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ORIGINAL PAPER

THE CONCEPT OF JUST ENERGY TRANSITION

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A b s t r a c t

Energy transition is an inevitable process of restructuring energy systems in response to climate challenges. Justice, although frequently invoked in this context, remains an ambiguous concept interpreted in various ways by researchers, policymakers, and society. Despite growing interest in this concept in scientific literature, there is a lack of coherent understanding of this phenomenon. The purpose of this article is to identify and analyze the key dimensions of just energy transition in order to better understand the multidimensional nature of this concept. To achieve this, a systematic literature review was conducted. The study analyzed publications on just energy transition available in the Scopus database. Based on the analysis conducted, a synthetic framework integrating existing approaches was presented. The study describes just energy transition as a multidimensional socio-economic process, extending beyond technological aspects, which requires addressing the needs of the entire society.

POJĘCIE SPRAWIEDLIWEJ TRANSFORMACJI ENERGETYCZNEJ

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Kody JEL: O13, Q56, Q40.

S ł o w a k l u c z o w e: sprawiedliwa transformacja energetyczna, transformacja energetyczna, sprawiedliwość energetyczna, sprawiedliwa transformacja.

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Abstrakt

Transformacja energetyczna jest nieuniknionym procesem przebudowy systemów energetycznych w odpowiedzi na wyzwania klimatyczne. Sprawiedliwość, choć niejednokrotnie przywoływana w tym kontekście, pozostaje pojęciem niejednoznacznym i interpretowanym na różne sposoby przez badaczy, decydentów oraz społeczeństwo. Pomimo rosnącego zainteresowania tą koncepcją w literaturze naukowej, brakuje spójnego ujęcia tego zjawiska. Celem artykułu jest identyfikacja i analiza kluczowych wymiarów sprawiedliwej transformacji energetycznej w celu lepszego zrozumienia wielowymiarowego charakteru tego zjawiska. Aby tego dokonać, przeprowadzono systematyczny przegląd literatury. W ramach badania przeanalizowano publikacje dotyczące sprawiedliwej transformacji energetycznej dostępne w bazie Scopus. Na podstawie przeprowadzonej analizy przedstawiono syntetyczne ujęcie integrujące dotychczasowe podejścia. Przeprowadzone badanie ukazuje sprawiedliwą transformację energetyczną jako wielowymiarowy proces społeczno-ekonomiczny, wykraczający poza aspekty technologiczne, który wymaga uwzględnienia potrzeb całego społeczeństwa.

Introduction

Energy transition has become one of the key challenges facing modern societies in the context of the escalating climate crisis. The transition from a fossil fuel-based economy to low-carbon systems is an inevitable process, but the way to implement it remains contentious. In response to growing concerns about the social and economic impacts of transformation, questions of justice are increasingly prominent in both public debate and academic discourse.

In recent years, we have observed the growing importance of ESG concepts in corporate strategies and public policies, as demonstrated by the introduction of European Sustainability Reporting Standards (ESRS) under the CSRD, which oblige companies to disclose environmental, social and corporate governance practices (Komunikat Komisji…, 2019). The different ESRSs require organizations to disclose decarbonization strategies, assess the impact of energy infrastructure on ecosystems, or regulate pollution in the energy production process. With regard to just transition, the social aspect is also important. It considers the impact of change on affected communities, defined as communities living or working in a region that is or may in the future be impacted by an organization's activities or its value chain (*European Sustainability Reporting*…, 2023).

Moreover, a significant concern is energy poverty, which Bouzarovski and Petrova (2015) define as a phenomenon characterized by the inability of households to afford an adequate level of energy services, including access to facilities, infrastructure and social norms. It must not be forgotten that transformation brings significant changes to the labor market, and therefore needs to account for the interests of those currently employed in high – emission industries.

The aspects mentioned above demonstrate the multidimensionality of the concept of just energy transition. The purpose of this article is identify the key dimensions of just energy transition. To do this, the literature review was conducted. The introductory section of this article examines the meaning behind

concepts such as social justice and energy transformation. Then the approaches to equitable energy transition presented in the literature were compared and specific aspects of it were detailed. Finally, the conducted analysis resulted in a comprehensive framework of just energy transition.

