

Open Invited Track on:

Models, control architectures and simulations for industrial energy symbiosis

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Abstract:

The industry sector is requested to promote energy efficiency measures and greater deployment of renewable energy to significantly reduce greenhouse gas emissions while boosting competitiveness. Industrial energy symbiosis, built on the sharing of energy-related resources, information facilities, and infrastructures is an effective strategy to promote energy conservation and enable renewable energy sources (RES) uptake at the industrial level. The present session aims at presenting the up-to-date models and methods for industrial energy symbiosis optimization integrating advances in technologies and renewable energy sources.

Detailed description of the topic:

Within the framework of the industrial symbiosis, the industrial energy symbiosis promotes and supports a wide range of sustainable and innovative solutions for reducing the energy-related carbon footprint of industry. Approaching sustainable solutions and energy planning from the district level represents an opportunity to implement energy strategies aimed at rationalizing consumption and optimizing the systems of supply. A multi-dimensional mix of technological options is available to implement inter-firm energy exchanges, joint projects for energy efficiency and for collective power generation and distribution. Energy synergies involve numerous stakeholders with potentially conflicting objectives encompassing technical, environmental and social issues. A suitable energy system model should facilitate the trade-off between conflicting objectives, including generic technology description, temporal details, flexibility options to allow renewables integration, information management, the system superstructure to manage the energy demand, and the different power generation technology. Modeling, simulating and evaluating energy symbiotic exchanges options is challenged by several aspects, as the dynamics of industrial networks, the uncertainty in quantifying the environmental performance of industrial symbiosis networks and in comparing scenarios, the uncertainty in distributing the environmental impacts and benefits from energy exchanges.

The aim of this session is to collect and present high-quality papers focusing on systematic approaches to deal with applying computer-based engineering tools in industrial energy symbiosis, including but not limited to the following topics:

- Models for industrial energy symbiosis, including renewable energy sources
- Models for the management and control of multi-energy systems applied to industrial energy symbiosis (including but not limited to smart multi-energy grid, energy hub, virtual power plants)
- Methods for the sustainability assessment of industrial energy symbiosis schemes
- Models for distributing and allocating energy exchanges in an industrial symbiosis network
- Methods for industrial energy symbiosis indicators calculation and validation