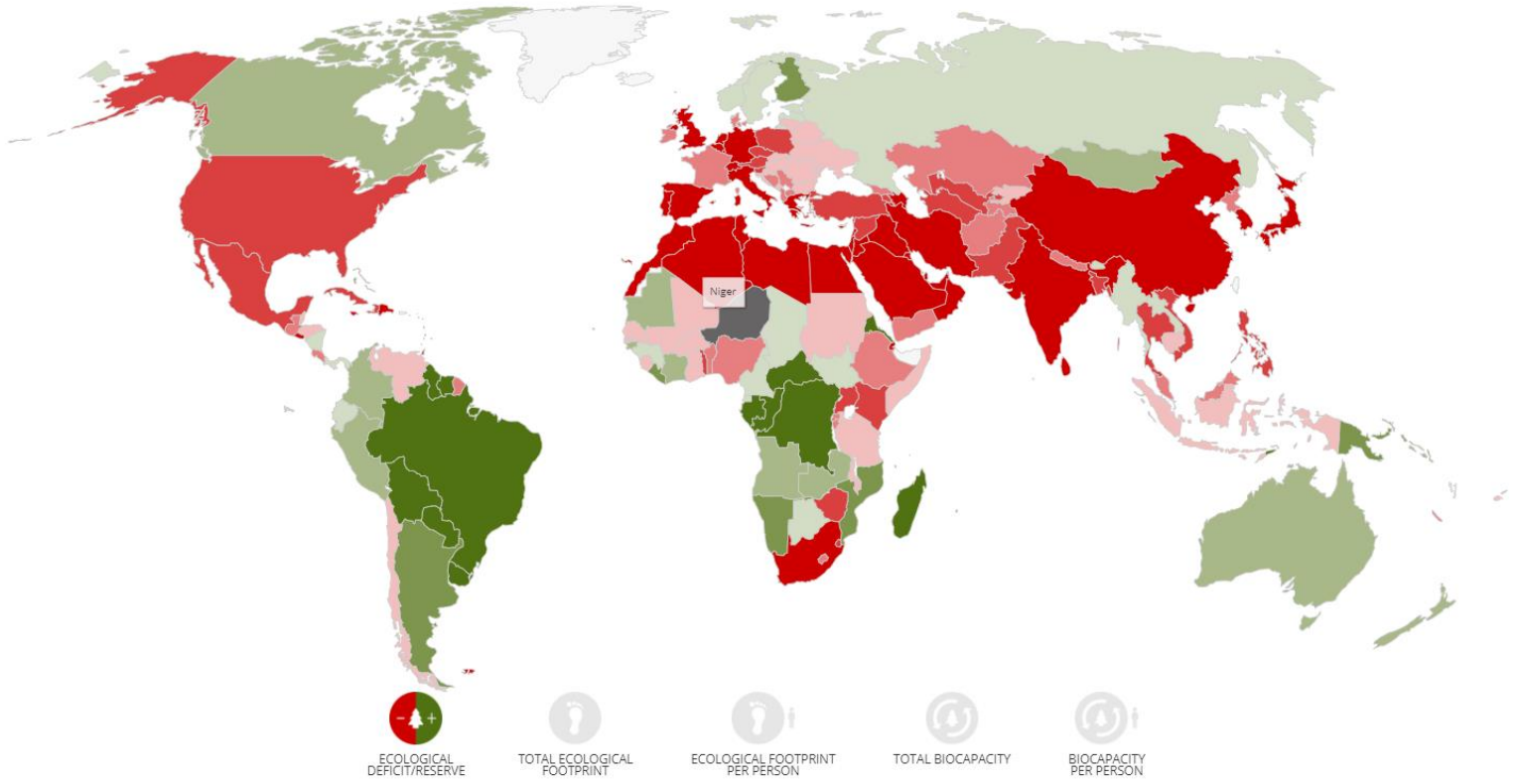
Manufatura sustentável

Manufatura sustentável

Pegada de carbono por país (2016)



