Special Issue

Industrial Ecology Strategies: Environmental Impact and Life Cycle Assessment

Message from the Guest Editors

Against the background of continuously increasing human consumption of natural resources and associated environmental impacts, the scientific field of industrial ecology has gained growing attention since the beginning of the 21st century. Inspired by the principles of the natural ecosystem, the goal is to use waste streams of one industrial process as input for other processes, minimizing the losses of substances to the environment (Frosch und Gallopoulos 1989). This idea of eco-industrial metabolism is extended by the circular economy framework focusing on aspects of product and material cycles, waste reduction, product lifetime extension, reuse and subsequent recycling (Blomsma und Brennan 2017). Recent research emphasizes the materials, energy, water, and emissions nexus (Masanet et al. 2021; Elshkaki 2019), drawing attention to a broad range of environmental impacts including climate change, land and water stress, resource depletion, or human and eco-toxicity (Finkbeiner et al. 2014). This fosters the need for connecting concepts of circular economy and industrial symbiosis with methods from the field of life cycle impact assessment (LCIA).

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