



Editorial

Modelling climate neutrality for the European Green Deal



The *European Green Deal* envisions a bold transformation of the European Union to create a resource-efficient and competitive economy, ensuring climate neutrality of the energy and transport system by 2050. This also includes the important social component of leaving no one behind in this sustainable transition; neither individuals nor geographic regions.

As part of the *Energy Modelling Platform for Europe 2020 (EMP-E 2020)* conference,¹ this Special Issue presents a selection of outstanding contributions on studies of European decarbonisation pathways, the linking of energy and climate modelling, the openness and transparency of modelling, the analysis of socio-economic impacts of the energy transition, and the related engagement of consumers and citizens. The question of how to use the momentum of the Covid-19 pandemic experience to accelerate the transition towards a more sustainable Europe was also part of *EMP-E 2020*. The fourth edition of this annual conference series aimed to bridge the gap between scientific modellers and decision/policy makers at all levels, with the support of representatives from the European Commission.

A total of thirteen contributions in this Special Issue cover several thematic blocks, starting with studies on decarbonisation pathways at the European level that support the implementation of the *European Green Deal*. This is not limited to technological analyses, but also includes social and distributional impact assessments. Complementary contributions conduct various detailed country studies examining the sensitivity of future carbon-neutral energy systems to climate change. This includes papers presenting the implementation of different modelling techniques and functionalities to reduce the computational complexity of the various decarbonisation studies. Furthermore, energy and climate model improvements, enhancements and linkage were an important aspect of *EMP-E 2020*. One of the articles looks at ways to improve energy system models, both from the perspective of model developers, and from the point of view of the users and their need for adaptations. The importance of considering and modelling social aspects of the energy transition is demonstrated in another paper. Contributions in this Special Issue are also dedicated to the decarbonisation of the mobility/transport sector. This includes, on the one hand, the increasingly visible e-mobility in a local energy community context and, on the other hand, possible structural changes in daily mobility behaviour in general, triggered by digitalization, changing lifestyles and disruptive events such as the Covid-19 pandemic. Last but not least, referring to the observed temporary decline in energy demand during the Covid-19 pandemic, the Special Issue concludes with a

fundamental paper on modelling energy demand taking into account unexpected shocks, which have occurred to varying degrees in past decades. Properly describing these disruptive events in the models of long-term energy demand trends should help us avoid false expectations that could impede climate neutrality.

At the *EMP-E 2020* conference, a large number of other excellent contributions were presented, which unfortunately could not be included in this Special Issue. Some analyses showed first modelling approaches and preliminary results on highly topical issues such as the criticality of raw materials used in renewables and their recycling to advance towards future circular economies; or the changing needs for energy and mobility services in smart cities with associated smart lifestyles. In addition, novel socio-economic modelling approaches to better describe consumer and citizen engagement in society's transition to climate neutrality were on the *EMP-E 2020* agenda. Future *EMP-E* conferences can expect exciting and robust modelling approaches and results on these topics. We are very much looking forward to it.

We, the guest editor team, would like to conclude by acknowledging the valuable work of the many anonymous reviewers who did a great volunteer job. We also wish to extend our warm thanks to the team at ENERGY for making this Special Issue possible and for continuously assisting us with every request. Henrik Lund, Shruti Venkiteswaran, Swann Song, and Rafaela Agathokleous have made the compilation of this Special Issue an exciting and pleasant experience!

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¹ See details on *EMP-E 2020* at <https://www.energymodellingplatform.eu/conferences/emp-e-2020/>.

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