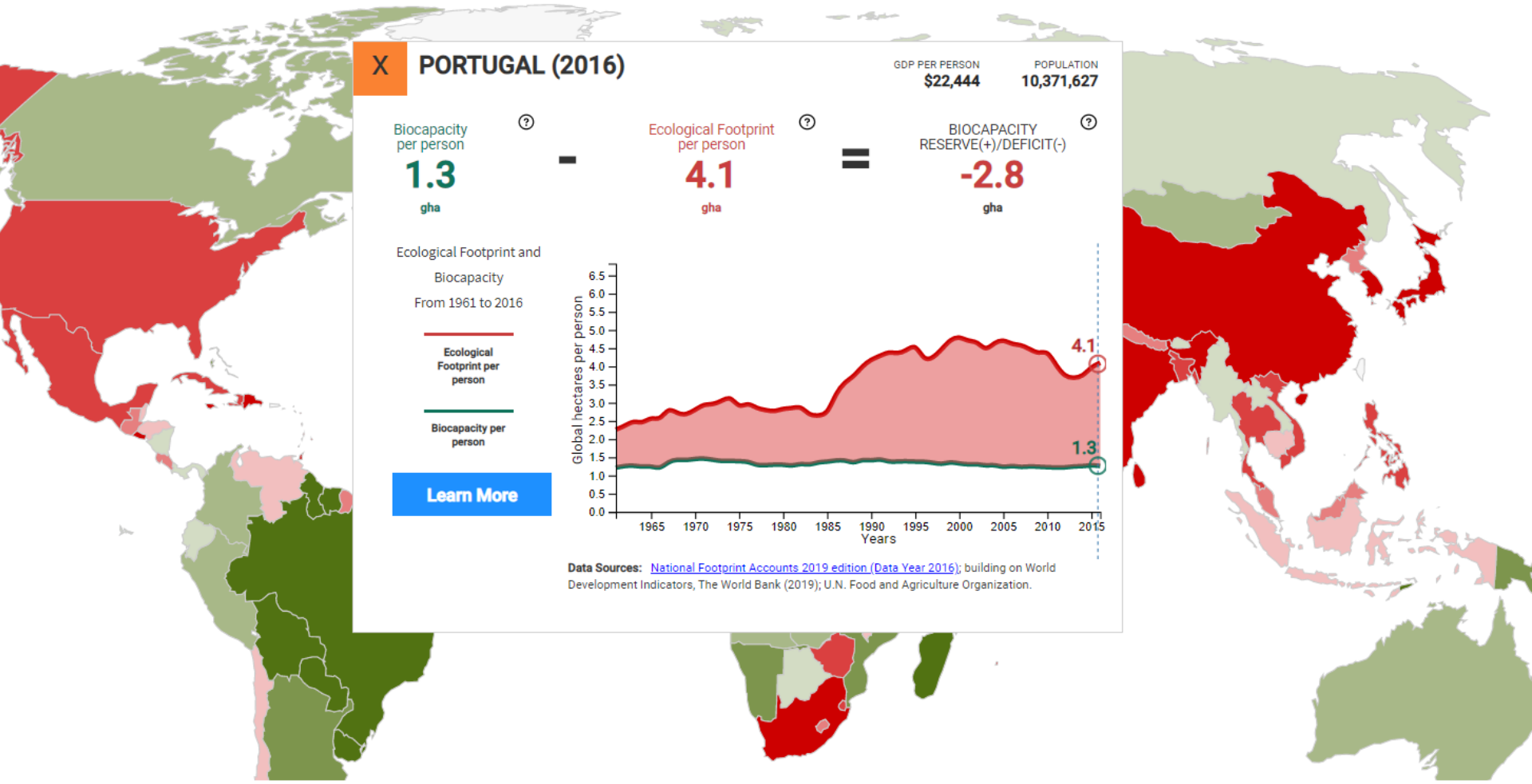
Vermelho: pegada de carbono > bio-capacidade

Verde: pegada de carbono < bio-capacidade

Fonte: Global Footprint Network

Manufatura sustentável

Pegada de carbono_ Portugal (2016)



