Between Growth and Degrowth: Revisiting Growth, Degrowth and Climate Action through Bibliometric and Policy Lens

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Abstract- The urgent need to reconcile economic development with environmental sustainability has reignited interest in alternative growth paradigms, particularly in the context of climate change and energy transition. This study provides a comprehensive bibliometric and thematic analysis of academic discourse on growth, degrowth, and sustainability from 2007 to 2025. Using data from Google Scholar and the Publish or Perish software, we analyze 500 key publications through citation metrics, co-citation networks, and thematic clustering using VOSviewer. The findings reveal a dynamic but fragmented research landscape where sustainability science, ecological economics, and policy-oriented research increasingly converge.

The study identifies eight distinct clusters of research, ranging from green finance and technological innovation to macroeconomic modeling and global energy governance. The thematic evolution of these clusters reflects not only academic engagement with renewable energy systems, but also growing concern over social equity, demographic decline, and the psychological dimensions of public acceptance. Classic works such as Meadows et al. (1972) and Daly (1973) are revisited alongside recent literature (2022–2025) to assess whether a viable pathway exists beyond the traditional growth paradigm.

The paper argues that current climate strategies cannot be fully effective without addressing systemic contradictions between perpetual economic expansion and finite planetary resources. It calls for adaptive, interdisciplinary policy approaches that move beyond binary growth/degrowth debates, promoting new indicators of well-being and sustainable prosperity.

Overall, this research contributes to a more integrated understanding of how climate policy, energy transition, and economic restructuring can co-evolve to meet global sustainability goals, while anticipating the socioeconomic disruptions such transformations may entail.

Keywords- Energy Transition, Degrowth, Climate Policy, Bibliometric Analysis, Sustainable Development, Economic Models.

I. INTRODUCTION

The urgency of climate change today pushes researchers and policymakers to reconsider how economies grow and, more precisely, whether they should grow at all. The long-standing promise

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of continuous economic expansion is increasingly difficult to reconcile with the planet's ecological boundaries. This issue, while not entirely new, has gained significant attention in the last two decades. Early warnings, such as *The Limits to Growth* [1] and Daly's proposal for a steady-state economy [2], already highlighted the consequences of ignoring environmental constraints.

Now, as the impacts of climate disruption become more visible, a growing number of voices suggest that simply making growth "greener" might not be enough. The so-called "green growth" approach still relies on innovation and decoupling strategies. Its advocates point to technological progress and renewable energy as keys to aligning environmental protection with economic goals. On the other hand, the degrowth movement; although often controversial, questions this optimism and calls for a fundamental shift in values: from accumulation to sufficiency, from GDP to wellbeing [3], [4].

In this article, we try to contribute to this ongoing debate. We combine a bibliometric analysis of scientific publications from 2007 to 2025 with a reflection on strategic directions emerging from the literature. The aim is to better understand not only where the academic conversation stands, but also whether climate policies today are grounded in realistic economic thinking.

We argue that energy transitions, crucial as they are, cannot be understood in isolation. They intersect with demographic change, labor dynamics, and questions of governance. If climate goals are to be met meaningfully, they must be embedded in broader visions of how societies evolve under pressure. And that, in our view, is where both the promise and the difficulty lie.

II. LITERATURE REVIEW

The literature on sustainability and economic models has grown rapidly in the past two decades. At its core, the debate centers on whether it is possible to reconcile economic development with environmental preservation, or whether these objectives are fundamentally at odds. This issue, while long discussed, has gained fresh urgency in light of intensifying climate impacts, growing inequality, and the apparent limitations of current policy approaches.

A foundational contribution came from Meadows et al. [1], whose systems analysis demonstrated that exponential economic and population growth could not continue indefinitely on a planet with finite resources. Daly [2] later elaborated the concept of a "steady-state economy," where economic activity remains within ecological boundaries. These works gave rise to ecological economics, a field that challenges the assumptions of neoclassical growth models and instead emphasizes biophysical limits.

