

Special Issue Reprint

Process Design and Sustainable Development

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Process design deals with the most important long-term engineering decisions in the chemical and process industries. It determines process economics, environmental impacts, and workers' wellbeing—the three pillars of sustainable development. The United Nations' resolution of 2015 defined 17 Sustainable Development Goals (SDGs); among the most important ones is Goal No. 12: “Ensure sustainable consumption and production patterns.” It includes 11 targets to be achieved over the next decade. Three of these targets are of utmost importance to industrial development by 2030: achieving the sustainable management and efficient use of natural resources; achieving the environmentally sound management of chemicals and all types of waste throughout their life cycle and significantly reducing their release into air, water, and soil; substantially reducing waste generation through prevention, reduction, recycling, and reuse. SDG 12 includes the consumption of raw materials, energy, water, and other resources used in process industries and their value chains. It is embracing the circular economy, resource efficiency, zero waste, and design for the environment (eco-design) by investing in innovation, research, and education to redesign the economy and update pollution strategies and industrial policies. Industry 4.0 brings about artificial intelligence, the Internet of Things, big data, automation, robotics, and process intensification. All these changes require a rapid adaptation of process design for sustainable development, which is the topic covered in this reprint.

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