



5th
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ADVANCES IN CLEANER PRODUCTION

“CLEANER PRODUCTION TOWARDS A SUSTAINABLE TRANSITION”

Growth, De-growth and Circular Economy. A Resource-based Perspective on Sustainability

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Production and consumption activities of human societies are always accompanied by airborne, waterborne and solid waste generation processes, so that the basic environmental issue worldwide still is how to best identify, prevent and manage waste streams. The increased waste generation is certainly a consequence of increased purchasing power, improved standard of life and more technological choices becoming available. However, the rapid urbanization and change in people's lifestyles - especially in countries with higher per-capita incomes - boosts the production and consumption of products characterized by shorter life spans and higher volumes, in so contributing to increased resource consumption and waste-to-disposal flows. Surprisingly, societies still have problems identifying a precise strategy for prevention and management of household and industrial emissions and waste. Consensus is shared worldwide about the fact that prevention is the most cost-effective waste management strategy, crucial to making progresses toward more sustainable societal patterns. De-growth patterns and sufficiency lifestyles are also advocated in order to achieve decreased resource use and environmental impact. Efficiency increase is also claimed to be a key pattern towards waste prevention and decoupling of resource consumption and economic production. Yet, downsizing of the economic process and doing more with less are not the only available choices and may be synergically reinforced by increased integration of production and consumption sectors, through so-called “circular economy patterns”, where energy and material flows are exchanged by means of appropriate planning of integrated agricultural, industrial and urban activities. Industries and companies can proactively propose new ways to avoid (reduce, valorize, dispose of) emissions and waste by explicitly addressing organizational issues, both on intra-company and inter-companies levels, including sustainable supply chain management and reverse logistics.

In this study we deal with a systems view of society. The interaction and integration among a system's components, the internal exchange of resources and services, the identification of matter and energy flows to, from and within a system, the demand for environmental support, and finally the efficiency of resource use for maximum power output and decreased emissions, are discussed and their importance for more sustainable production patterns is highlighted. According to this perspective, case studies (sustainable clothing, cooking oil recycling, biorefinery designs, integrated dairy and energy production, sludge treatment and cement production, innovative waste management, energy from slaughter residues) are evaluated and discussed. Environmental benefits, income and job opportunities, waste prevention, circular resource use and innovative resource management are highlighted out by means of integrated Life Cycle Assessment and Emergy Accounting methods.

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