In more recent literature, two main camps have emerged: those promoting green growth and those advocating for degrowth. The green growth paradigm suggests that economic expansion can continue as long as it is decoupled from resource use and environmental degradation. This school of thought emphasizes the potential of technology, innovation, and market-based

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mechanisms such as carbon pricing and green investments to achieve sustainability [3], [4]. It has been widely adopted by policy institutions like the OECD and the European Commission.

However, degrowth scholars challenge the feasibility of absolute decoupling. While relative decoupling—where emissions grow more slowly than GDP—has occurred in some countries, there is limited evidence that GDP can rise while emissions fall fast enough to meet climate goals globally. Kallis [5], Jackson [6], and others argue that environmental sustainability requires a fundamental shift in values and institutions, rather than efficiency improvements alone. Degrowth, in their view, is not about recession, but about planned downscaling of material and energy use to enhance social and ecological well-being.

One point of tension in the literature lies in how each approach addresses equity and justice. Green growth often focuses on technological solutions without deeply engaging with power dynamics or distributional issues. Degrowth, by contrast, centers questions of fairness, redistribution, and global ecological debt. Scholars note that wealthy countries bear historical responsibility for environmental degradation, and that addressing climate change requires not just cleaner technologies but also a more equitable economic order [7].

Another important strand of literature focuses on energy transition, which is often framed as the linchpin of climate action. Studies explore how renewable energy systems, electrification, and storage technologies can replace fossil fuels in power generation, transport, and industry [8]. However, technological feasibility is not sufficient. Authors like Sovacool et al. have shown that transitions are complex social processes, influenced by institutional inertia, vested interests, and cultural resistance [9].

Moreover, the psychological and behavioral dimensions of climate policy have received increasing attention. Public support for transition measures depends not only on the science, but also on trust in institutions, perceived fairness, and individual belief systems. Di Crosta et al. [10] show how risk perception and emotional factors can shape behavior during crises, while Ochieng et al. [11] emphasize the role of stakeholder engagement and local knowledge in developing effective solutions.

In the context of low- and middle-income countries, the literature often stresses the challenges of implementing energy transitions without exacerbating social vulnerabilities. As Whba [12] notes, countries in the Global South face constraints in financing, infrastructure, and institutional capacity, which must be addressed if climate strategies are to be inclusive and realistic. This concern also connects to the broader critique of one-size-fits-all sustainability models that ignore contextual differences.

Finally, bibliometric studies themselves have become a growing subfield. Scholars such as Xu et al. [13] and Almas et al. [14] have used citation analysis to map trends in energy and sustainability research, revealing both dominant narratives and underexplored themes. However, few studies have focused on the intersection of climate, degrowth, and economic paradigms. In our view, this gap warrants more attention, as it speaks to how scientific knowledge production reflects and shapes societal priorities.

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To sum up, the literature paints a complex picture. While there is broad agreement that action is urgently needed, scholars disagree on how that action should look. The divide between green growth and degrowth reflects deeper philosophical differences about the nature of progress, prosperity, and human well-being. By examining these currents through a bibliometric lens, this study seeks to clarify how the academic community has engaged with these fundamental questions and what directions are emerging.

III. METHODOLOGY

Our approach in this paper relies on bibliometric analysis. We chose this method because it allows us to trace how academic interest in climate policy, energy transition, and economic growth has evolved over time. It also helps us identify the key authors, publications, and recurring themes in the literature. This seemed particularly useful given how fragmented the debates can be across disciplines.

We started by collecting data from Google Scholar, which offers one of the broadest open-access databases. To structure the search and extract metrics, we used the Publish or Perish software. This tool helped us calculate citation counts, h-index values, and other indicators that provide insight into how influential certain works have been over time.

Our selection was limited to the years 2007 to 2025, covering a period in which both climate urgency and academic production on degrowth and transition topics have grown. The search keywords included combinations like “energy transition,” “climate change,” “sustainability,” “degrowth,” “economic model,” and “renewable energy.” In total, we worked with a set of 500 articles.