Social Justice and Energy Transition

The definition of justice has evolved over the centuries. Aristotle (1956) distinguished compensatory justice, that is, rewarding for good and punishing for evil, and, particularly relevant to this topic, distributive justice, saying that everyone should receive a share proportional to the value they represent. For the proper application of the law, the formal concept of justice, formulated in the 20th century by Rawls (1971), will be most relevant. This definition asserts that though inequalities are inevitable, they should be distributed to benefit the most disadvantaged, while ensuring equal access to public institutions. Justice is therefore an abstract idea to which a rational legislator should strive, paying attention to whether the solutions applied will improve the situation of the least well-off, and whether they will not introduce discrimination in access to public institutions. Rawls argued that social inequalities and privileges stemming from birth circumstances are unjust, despite being natural.

Moving forward, energy transformation refers to a change in the structure of primary energy, which leads to the creation of a new paradigm of the energy system. As pointed out by Smil (2010), this is a long-term phenomenon that can be examined in terms of the duration of time between the emergence of a new energy source and the acquisition of a significant share in the energy mix both locally and globally. Meanwhile, Cantarero (2020) emphasizes that the energy transition integrates assumptions related to energy efficiency, affordability, reliability and energy independence. York and Bell (2019) draw attention to the accurate understanding of the concept of energy transition. True transformation is not only about implementing new energy sources, but also about replacing existing ones and changing the entire energy mix.

Research Method

In order to identify key dimensions of just energy transition, approaches to just energy transition present in the literature were analyzed. This was accomplished by using the Scopus database. This is one of the largest databases of scientific literature, including peer-reviewed articles, conferences and monographs, which provides access to up-to-date and reliable sources. In addition, this database allows advanced citation analysis, which is crucial for a comprehensive evaluation of this issue.

In the first stage of the research, efforts were concentrated on identifying occurrences of the term "social justice" in the Scopus database among titles, keywords and abstracts. This resulted in 104,777 papers. The search was then limited to those in which one of the keywords was "energy transition" or "energy transitions". As a result, 372 publications were found. Next, the search was narrowed to include only English-language publications in the fields of social sciences, energy and economics, econometrics and finance. The choice of literature from these domains was motivated by their immediate relevance to the analyzed topic, thereby improving the value of the collected research data. As a result of this measure, the number of analyzed publications was reduced to 325.

The first publications meeting the search criteria are from 2013. The largest increase in interest in this term occurred after 2019. The largest number, 74 publications, was published in 2024. What's more, as of March 22, 2025, 22 publications had already been published in 2025, which indicates, an ongoing growth trend. This study deliberately avoided implementing the restrictions of the time frame of the analyzed literature, which made it possible to identify key works, that contributed to its conceptualization. The searched articles were published in a total of 99 journals. The most common titles included: Energy Research and Social Science – 74 times, Energy Policy – 29 times, Energies – 13 times, Applied Energy – 12 times, Sustainability (Switzerland) – 11 times. Meanwhile, the most frequently occurring keywords included "energy policy", "energy transitions", "energy justices", "alternative energy", "environmental justice" and "sustainable development".

Results of Analysis

Due to the generous number of publications searched, it was decided to include only those with the highest number of citations. Therefore, a limitation was imposed according to which publications with more than 50 citations were analyzed. As a result of applying this criterion, 60 publications were qualified for analysis. A total of 8,283 citations of these publications were recorded. However, not all the papers directly addressed the issue of just energy transition. As a result, the number of analyzed publications was once again reduced. In the end, 19 works were included, which are summarized in the Table 1. The analyzed papers were assigned to groups due to the aspects of just energy transition that are analyzed.

The concept of just transition emerged from labor unions and environmental organizations, which noted the need to move away from harmful industries while providing workers with adequate retraining opportunities. In the 1990s, the Just Transition Alliance initiated a groundbreaking dialogue between workers in carbon-intensive industries and the communities affected by their operations

Table 1

Publications searched in Scopus database by category related to the dimension of equitable energy transition. Status as of March 22, 2025

Dimension	Author	Year	Number of citations
Public policies	S. Bouzarovski, H. Thomson, M. Cornelis	2021	127
	N. van Bommel, J.I. Höffken	2021	93
	W. F. Lamb et al.	2020	59
	A.D. Boyle et al.	2021	52
Justice	D. McCauley et al.	2019	302
	K. Yenneti, R. Day, O. Golubchikov	2016	250
	D. Streimikiene et al.	2021	92
	K. O'Sullivan, O. Golubchikov, A. Mehmood	2020	77
	A. Dall-Orsoletta, P. Ferreira, G. Gilson Dranka	2022	75
	Z. Hu	2020	51
Energy poverty	S. Carley, D.M, Konisky	2020	699
	P. Newell, D. Mulvaney	2013	668
	L. Middlemiss	2022	57
Social participation	K. Jenkins, B.K. Sovacool, D. McCauley	2018	241
	D. Fairchild, A. Weinrub	2017	52
Theoretical approach	N. Healy, J. Barry	2017	502
	T. Kalt	2021	78
	S. Bouzarovski	2022	52
Possible actions	S. Carley, D.M Konisky	2020	699
	B.K. Sovacool, D. Furszyfer Del Rio, S. Griffiths	2020	150

