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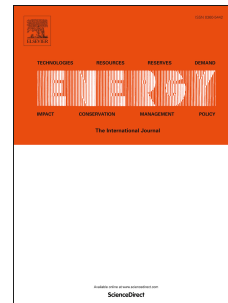
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Methods Optimisation, Process Integration and Modelling for Energy Saving and Pollution Reduction

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1 Abstract

Researchers, industrial and institutional experts dealing with energy-related issues, have been working on improving the efficiency of energy sourcing, conversion and use, as well as on minimisation of Greenhouse Gas (GHG) emissions. As a major venue, dedicated to knowledge exchange and networking on these issues, the 19th Conference on Process Integration for Energy Saving and Pollution Reduction – PRES 2016, took place in Prague, during 27-31 August 2016. Following the venue, in collaboration with the Energy Journal, 15 high-quality manuscripts have been selected in the current Special Issue (SI). This article analyses the challenges tackled by the published articles within the overall area of energy saving and pollution reduction, briefly discussing their key actions and pointing to the achieved results. Four key areas can be distinguished in these research articles, relating to renewable energy sources, energy saving during conversion and use, direct CO₂ sequestration and regional supply issues.

2 Introduction

In the 1970's, the world oil crisis drove innovation in the industrial sector resulting in vast improvements in thermal energy efficiency for many large energy users in chemical and oil processing [1]. The looming and currently developing environmental crises resulting from the intensified industrial development – including climate change, air pollution, and water issues, are coalescing to an even stronger wake-up call, inspiring a sustainability revolution, led by innovation alliances between the academic and the industrial sectors [2].

The chemical, process and food industries need new technology solutions with significantly improved economic and environmental sustainability. The industrial sector has high energy demands – about 54 % [3] of the world's total delivered energy, while industrial separation processes alone represent 10 to 25 % [4] of total world energy consumption.

A large part of the innovation necessarily is delivered by Research and Development activities globally. The latter need dissemination and networking vehicles. The Conference on Process Integration, Modelling and Optimisation for Energy Saving and Pollution Reduction (PRES), which started in 1998, is a well-established platform for such exchanges. The PRES 2016 venue [5], held in Prague, 27-31

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