



OPEN ACCESS

EDITED AND REVIEWED BY
Bamidele Victor Ayodele,
University of Technology
Petronas, Malaysia

*CORRESPONDENCE
Olubayo Babatunde
✉ olubayobabatunde@gmail.com

RECEIVED 24 March 2026
ACCEPTED 10 April 2026
PUBLISHED 27 April 2026

CITATION

Babatunde O, Aruga K, Leung CK,
Babayomi O, Adebisi J and Gbadamosi S
(2026) Editorial: Environmentally just and
economically sustainable
low-carbon transitions.
Front. Sustain. Energy Policy 5:1838153.
doi: 10.3389/fsuep.2026.1838153

COPYRIGHT

© 2026 Babatunde, Aruga, Leung,
Babayomi, Adebisi and Gbadamosi. This
is an open-access article distributed
under the terms of the [Creative
Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/).
The use, distribution or reproduction in
other forums is permitted, provided the
original author(s) and the copyright
owner(s) are credited and that the
original publication in this journal is
cited, in accordance with accepted
academic practice. No use, distribution
or reproduction is permitted which does
not comply with these terms.

Editorial: Environmentally just and economically sustainable low-carbon transitions

Olubayo Babatunde^{1,2,3*}, Kentaka Aruga⁴, Chun Kai Leung^{5,6},
Oluleke Babayomi⁷, John Adebisi⁸ and Saheed Gbadamosi⁹

¹Department of Industrial Engineering, Durban University of Technology, Durban, South Africa, ²Institute of Systems Science, Durban University of Technology, Durban, South Africa, ³Facilities and Management Planning, University of Denver, Denver, CO, United States, ⁴Graduate School of Humanities and Social Sciences, Saitama University, Saitama, Japan, ⁵Global Society and Sustainability Lab, Faculty of Social Sciences, The University of Hong Kong, Hong Kong, Hong Kong SAR, China, ⁶Institute for the Humanities and Social Sciences, The University of Hong Kong, Hong Kong, Hong Kong SAR, China, ⁷ICT Convergence Research Center, Kumoh National Institute of Technology, Gumi, Republic of Korea, ⁸Division of Engineering and Technology, The University of West Alabama, Livingston, AL, United States, ⁹Power and Energy Research Group, Department of Electrical and Electronic Engineering, Bowen University, Iwo, Osun, Nigeria

KEYWORDS

climate change, energy transition, environmental justice, low-carbon technological change, sustainable energy

Editorial on the Research Topic

[Environmentally just and economically sustainable
low-carbon transitions](#)

The shift to low-carbon energy systems has become a central theme in the international discourse of sustainability due to the pressing necessity to mitigate the impact of greenhouse-gas emissions and protect the socio-ecological stability in the long term. However, decarbonization pathways are being increasingly viewed as critical to climate change mitigation, a growing body of literature highlights that the transition is not strictly technical or economic but also fundamentally normative and needs awareness of issues of justice, equity, and societal effects. More recent studies note that successful decarbonization policies should strike the right balance between the rapid reduction in emissions and institutional capacity, investment patterns, and distributional factors to be able to maintain the long-term developmental results and the ability of the policies to be legitimized (Babayomi et al., 2023). Simultaneously, an increasing body of research on sustainability transition echoes the necessity to implement environmental, economic, and governance aspects of decarbonization to facilitate effective policy formulation and system resilience. Taken together, all these perspectives support the growing view that decarbonization should be seen more as a socio-technical change than a technological one and needs interdisciplinary research and policy alignment of climate goals to social welfare outcomes (Babatunde et al., 2024).

This Research Topic “*Environmentally just and economically sustainable low-carbon transitions*” was hosted to bring together studies that explore the overlapping of these dimensions. The objective was to stimulate studies that would examine the institutional, financial, technological, and sectoral circumstances,

in which decarbonization can promote inclusive development and protect ecological systems. Its contributions cut across various geographical settings and schools of thought, such as macroeconomic studies, sector analysis, institutional studies, and ecosystem-based evaluations. Collectively, they show that the process of low-carbon neutralization must not be reduced to environmental actions alone, but necessitates multi-factorial elements such as governance institutions, economic motivators, and social relations.

One of the key themes of this Research Topic is that environmental integrity is a key consideration in the growth of renewable energy. As such, [Ayompe and Egoh](#) presented a comprehensive review of the use of renewable energy and its interactions with ecosystem services. On one hand, their review supports the hypothesis that renewable energy systems provide significant socio-economic benefits, such as job creation, improvement of the health of the population, and energy security. However, sustainability can also be associated with ecological trade-offs, such as impacts on land use, biodiversity, and environmental stability. The authors highlight the need to incorporate ecosystem service considerations into energy planning and propose long-term monitoring, adaptive management, and enhanced data systems. Their contribution supports the significance of maintaining systems approach where renewable energy transitions are not considered through the prism of emissions reduction only but also concerning environmental sustainability and communal welfare.

One of the contributions was devoted to the impact of sector-specific dynamics on the results of decarbonization. [Khan et al.](#) study the environmental performance of subsectors of the Chinese tourism industry and demonstrate that there is a great range of differences in terms of ecological intensity and development impacts. According to their results, lodging has a disproportionate impact on greenhouse emissions and ecological footprint growth, whereas entertainment activities yield greater profits in human development outcomes. The research also shows that regulatory tools invariably enhance environmental performance, but fiscal tools have inconsistent effects depending on the sector. This work identifies the necessity of differentiated approaches to policy that could harmonize the development of tourism with environmental and developmental goals, by providing a sub-sectoral system of governance.

