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Editorial: Wind and solar energy sources: Policy, economics, and impacts on environmental quality

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Editorial on the Research Topic
Wind and solar energy sources: Policy, economics, and impacts on environmental quality

Introduction

The world continues to experience significant environmental issues such as global warming, air pollution, water-sea pollution, and deforestation as well as associated health, social, and economic problems due to environmental problems. In the face of these threats, solutions have been discussed intensively since the 1990s on various national and international platforms and summits such as the COP21 Summit in Paris (1997), the Kyoto Protocol (1997), and the Rio de Janeiro Earth Summit (1992).

The summits point to two main outcomes: (i) the inevitability of catastrophic climate change and global warming, and (ii) the need for governments to enact contingency plans to prevent environmental degradation and increase environmental quality. The outcomes were mainly to recommend that authorities implement public-government regulations that can be effective, i.e., in the reduction of CO_2 emissions to increase the environmental quality.

This Research Topic aims to analyze the potential positive or negative contributions of wind/energy sources to environmental quality. This Research Topic brings together 7 relevant articles fundamentally fulfilling the research aims. The papers written by the authors belong to different disciplinary sectors. Specifically, the papers probe the research from various geographical places, such as China, Canada, India, Malaysia, and Oman.

The first article Avotra et al. has the objective to find out the significant relationship between CSR and green construction and sustainable development. The data has been collected from 319 respondents working on different projects in the construction industry

of China. SEM analysis with the help of Smart-PLS has been applied to test the hypothesis relationship and mediations between components of CSR, green construction, and sustainable development. Results define that green procurement as a component of green construction strongly mediates between corporate social responsibility and sustainable development, and green design and CO_2 emission moderately mediates between corporate social responsibility and sustainable development.

The paper Nawaz et al. estimates the penalty cost based on the produced C&D wastes in steel and concrete skeleton projects. The field survey and the BOQ data were collected from five concrete and four steel skeleton projects. The difference in materials used and wastes generated between concrete and steel skeleton projects were evaluated statistically. A financial analysis was implemented for estimating the penalty cost. The study outcomes demonstrate that the amount of waste that construction managers estimated is significantly lower than the actual amount generated. As a result, imposing the estimated cost as a penalty would force construction managers to think thoroughly about the generated C&D waste problems.

The paper Rehman et al. analyzes the underlying impact of wind and solar energy generation, economic development, and fossil fuel consumption on CO_2 emissions to mitigate the environmental degradation in the world's top three largest energy consumers and CO_2 emitters nations namely, China, India, and the United States. To investigate the integrated impact of CO_2 emission, a grey relational analysis (GRA) technique is adopted in the year 1990–2017. The outcomes through the GRA technique discovered that India is a major contributor to carbon emissions caused by economic development, and China appeared to be the more afflicted nation for raising its carbon emissions owing to fossil fuel consumption. Whereas, the generation of solar and wind energy are grounded factors in the reduction of carbon emissions for China and the United States.

The paper Liu and Ware combines the graph convolutional neural (GCN) with the gated recurrent unit to do predictions on simulated and real wind speed and wind power data sets. The improvements in prediction results by GCN in all wind speed experiments show its ability to capture spatial dependence and improve prediction accuracy. Although the GCN does not perform well in short-term wind power prediction as the change of wind power data is not so smooth due to the limitation of turbine operation, the results of long-term prediction still prove the performance of GCN.

The article Singh et al. explored the dynamic impact of total renewable energy consumption (RE) on the decomposed wavelet frequencies of energy consumed by fossil fuels (FE) in the commercial sectors of the USA economy from 2001:1 to 2021: 7. Empirical findings based on wavelet coherence showed significant co-movements between FE and RE with a positive association in the short-run while a negative association in long-run monthly frequency bands.

The paper Ebaid et al. aims to examine the asymmetric impact of oil price shocks on environmental degradation for a panel of six GCC countries from 1996 to 2016. Authors use the dynamic seemingly unrelated regressions approach that considers cross-sectional dependency to reveal the interrelations between oil price shocks and CO_2 emissions. The finding shows that the positive shocks of oil prices have a statistically significant negative effect on CO_2 emissions, while negative shocks of oil prices did not affect CO_2 emissions. Also, the results support an EKC hypothesis in Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates; in contrast, the hypothesis was rejected in Bahrain and Oman.

The last article Tong et al. studies the progressive impact of China's fiscal policy on the sustainable development of the photovoltaic industry. On the one hand, the method based on characteristic facts, through the derivation of the evolutionary game theory of the two parties, finds the influence of the central and the local government on the alternate development of China's photovoltaic industry production enterprises and power generation enterprises due to different policy subjects; on the other hand, from 2013 to 2018, the newly installed capacity of distributed photovoltaics in various provinces in China, through the method of measurement and empirical evidence, found that policy preferences the effects of alternate development.

In summary, in these papers, the impact of wind/solar energy consumption on environmental quality in developed and developing countries has been empirically discussed with data obtained from the relevant countries and/or regions. So these papers collectively will contribute to the energy-environment literature and inspire potential readers and researchers in this field.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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