Energy and environment: bringing together engineering and economics

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Published online: 17 August 2016

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This special issue includes extended and reviewed versions of high-quality papers submitted to the “2nd International Conference on Energy and Environment: bringing together Engineering and Economics (ICEE 2015)” held in Guimarães, Portugal, on June 18–19, 2015. Twenty-two papers were selected and the authors invited to submit an extended version for regular journal review, in order to be included into this special issue. After the journal’s review process, 10 papers were accepted for publication.

The topics of the selected papers address multidisciplinary issues aligned with the multidisciplinary scope of the journal and cover a large spectrum of themes including sustainable development and economic growth, energy policies, clean energy and mobility technologies, waste management and social well-being. Research papers and case studies in different geographic regions are included providing a broad range of insights and opening avenues for further research.

Rolewicz-Kalińska et al. (2016) focus on the location of facilities designed to treat the organic fraction of municipal solid waste (OFMSW) in Poland. The authors analyze case studies from several European countries considering organizational, economic, technical, spatial and social issues and conclude that the key factors for determining the choice of technology are the legal framework and the investment economics. The results show that further development of the anaerobic digestion (AD) facilities in Poland requires a coherent policy and commitment on the site of the local and central authorities.

Miranda et al. (2016) present an innovative approach to characterize the metabolic pattern of informal urban settlements or slums. The case of Vidigal, a slum in Rio de Janeiro, Brazil, was addressed using the system of accounting Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM). Results show relatively low exosomatic metabolic rates for both the household and paid work sector in Vidigal, as well as high levels of human activity dedicated to economic activities and put in evidence

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the need for better transportation system for the integration of Vidigal into the social fabric of the rest of the city.

Botelho et al. (2016) apply contingent valuation and discrete choice experiments, respectively, to estimate the effects of the activity of forest biomass power plants on the welfare of two groups of stakeholders, namely local residents potentially negatively affected by the presence of the power plant, and the general population. The results of this study show that the welfare effects are location and impact specific, and demonstrate also that environmental impacts as experienced and valued by local residents can be offset by a monetary compensation.

Martinho (2016) analyzes the importance of forestry activities for sustainability in Portugal comparatively to other European countries. Statistics covering the last decade are used aiming to capture interrelationships between forest indicators and economic (production and international trade), social (employment) and environmental (greenhouse gas emissions) variables. The author concludes on the importance of the sector for rural gross domestic product (GDP) and export for Portugal.

Barroso et al. (2016) discuss the important topic of achieving human development with less economic growth. The authors collected data of 118 countries aggregated in 10 different blocks and found a weaker relation between GDP and the social dimension of human development for developed countries, as compared to their less developed counterparts. This can be interpreted as a sign that there are conditions for human development even with less economic growth.

Grijó and Soares (2016) also addressed the issue of economic growth but related to solar photovoltaic (solar PV) investments in the European Union (EU). The paper explores the relationship between solar PV and GDP using a fixed effects panel data methodology and a sample of eighteen EU countries. Overall, the results demonstrate that investments in solar PV installed capacity have a positive impact on economic growth.

Kocsis and Hof (2016) propose a framework for energy policy evaluation based upon assessing their effectiveness. The authors apply their framework to a selection of Dutch energy policy instruments, namely production subsidies and their complementary non-financial instrument (DEN-B). The authors conclude that both these instruments are partly effective. The evidence of their research work allows formulating recommendations for future policy.

De Sena et al. (2016) discuss the integration of solar and wind power in the Brazilian electricity system focusing on the social awareness and acceptance of the population living in high renewable potential regions. A questionnaire was implemented in an academic institution in the State of Rio Grande do Norte (RN) with the target population representing key actors for the present and future energy policy decision making in the RN state. The results demonstrate the high level of acceptance of both solar and wind technologies with low evidence for eliciting the Not In My Backyard (NIMBY) syndrome.

De Llano-Paz et al. (2016) discuss the carbon capture and storage technology (CCS) and in particular the uncertainty about the final costs and economic risk of these technologies. The authors provide an analysis of the effects of different variations in the cost and risk of the CCS technology scenarios over the European power technologies mix using the portfolio theory. The results point to the importance of CCS availability in the near future in order to achieve EU wide more efficient power portfolios.

The paper presented by Marques et al. (2016) proposes a new energy dependency score methodology and applies it on the analysis of gasoline, diesel, natural gas (used for H₂ production) or electricity cars sold in different countries worldwide. The results highlight the good performance of electric vehicles ranking higher when compared with the other

technologies analyzed for all locations in this study. On the other hand, internal combustion engine vehicles and hybrid vehicles rate the lowest for almost all locations, with the exception of net energy export regions.

The conference offered the opportunity to share findings and joining together researchers from different disciplines, resulting in valuable and pertaining discussions and allowing to extend the knowledge beyond traditionally more closed research fields. Energy and environmental decision-making problems are highly complex, and successful projects require the collaboration of researchers from different backgrounds and with diversified experience. This special issue results from the successful accomplishment of the ICEE objective of bringing together engineering and economics in this unique forum. The papers published in this edition were enhanced by the fruitful discussions during the conference and reviewers feedback. Well-established research collaboration will be the next logical step to foster valuable outputs to the scientific, academic and industrial communities, expecting that ICEE next editions and Environment Development and Sustainability Journal will act as leading disseminators of newly generated knowledge.

Acknowledgments The Guest Editors appreciate the contributions from all authors, reviewers and staff of Springer during the preparation of this special issue.

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