Source: own analysis based on data from the Scopus database.

in response to new regulations aimed at protecting the environment, which resulted in the closure of facilities deemed harmful to the environment (Newell & Mulvaney, 2013).

When analyzing the publications, it can be observed that they take into account various aspects of just transition, which are detailed in Table 1. In the 4 cited publications, the authors emphasized the importance of political aspects in the energy transition process. Lamb *et al.* (2020) consider that energy policy can have both positive and negative impacts on society. They believe it is possible to achieve climate goals while improving living conditions, employment and social cohesion, as long as policies that incorporate justice and equity are implemented. In contrast, van Bommel and Höffken (2021) note that it is not clear that initiatives implemented by the European Union that aim at just transition will actually ensure it. The authors find it essential to provide support to marginalized groups and low-income communities. Bouzarovski *et al.* (2021)

cite the approach presented by the European Commission, according to which combating energy poverty is an integral part of just energy transition. Moreover, they point to the need for consistency between environmental and social policies and the involvement of citizens in the decision-making process. Meanwhile, Boyle *et al.* (2021) note that just transition is linked to a shift away from a narrow, cost-based approach to climate policy to a more comprehensive view that takes into account social aspects.

Another aspect included in the analyzed articles is justice. Yenneti *et al.* (2016) focus on spatial justice, recognizing that even ecologically progressive projects such as solar farms can negatively affect local communities by taking away their sources of income. Large-scale photovoltaic farms, like hydroelectric power plants, require the conversion of large areas of land, excluding its agricultural use. Unlike water reservoirs, which can also serve other purposes, solar parks usually completely exclude the land from other uses. On the other hand, O'Sullivan *et al.* (2020) pay attention to spatial justice in relation to the differences between the center and the periphery. According to the authors, although the transition supports decentralization and democratization of energy and local economic development, for socially, economically and politically marginalized regions the offered opportunities are difficult to use. While the dispersal of energy systems and markets could provide a solution to existing problems, the hegemonic nature of market mechanisms continually favors the center, marginalizing the periphery. This results in the periphery's dependence on external decisions that determine the type of technologies, their location, and their impact on the local landscape and economy. Hu (2020) in his work refers to restorative justice, which aims to provide compensation to individuals negatively affected by energy projects. He mentions government subsidies for marginalized communities as part of the transformation, but as he points out, these can lead to increased inequalities among energy consumers. Meanwhile, McCauley *et al.* (2019) refer to the idea of energy justice, recognizing that the basis of this concept in times of cutting carbon consumption should be just transition to a net-zero economy. Another approach to the aspect of justice is presented by Dall-Orsoletta *et al.* (2022), who emphasize that low-carbon technologies are not fundamentally just. Despite many benefits, they can exacerbate inequalities in the initial cost of vehicles and the availability of charging infrastructure for the poorest. They mention in their paper the disregard for local communities during lithium and cobalt mining, which results in conflict and forced relocation of indigenous people.

Streimikiene *et al.* (2021) develop indicators to track just energy transition. Economic indicators include per capita income, energy consumption, energy intensity, electricity and gas prices for households. Social indicators, on the other hand, include variables depicting energy poverty, such as the inability to maintain adequate heat in a housing facility, energy arrears, leaky housing and damp walls. Environmental variables, on turn, are greenhouse gas emissions and the share of energy from renewable sources in total energy consumption.

Energy poverty is another aspect that researchers highlight in the context of just energy transition. As Middlemiss (2022) points out, just transition may exacerbate the problems of energy-poor households, as they are in a worse initial position. According to Carley and Konisky (2022), energy poverty can occur as a result of rising energy costs due to the transition. Also, Newell and Mulvaney (2013) highlight the need to include increased access to electricity for those affected by energy poverty as part of just transition.

Some authors emphasize in their works the importance of social participation in just energy transition. Jenkins *et al.* (2018) stress that the transition cannot be effective without the participation of the entire society. According to Fairchild and Weinrub (2017) the basis of just energy transition is democracy, where both employees and communities influence the choices that shape their lives.

