

Editorial

Editorial to the ‘Special Issue—Energy transition in a circular economy perspective’ of AIMS Energy

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There is strong scientific evidence that emissions of greenhouse gases arising from traditional fuels are harming the environment, causing global climate change [1]. In this field, bioenergy (i.e., fuels, power, heat) are increasingly drawing attention as sustainable alternatives to fossil-based energy production, potentially able to address concerns associated with energy costs, global warming, energy security, etc. [2]. Policy makers guide the choices regarding sources of energy, but the energy industry should use circular economy (CE) as a foundation for developing new business opportunities in order to be ready for tackling issues linked to the decrease in the availability of traditional raw materials and the increase in related prices [3]. Little has been done so far, but research and innovation can considerably contribute in improving life through CE by closing the loop between sustainability and decarbonization. The Special Issue aims to inspire works encompassing and identifying the development and implications of more sustainable options of energy use and production in a close collaboration with all relevant stakeholders (i.e., communities, firms, policymakers, and researchers).

Sustainability approaches towards a low carbon and CE have been scrutinized both at the micro and macro levels while looking at the (bio) energy systems. Fragkos [4] shows that enhanced energy efficiency and increased material circularity can reduce energy consumption in all sectors, but most importantly in the industrial sector. Schwartzman and Schwartzman [5] recognize that, taking into account technological improvements in 2nd law (exergy) efficiencies, the renewable energy supply should be no more than 1.5 times the present level, with the capacity to eliminate global energy poverty, for climate mitigation and adaptation. Using the Canadian province of Ontario as an example, Elmanakhly et al. [6] acknowledge that the deployment of hydrogen technologies promises major contributions to fulfilling the economy's significant energy needs while also reducing urban pollution

emissions and the overall carbon footprint and moving towards a circular economy. Giganti and Falcone [7], focusing on the niche of the virtual and augmented reality, try to shed light on the understanding of the bioenergy niche development and the related transition towards circularity. Okafor et al. [8] examine, by means of a literature review, the challenges and opportunities of implementing coupled CE and energy transition model in Nigeria. Erfani et al. [9], focusing on Iran as a case study, develop a modified decision-making approach in Renewable Energy projects using an analytical hierarchy process. They find that ‘wind energy’ is the best alternative energy source for investment based on current Iran’s energy market. Thapa-Parajuli et al. [10] examine the short-run and long-run relationship between energy consumption, export performance, and economic growth in a landlocked developing country (Nepal) from 1980 to 2018. The estimated results confirm the existence of a long-run relationship between economic growth, energy consumption and export. Okafor et al. [11] underline as the timeframe for the energy transition is largely dependent on country’s socioeconomic and technological capacity. Finally, by proposing a multi-step evaluation model to support the decisions considering the different points of view of stakeholders, Bertocini et al. [12] find that a trigeneration central plant powered by biomasses and combined with the installation of photovoltaic panels on rooftops of buildings is the most suitable for the case of a district located in Turin (North Italy).

This Special Issue aimed at gathering studies focusing on the role of innovative ways to pave the wave for a transition to happen. Certainly, innovation is a way for reaching a competitive advantage in the market. CE has transformed the way companies, customers and decision makers look at the market [13]. The reported contributions offer to practitioners and common readers a perspective of how researchers, from all over the world, are mapping this transition towards circularity in the energy sectors.

As the Guest Editor of this Special Issue ‘Energy transition in a circular economy perspective’, I express my gratitude to the journal editorial team, authors and reviewers of the manuscripts, and all those who have contributed and sustained the successful completion of this project.

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