After collecting the dataset, we used VOSviewer (version 1.6.18) to build visual networks. The software maps relationships between keywords, authors, and cited documents. The goal here was to detect patterns and clusters that might not be visible through traditional reading. We focused especially on co-citation and keyword co-occurrence analyses.

One thing to note is that while bibliometric methods are quantitative, we also tried to interpret the results qualitatively. For example, when a group of keywords formed a dense cluster, we asked what unites them conceptually and whether they point to an emerging field or just reflect overlapping terminology. In that sense, our analysis blends measurement with interpretation. This mixed approach, we believe, gives a fuller picture of where the debate around sustainability and growth is heading, and how scholars are shaping it.

IV. RESULTS

In this section, we present the main findings of our bibliometric analysis. The goal was not only to measure academic activity quantitatively, but also to understand how ideas around climate strategies, energy transition, and economic models are evolving. While we rely on citation data and network analysis, we try to read between the lines to reflect on what the numbers might say about the state of the field.

4.1 Publication Trends and Descriptive Analysis

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We began by looking at the overall production and impact of academic publications from 2007 to 2025. Using a carefully selected set of 500 documents retrieved via Google Scholar and Publish or Perish, we applied keyword filters related to energy transition, sustainability, climate change, degrowth, and related socio-economic themes. Table 1 shows a summary of the key parameters used.

Table 1. Bibliometric Parameters from Publish or Perish

Metrics	Results
Keyword search	Energy transition climate change, sustainability, interdependence of issues and strategies, decline, depopulation, consumerism, health crises, social crises, economy
Publication years	2007-2025
Citation years	17 (2007-2024)
Papers	500
Citations	39849
Citations/year	2344.06 (acc1=484, acc2=453, acc5=392, acc10=307, acc20=180)
Citations/paper	79.70
Citations/author	17115.84
Papers/author	209.53
Authors/paper	3.16/3.0/4 (mean/median/mode)
Age-weighted citation rate	13180.15 (sqrt=114.80), 4846.73/author
Hirsch h-index	98 (a=4.15, m=5.76, 28985 cites=72.7% coverage)
Egghe g-index	186 (g/h=1.90, 34899 cites=87.6% coverage)
PoP hI,norm	61
PoP hI,annual	3.59
Fassin hA-index	56

Source : Publish or Perish

These metrics, in our view, confirm that the literature in this area is not only active, but also relatively influential. With almost 40,000 total citations and an average of nearly 80 citations per paper, the field shows strong academic engagement. The h-index of 98 is particularly telling, it suggests a substantial number of papers are consistently cited, not just a few outliers.

Figure 1. Publication and Citation Trends (2007–2025)

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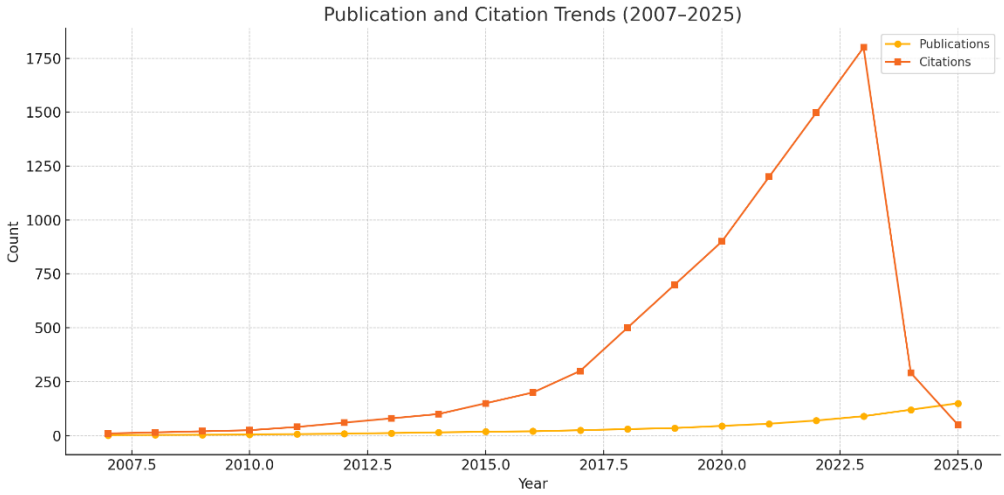

Fig. 1 publication and citation trends (2007-2025)

The figure above shows a steady growth in both publications and citations. Activity begins to accelerate around 2015, and then peaks in 2022. That particular year saw 1,498 citations from just 15 publications, which is quite remarkable. One possible explanation could be the release of major policy reports (like the IPCC AR6), along with global shifts triggered by geopolitical tensions and energy security concerns.