Fonte: Global Footprint Network

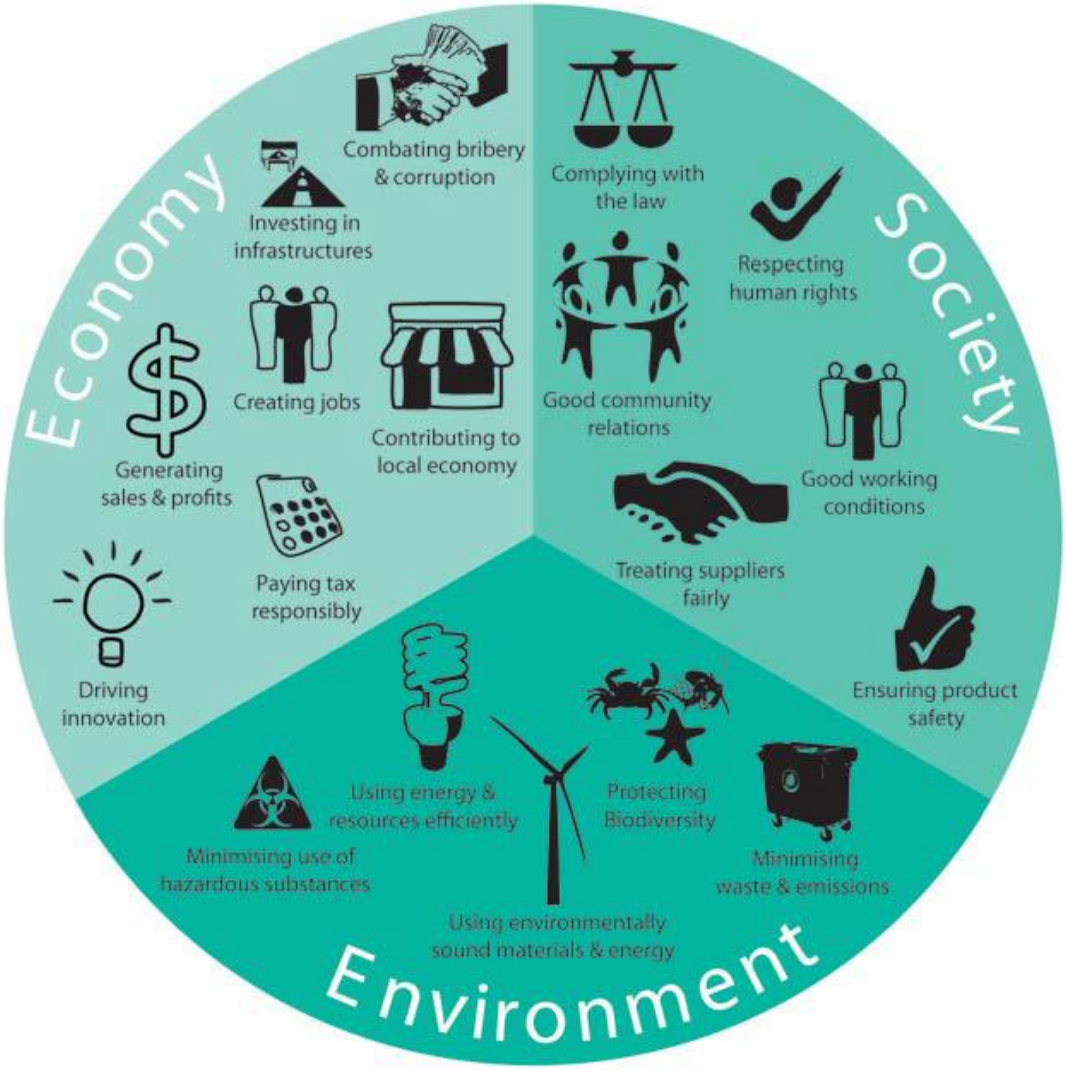
Manufatura sustentável

Manufatura sustentável

"The creation of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities, and consumers and are economically sound"

By the: US Department of Commerce's Sustainable Manufacturing Initiative

Manufatura sustentável



Fonte: OECD Sustainable Manufacturing toolkit (2011)

