
Editorial

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Biographical notes: Haris Doukas is a Mechanical Engineer at the Aristotle University of Thessaloniki (AUTH) in 2003). He holds a PhD degree on the decision support systems for the sustainable energy sector's operation at the National Technical University of Athens (NTUA) in 2009. He is currently a Lecturer in the School of Electrical and Computer Engineering, NTUA. His areas of expertise include the development of models and decision support systems for energy and environmental policy. In these fields, he has more than 60 scientific publications in international journals and numerous announcements in international conferences, chapters in books, etc. For his work, he has received awards by the State Scholarship Foundation (IKY), the NTUA, the AUTH, the Technical Chamber of Greece (TCG) and the Hellenic Operational Research Society (HELORS).

Christian Hurson is a teacher and researcher at University of Rouen. He is the Director of Institut d'Administration des Entreprises (IAE) at University of Rouen and expert at higher education and research evaluation French National Agency (AERES). His research interests fall into the areas of multi-criteria decision analysis, operational research and their applications. In these fields, he has over of 30 scientific publications in international journal, international conferences, chapters in books, etc.

The current financial and economic crisis, as well as the wider socio-economic and environmental pressures, jeopardises the traditional high-level patterns of living, consuming and resource-sharing. However, the high expectations and visions for coordinated actions and holistic interventions, to address the problems of modern society and competitive economy, are sustained. Specifically, sustainable development and green economy are these factors, the promotion of which, through targeted strategies and actions, is a key challenge for policy makers.

Simultaneously, both researchers and practitioners have responded to the abovementioned challenges with the development and application of new energy and environmental modelling methods. Operational research and management science are some major disciplines that attempt the bridging of the scientific community with the other stakeholders towards the efficient assessment and structuring of future energy, environment and sustainability policies. In particular, decision support methods and systems have a key role in the pursuit of appropriate approaches, necessary to support the restructuring of the energy sector, concerning patterns of energy extraction, generation, transformation and use, from unsustainable to sustainable forms of development.

In this special issue, four articles were selected to contribute to the fostering of discussion and experience exchange on decision support for the sustainable development of the energy sector. Each paper sheds light on specific issues and aspects of sustainable development.

The special issue opens with the article of Wolfgang Eichhammer, Wolfgang Eichhammer and Lutz Stobbe, who delve into the energy saving potential of information and communication technology (ICT) systems and equipment. They use a bottom-up stock modelling approach to determine the net impact of both technology dynamics and ICT equipment on the future development of electricity consumption, for the case of Germany. They unveil a high potential for electricity consumption reduction, or at least stabilisation, until 2020, through the promotion of high-capacity and energy efficient communication networks, system solutions for efficient computing and storage performance, or software-based network adjustments.

The next article of Evangelos Spiliotis, Achilleas Raptis, Zampeta Nikoletta Legaki and Vassilios Assimakopoulos focuses on ICT and commercial buildings. Specifically, they propose a methodology predicting electrical consumption in energy-intensive commercial buildings, through the exploitation of several energy performance indicators (EPIs). They tested their methodology on a fast-food restaurant in Cyprus, to conclude that using EPIs time series with high correlation values per energy end use, to predict electrical consumption of a building, can lead, under specific circumstances, to more accurate forecasts than applying directly time series models on the total electrical consumption time series.

The third paper, by Inga Boie, Mario Ragwitz and Anne Held, focuses on the broad diffusion of renewable energy (RE) technologies, examining the side of investors. In particular, they propose a robust set of determinants for RE-diffusion and suggest respective data sources, allowing for objective assessment of framework conditions on country level. Their results are based on literature research, interviews with stakeholders and expert workshops, and they can set the foundations of effective and cost-efficient policy making.

In the last article of the special issue, Pelopidas Siskos and Pantelis Capros attempt to illuminate the restructuring of the transport sector and its effect on sustainability. Specifically, they depict the importance of coordination of the decision makers, who are involved in the market of alternative fuels, and they focus on the key market and economic factors, related to the uptake of biofuels, electricity and hydrogen infrastructure in Europe. They result that biofuels represent the less risky investment, whereas hydrogen refuelling stations require the highest capital investment than all other alternative options and involve the highest risks due to their irreversibility nature. On the other hand, the case of electricity is more complex, since well-developed network of charging points are prerequisites for the operation of the electric vehicle fleet.

As guest editors, we hope that this special issue makes a small but tangible contribution to the promotion of DSS systems and techniques as catalytic agents to the attainment of the sustainable development objectives. The aim of this issue is to further trigger research on decision support models and tools and their efficacy to energy efficiency and environmental planning problems.

Acknowledgements

We would like to thank all the authors, who submitted papers to this special issue, and especially the referees, who spent their valuable time to provide their detailed reviews. I would also like to acknowledge the hard work of all the people who aided with the materialisation of this publication to the highest attainable standards.