

Energy-efficient and flexible production for net-zero emission manufacturing (Code: y3214)

Goal:

Carbon neutrality is being a major driving force for the development of energy-efficient and carbon-reduction technologies. In line with the sustainable concerns of Industry 5.0, modern factories are striving for an ever-higher degree of energy-saving and carbon emission reduction, where on-site renewable energy is going to be exploited as part of their energy supply. To achieve it, manufacturing systems should be energy-efficient and flexible to be capable of actively adapting their energy demand towards the volatile energy generation and supply without compromising on the production performance. Cutting-edge technologies, including energy-oriented production planning and control, energy-efficient scheduling, demand response, industrial IoT, advanced data analytics, digital twin/cyber-physical system, and mixed reality/metaverse create the potentials to bridge the gap. This invited session aims at presenting the state-of-the-art theoretical development and applications in this area, and bringing academy and industry practitioners to tackle difficult problems of international concerns.

Topics:

This special session aims to present the state-of-the-art, approaches, tools, systems, and cases to enable the readiness and realization of energy-efficient and flexible production in support of net-zero emission manufacturing. To contribute to those areas, this special session includes the following topics, but are not limited to:

- New paradigms, methods for energy-efficient and flexible Production
- Energy-oriented production planning and control
- Energy-efficient scheduling and parameter optimization
- Load management and demand response for energy-efficient and flexible production
- Industrial IoT and advanced data analytics for energy-efficient and flexible production
- Digital twin/cyber-physical system for energy-efficient and flexible production
- Energy-efficient and flexible production cases, systems, and implementations
- Other relating research topics

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