Manufatura sustentável

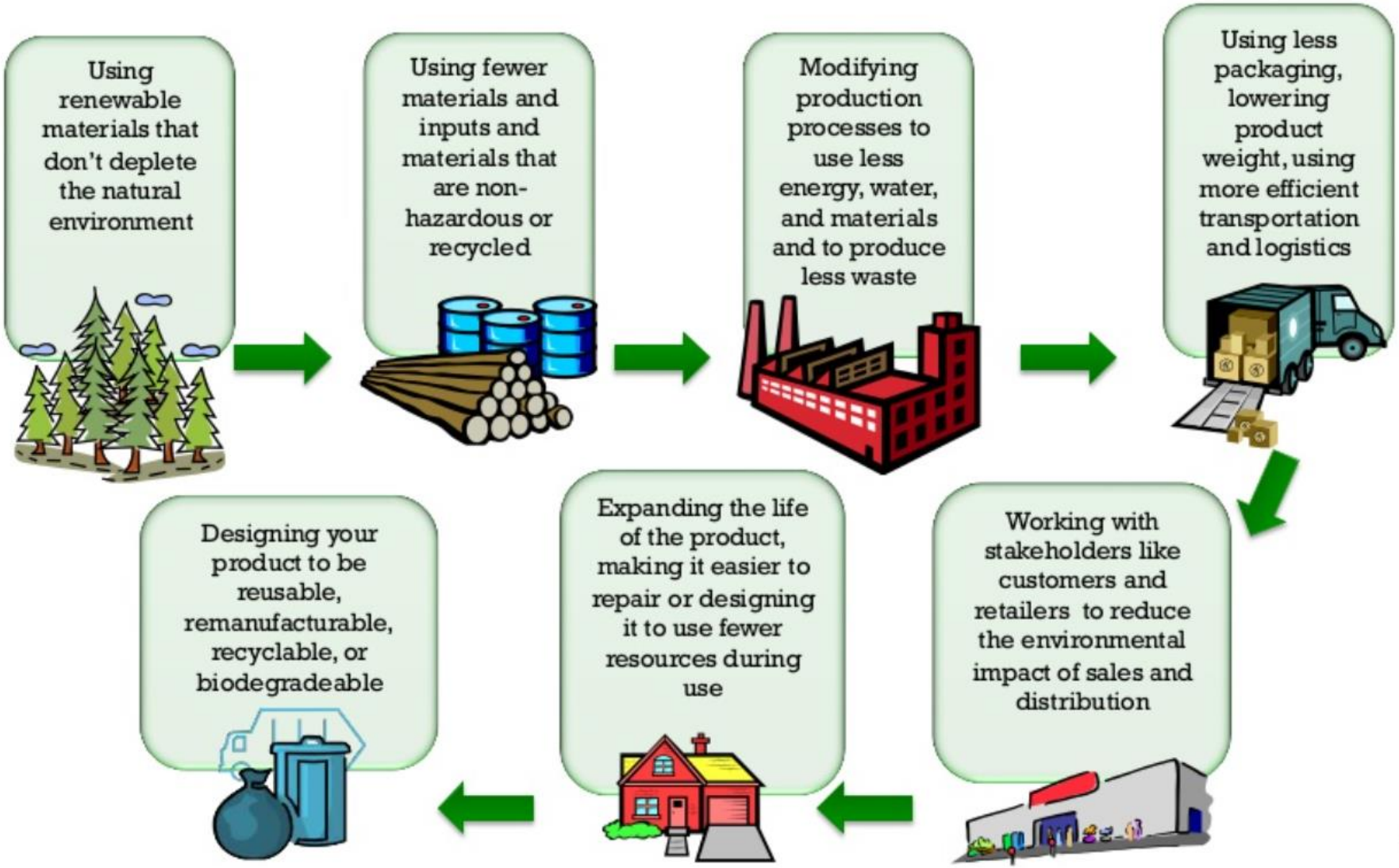
A **manufatura sustentável** é um processo que envolve o estudo/otimização de diversos parâmetros/processos utilizados na produção de um dado material, bem como a sua utilização futura e o tratamento que será dado ao mesmo no final do seu ciclo de vida útil.

Basic relationships between manufacturing and the environment

Inputs	Operations	Products
Materials or intermediate products used to manufacture your products	Processes to turn inputs into products and activities necessary to operate the production processes (*e.g.* facility operation, transport of inputs and products, business travel, staff commuting and other overheads)	Products manufactured and their use and treatment at the end of their lifetime.

