



2nd INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

"KEY ELEMENTS FOR A SUSTAINABLE WORLD: ENERGY, WATER AND CLIMATE CHANGE"

Managing I/O Material Flows in Industrial Processes – A Key Step Towards Sustainable Production

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Abstract

Industrial wastes consist of unused resources in the production process, which create costs and no added value.

Measuring input-output material flows at a company level is therefore crucial for waste prevention, which is a key path towards higher resources productivity. Waste prevention strategies focus in particular on reducing or eliminating undesired waste streams, and managing by-products within the production process, rather than treatment and disposal approaches. In the long run, prevention strategies are more cost-effective and environmentally sound than conventional pollution control approaches. Waste prevention strategies apply to any manufacturing process and range from relatively easy operational changes and good housekeeping practices to more extensive changes such as replacing input materials, fine tuning or replacing equipment, or even making use of state-of-art technology.

This paper provides insights on the development and testing of a toolbox for the inventory and management of waste flows looking forward to implementing a 'zero waste' strategy. Twelve case studies selected within seven Portuguese industrial branches were explored. The toolbox included an activity based costing methodology, as well as detailed process mapping and material balances used at company level to measure resource flows and undesired waste streams, and thus to fix optimisation targets by integrating waste prevention into business strategies.

In each company, empirical results showed: a) The usefulness of the approach; b) how powerful waste prevention is providing strategic inputs for decision taking (a hierarchy built on a economic and environmental basis); c) how critical operating conditions are, and therein both branch or company's culture, in order to influence the implementation of waste prevention initiatives.

Main conclusions drawn from those case studies enable to propose both: a) at a micro level, new options for strategic improvement; b) at a macro level, hypotheses about how public policies may address waste prevention and about the diffusion of eco-efficiency in those industrial branches in order to pave the way towards sustainable production.

Keywords: Manufacturing; strategy; performance-measure(s); methodology; innovation.