In the 3 cited publications, theoretical approaches to just energy transition were also noted. Kalt (2021) points to the ambiguity of the term and its different interpretation by various groups. On the other hand, Bouzarovski (2022) postulates a change in the approach to just energy transition, since the current approach to this issue is characterized by excessive technocratism and rootedness in capitalist structures. Whereas, in the view of Healy and Barry (2017) without addressing issues of power, political economy and politics, the conflict between "decarbonization" and "equity" will last forever.

Two publications presented recommended actions necessary for achieving just energy transition. Carley and Konisky (2020) list the following: workforce diversification programs, energy support and thermo-modernization, expanding access to energy technologies, collective action initiatives, and energy innovation in business. Meanwhile, Sovacool *et al.* (2020) identify measures such as financial support for workers, tools for affected communities serving economic development, and training programs.

A Comprehensive Approach to Just Energy Transition

Fairchild and Weinrub (2017) perceive just transition as a concept that involves transforming a destructive profit-driven economy into an ecologically sustainable and socially inclusive one. Its foundation is democracy, where both workers and communities influence the decisions that shape their lives. Carley and Konisky (2020) indicate that just transition refers to both energy transition and energy justice, emphasizing the need for equitable distribution of benefits and costs associated with changes in the energy system. Meanwhile, Newell and Mulvaney (2013) write about transition as a just, sustainable and reasonable in the eyes of citizens transition to a low-carbon economy. According to Bouzarovsky (2022), just transition is a process that combines climate action with socioeconomic transformation. A different approach to just transition is presented by Sovacool

et al. (2020), who quote the definition presented by Henry *et al.* (2020) and identify its purpose – to guarantee that no individual is marginalized.

As evidenced by the review of the literature, merely five of the referenced publications offer an explicit and unequivocal definition of just energy transition. Papers on this issue often focus on one particular aspect of the problem. Just energy transition is an interdisciplinary concept that combines terms such as social justice and energy transition. This process involves a transition towards a low-carbon economy, synthesizing established climate goals with social justice and economic development. Its basis is democracy, which enables both workers and local communities to engage in actions that have a real impact on the decisions that determine their existence. This approach goes beyond the traditional cost – oriented perspective of climate policy, introducing a comprehensive view that takes into account social aspects.

Just transition is not only a concept in the fields of technology and social economics, but also in politics. It emphasizes the need to redistribute wealth, in order to ensure that all citizens have access to adequate energy services and infrastructure, while supporting economically vulnerable households. Addressing the needs of all social groups is the foundation of the transformation. It is particularly important to pay attention to the situation of employees in carbon-intensive sectors and local communities, as these groups, in particular, are the ones bearing the costs of the transformation. The integral element of just energy transition is the elimination of energy poverty.

When discussing just energy transition, it is also necessary to mention the actions supporting it. Firstly, it is necessary to provide appropriate financial support for workers in high-carbon sectors and implement tools to enable local economic development for affected communities. Moreover, workers should have the opportunity to attend training and retraining programs, which would make it easier for them to find new employment if they lose their jobs as a consequence of the transition. Another crucial factor involves the implementation of energy assistance programs and thermal modernization initiatives, which will enhance energy access for individuals experiencing energy poverty. It is also necessary to provide broader access to energy technologies, as well as to promote collective initiatives and energy innovation.

Conclusions

Just energy transition is one of the biggest challenges today, simultaneously offering opportunities for socio-economic development for the society. The systematic review of the literature on just energy transition conducted in this article has made it possible to identify the key concepts scattered in various research approaches.

The conducted analysis provides a better understanding of the multidimensional nature of just energy transition. Based on the literature review, it is clear that the transition process goes beyond economic and technical paradigms, placing special emphasis on the social and ethical issues of energy transition. A key challenge for policymakers is to design policies that, on the one hand, enable the achievement of ambitious climate goals and, on the other, provide support for workers in carbon-intensive sectors and local communities. Another inherent aspect of just energy transition is the alleviation of energy poverty, which takes on new significance in the context of energy systems transition. Without appropriate action, transition may result in a disproportionate burden on low-income households. Participatory democracy, in which both workers and local communities can influence decisions that shape their future, also undoubtedly plays an important role.

At the same time, it should be stressed that the proposed definition should not be treated as final and unchangeable. The energy transition is a dynamic phenomenon, subject to constant change under the influence of technological progress, socio-economic changes and the evolution of climate policy priorities.

Translated by the Author

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