Manufatura sustentável

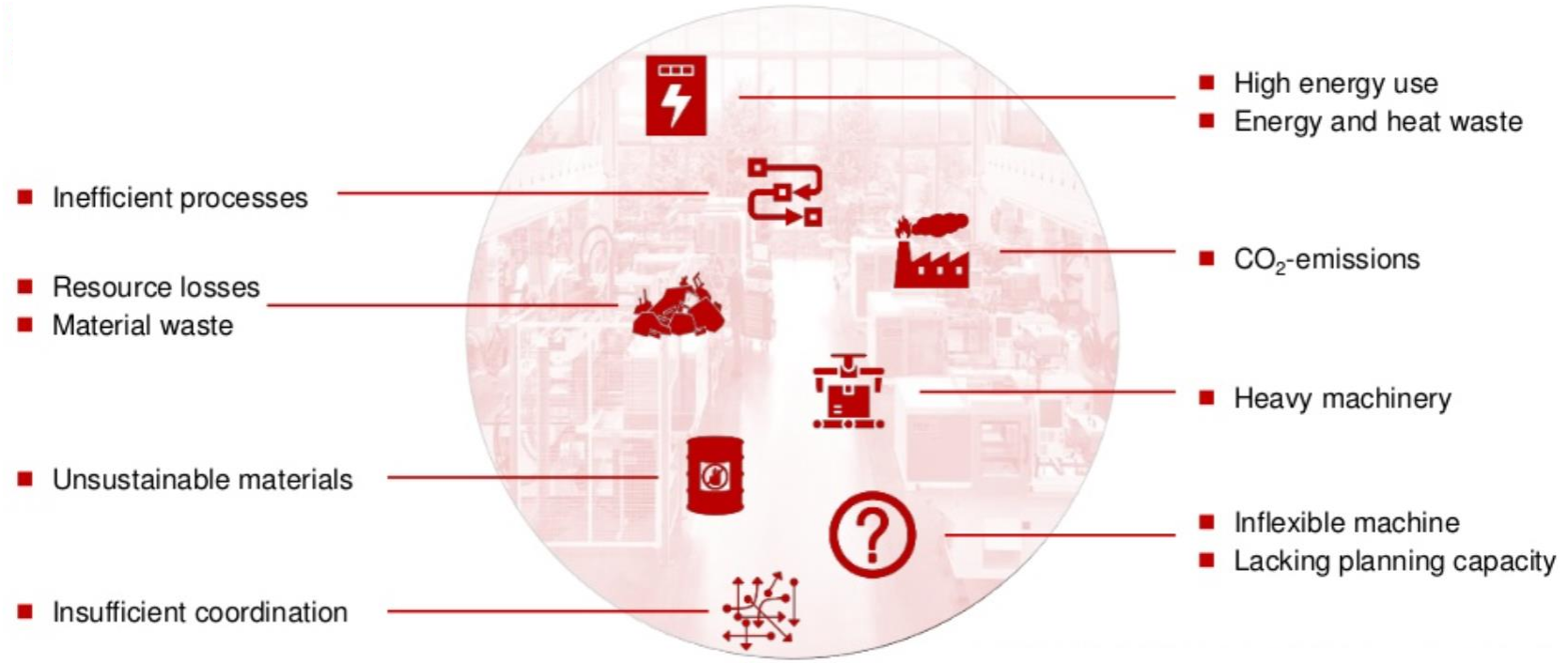
Exemplos de estratégias que promovem a Manufatura Sustentável:



Manufatura sustentável

A manufatura precisa de ser mais sustentável

(energia, água, materiais, resíduos)



Manufatura sustentável

Redução dos recursos na manufatura

(energia, água, materiais, resíduos)