Institution capacity and governance structure can also be key determinants of successful clean transition outcomes. [Oladejo et al.](#) explore the adoption of renewable energy in South African local governments focusing on workforce competence and administrative ability in supporting transition policies. Their qualitative data indicates that a significant skill shortage among the municipal officials impedes the potential of local efforts in renewable energy. According to the authors, training programs, stakeholder engagement, and institutional learning mechanisms are all necessary for local governments to leverage renewable energy for economic and social benefits. Thus, the failure of transition policies is usually not due to technological barriers alone, but also due to institutional hurdles and implementation capacity gaps.

[Yuning et al.](#) offer a wider institutional approach in their study, which examined the role of institutional pressure in determining low-carbon innovation policies among manufacturing companies.

Their results suggest that environmental management systems are instrumental in mediating the transformation of regulatory pressure into the innovative outcomes, whereas governance heterogeneity and environmental interpretation have a strong impact on firms' responses. The study concludes that the success of decarbonization is based on the internalization of environmental policy signals by organizations and highlights the role of governance design in facilitating the diffusion of innovation.

On the macroeconomic level, one of the contributions explored the effect of the financial system and technological development on environmental performance. [Li et al.](#) examine how banking liberalization facilitates corporate environmental, social and governance (ESG) performance, based on a quasi-natural experiment due to Chinese policy change that lifted foreign ownership limits. Their findings reveal that financial reform enhances ESG performance by raising transparency, decreasing financing limitations, and curbing managerial short-termism, to a substantial degree. The article also uncovers the regional spillover effects indicating that financial reforms have the potential to create more systemic benefits in environmental governance. This article emphasizes the role of financial policy in achieving sustainability goals and shows the effects of capital allocation decisions on the environmental behavior of corporations.

[Hao and Arshad](#) compare drivers of carbon emission in G5 economies through a single empirical model by incorporating green technology, energy intensity, environmental performance, and economic growth. Their study reveals that in higher emission contexts, green technological development and economic development can help reduce emissions, with the possibility of environmentally sustainable development paths. Nevertheless, the research also indicates that increasing energy intensity and inadequate effectiveness of the existing environmental policy can continue to frustrate the mitigation processes. These outcomes highlight the importance of policy frameworks that integrate the support of innovation, energy efficiency, and institutional reform.

[Ullah and Lin](#) expanded macro-level analysis by testing the impacts of technological cooperation, grants, and energy depletion on the environmental sustainability in Pakistan. Their findings reveal that international technological collaboration, through ecological capacity enhancement, has a major positive impact on environmental safety, whereas industrialization and resource decimation damage the environment. This article suggests the significance of cross-border collaboration, technology transfer, and aligned policy frameworks in sustainable transitions for emerging economies.

[Liang and Qiao](#) provides another institutional-development framework, comparing the impact of low-carbon city pilot policies in China on common prosperity. They analyze that such policies have a range of positive effects related to the quality of employment and the establishment of human capital, leading to an inclusive development outcome. However, the effects are region-specific and are reflected over the long term, which implies that institutional adjustment and regional economic structure have a significant influence on the transition benefits. The authors argue that dynamic policy evaluation systems, region-specific implementation strategies, and enhanced interregional

coordination are required to ensure that low-carbon urban transformation supports equitable development.

Collectively, the articles in this Research Topic illuminate several valuable insights. First, they show that environmentally just transitions involve incorporating ecological views into technological and economic planning instead of environmental protection being a peripheral goal. Also, they demonstrate that climate policies need to be matched with financial systems, industrial organization, as well as development of the labor market to be economically sustainable. Furthermore, the Research Topic highlights the key role of institutions in mediating the outcome of transition. Coherence in governance, clarity in regulations, and administrative capacity influence the process of implementing and maintaining policies, which can frequently define whether technological opportunities will bring changes in a meaningful manner.

In addition to these findings, the Research Topic also indicates other significant future research directions. Integrated analytical frameworks that can connect environment performance, economic sustainability and social equity under one assessment framework are essential. Enhanced metrics of distributional performance—especially regarding the quality of jobs, spatial inequality, and clean energy access would enhance the evidence on the use of transition planning. Moreover, it is important to increase international collaboration in terms of technology transfer, financial governance and institutional capacities building to ensure that low-carbon transitions will be effective and equitable in various development environments.

With the pressure of climate change and the acceleration of decarbonization, the dilemma of an environmentally responsible, economically viable and socially inclusive transition design will continue to occupy the center of the global policy agenda. This Research Topic can help to enhance the knowledge base on how the pursuit of low-carbon futures is possible in a manner that does not harm ecological systems and helps to promote sustainable development by integrating studies across different regions and sectors. We believe that this discussion will inspire new interdisciplinary investigations and direct policy strategies that can produce sustainable and just transition outcomes.

References

Babatunde, O., Adebisi, J., Emezirinwune, M., Babatunde, D., and Abdulsalam, K. A. (2024). How serious are ethical considerations in energy system decarbonization? *Curr. Opin. Environ. Sust.* 71:101477. doi: 10.1016/j.cosust.2024.101477

Author contributions

OlubB: Writing – original draft. KA: Writing – review & editing. CL: Writing – review & editing. OlulB: Writing – review & editing. JA: Writing – review & editing. SG: Writing – review & editing.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was not used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.