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for a new sustainable process industry in Europe

ABSTRACT BOOK

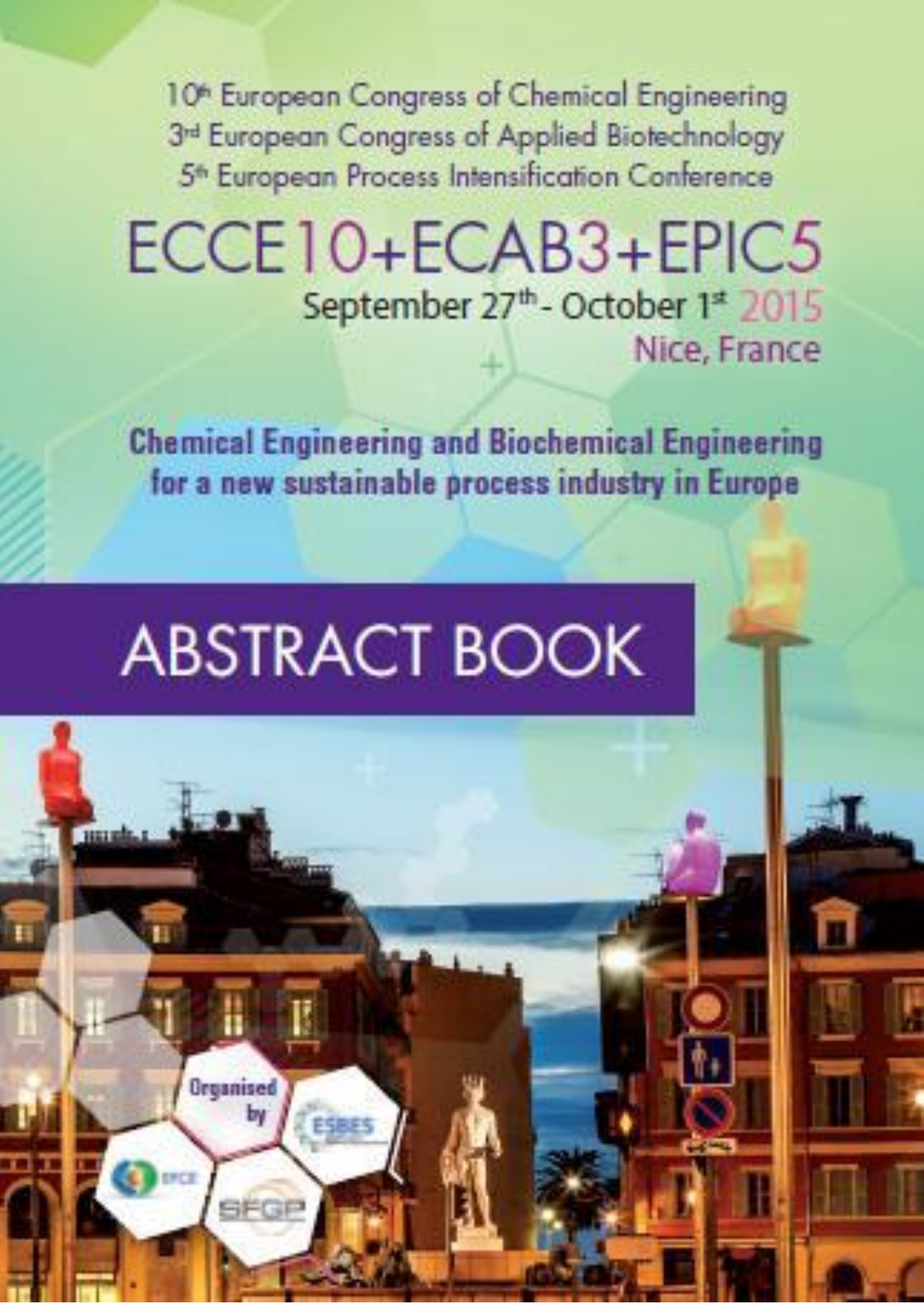
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Congress: ECCE10

Topic: Energy: conservation and management

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Abstract:

The Energy Efficiency Directive 2012/27/EU (EED) was released in October 2012 and transposed in June 2014 by Member States. The Directive requires large companies to carry out an energy audit before December 2015, which has to be repeated every 4 years. A possibility for companies to be exempted from regular energy audits is to be or become certified by an approved energy management system (EnMS), most likely the international standard ISO 50001. In both cases it means that companies have to set plans and define actions to comply with European and national requirements that aim at improving their energy efficiency. Considering the differences across European countries regarding the awareness and involvement of the industrial sector in terms of energy management, a large number of companies still lack systematic and comprehensive systems to understand, monitor and improve their energy consumption in a cost-effective and sustainable way.

This paper presents a methodology to carry out indicative energy audits in compliance with the European standard EN 16247-1 and including the ISO 50001 requirements of the energy planning phase (e.g. energy review, energy baseline and energy performance indicators). The proposed methodology follows a top down approach, starting from the energy bill and identifying major energy sources. It covers the evaluation of the actual system's energy efficiency, identifies energy savings opportunities and presents an innovative approach for energy consumption monitoring via surrogate models of processes. It makes use of state-of-the-art techniques such as data reconciliation, heat integration via total site pinch analysis and statistical tools. Since natural gas and electricity usually take up the largest share of the total energy consumption in industry, the focus is put on these two energy carriers.

One of the interesting aspects of the methodology concerns the data gathering and processing phases. Here the required data are targeted and classified in a systematic way in order to characterise the energy consumers and identify the areas of significant energy use presenting a potential for energy efficiency improvement. Once the energy review step is carried out, strategies for energy consumption monitoring should be developed. The methodology proposes an innovative approach to generate specific energy consumption models of industrial processes (surrogate models) that could be used to monitor units, online or offline, and detect deviations from expected behaviour.

Reference 1: Directive 2012/27/EU on energy efficiency, amending directives 2009/125/EC and 2010/30/EU and repealing directives 2004/8/EC and 2006/32/EC. Official Journal of the European Union, 14.11.2012.

Reference 2 : Energy efficiency in the European Union: trends and policies – Lessons learned from the ODYSSEE MURE project. September 2012

Reference 3 : ISO 50001:2011 Energy management systems - Requirements with guidance for use. International Organisation for Standardisation

Reference 4 : EN 16247-1:2012. Energy audits: General requirements. European Standard for General Audit

Highlight 1: Data gathering and data treatment methodology

Highlight 2: Systematic and cost-effective approach

Highlight 3: Energy consumption models (surrogate models)