Manufatura sustentável

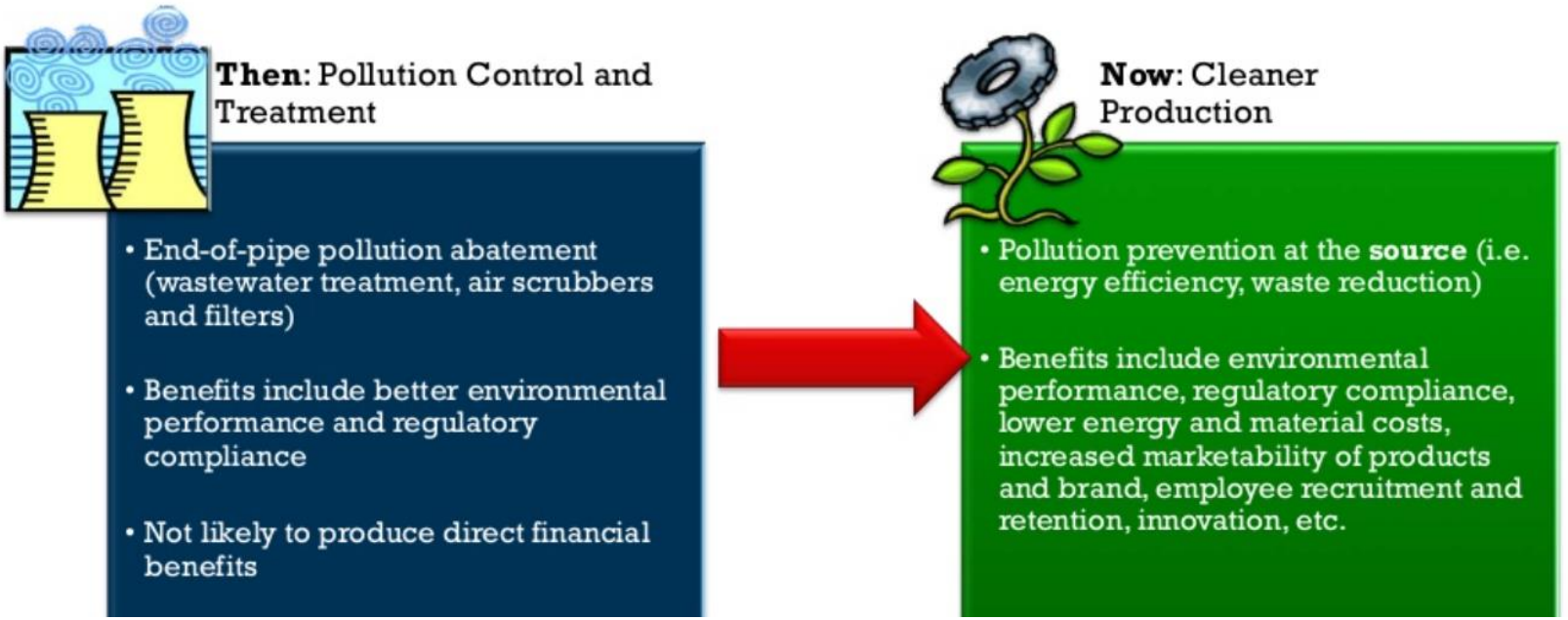
Fatores externos a considerar

- Grid energy mix
- Waste management
- Recycling technologies
- Material sourcing
- Transport of goods
- Product durability and use
- Consumer choice / behavior
- Energy for computing

Manufatura sustentável

Evolução da Manufatura sustentável

Durante muito anos a principal preocupação ambiental considerava métodos de **mitigação da poluição**, reduzindo ou eliminando a poluição que tinha sido gerada. Atualmente a atenção é dada à **prevenção da poluição na fonte** (etapa de produção) – "cleaner production", de modo a **prevenir a produção de poluição.**



Manufatura sustentável

Casos de estudo

Good Practice

Solvent use reduced by finding alternatives

Isothane (Accrington, United Kingdom)

Sector: Construction materials
Employees: 32
Annual turnover: USD 14 million (2009)

Isothane is a manufacturer of products used for insulating buildings, providing buoyancy for boats, protecting bridges and reinforcing roads. It decided to eliminate flammable materials from its product lines in order to reduce substantially the solvent emissions and help ensure compliance with legislation. Most of this was accomplished through material substitution, but a few product lines were discontinued. The company's research and development (R&D) team spent two months researching less hazardous alternatives to find substitutes.

Good Practice

Used materials improve aesthetics while reducing impact

Wausau Tile (Wausau, Wisconsin, United States)

Sector: Construction materials
Employees: 300
Annual turnover: Undisclosed

Wausau Tile manufactures architectural products for the global market, such as: plastic site furnishings; precast concrete and metal site furnishings; concrete pavers; terrazzo tile; and precast terrazzo. The company wanted to reduce the use of natural raw materials and save costs at the same time as part of its "green initiative". It investigated the possibility to find alternative aggregates to mix with concrete, where gravels are normally used and found a process to treat glass for that purpose.

Wausau Tile considered trying used glass as a new concrete aggregate. Of all the collected post-consumer materials, glass has been one of the most difficult to recycle and much of the used glass ends up in landfills. Even though using broken glass can lead to additional costs, the company believed that any extra cost could be offset by the decorative value of the material, by

Good Practice

Products that help consumers reduce ecological footprint

Henkel (Dusseldorf, Germany)

Sector: Household products
Employees: 48 000
Annual sales: USD 20 billion (2010)

Henkel, the consumer products manufacturer with global brands including Somat, Right Guard and Pritt, has taken a number of steps to reduce the impact that their products have during use. For example, studies have found that a significant proportion of the lifecycle impact of their products comes from the use of energy required to heat water and run a laundry or dishwasher and the use of water. The company set out to identify opportunities to reduce this impact, which resulted in:

Good Practice

Greener products enhance competitiveness

PortionPac Chemical Corporation (Chicago, United States)

Sector: Cleaning chemicals
Employees: 84
Annual turnover: USD 20 million (2009)

PortionPac Chemical Corporation is a producer of high-concentrate, pre-measured cleaning and floor finish products for commercial, institutional and public sector use. The company considered the environment and health and safety of sanitary workers to be important when creating the concept of a pre-measured product in 1964. The formulations were made with consideration for the safest components available, but at that time, the company did not talk about the "greenness" of a product but focused on the cost savings of shipping concentrates. In 2005, looking to become more sustainable, the company began work to assess the lifecycle impact of its products and obtained a third-party green certification for all of its floor cleaners, all purpose cleaners, glass cleaners and bowl cleaners. It also updated packaging components to further reduce waste, saving disposal, freight and other costs.

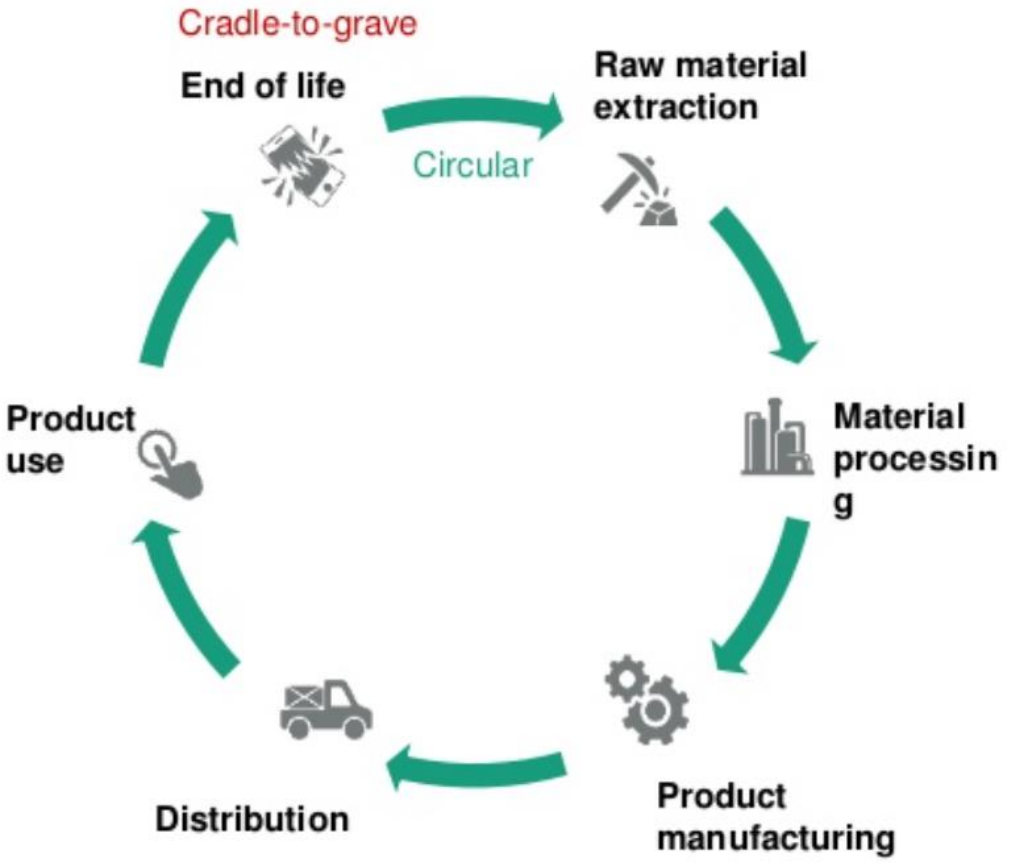
https://www.oecd.org/innovation/green/toolkit/sustainablemanufacturinggoodpractices.htm

Manufatura sustentável

Avaliação do ciclo de vida de um produto
("Life Cycle Assessment – LCA")

Definition/Method of LCA

- Evaluating the **effect** of a **product**, **service**, **process** over its **entire life-cycle**
- Focus on **environmental impact** (esp. resources, energy, emissions, waste)
- **ISO 14040** and **14044** norms for **eco-balancing**
- LCA for **conducted** for **various industries** (e.g. steel, cement, batteries)
- **Quantitative data**; use of **LCA-IT-tools**
- Enabling **technological optimization** strategies



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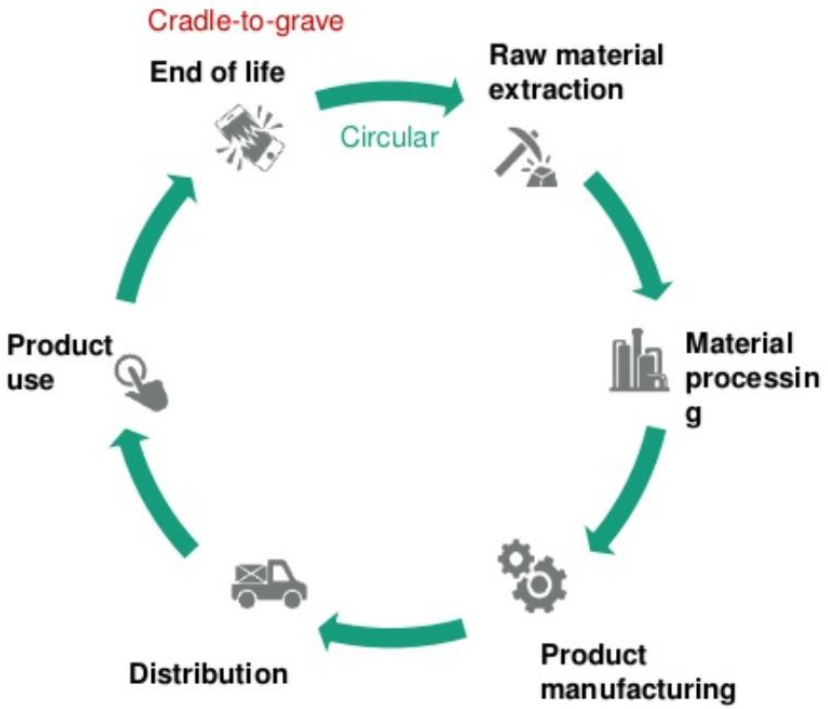

Limitations of LCA

- Does **not define sustainability thresholds**
- **No consideration** of **societal behavior** (e.g. consumer choices and individual product use)
- **Insufficient** accounting **product externalities** (e.g. outsourcing, computing, transport etc.)
- **Not all data obtainable** (missing records, no IT, global sourcing, developing countries etc.)
- No **societal strategies**

Eco seleção de materiais

Base de dados sobre materiais e processos: CES EduPack