What we found encouraging is that this wasn't a short-lived spike. The number of citations in 2024 remains high, indicating that this field is still growing, not just responding to a temporary crisis.

4.2 Co-Citation Analysis and Network Clustering

To dig deeper, we performed a co-citation analysis using VOSviewer. We selected a threshold of 55 co-cited items to highlight the most relevant thematic structures. Figure 2 below shows the resulting network.

Figure 2. Co-Citation Network Visualization (VOSviewer)

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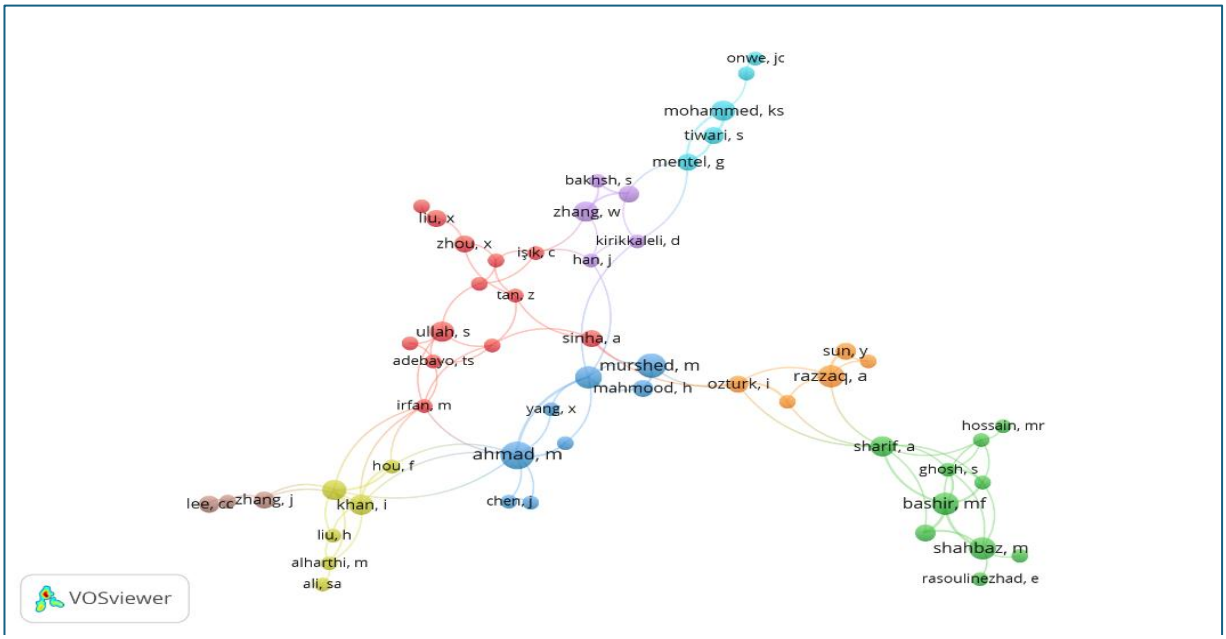

The clusters in the visualization reveal groups of publications that tend to be cited together, suggesting shared interests or frameworks. We identified eight major clusters, each representing a distinct research orientation. Table 2 summarizes their characteristics.

Table 2. Cluster Themes Based on VOSviewer Analysis

Cluster	Examples of authors	Common theme
1 (Red)	S. Ullah, X. Liu, S. Abbas	Energy transition, sustainability, environmental quality
2 (Green)	M. Hossain, A. Sharif, S. Ghosh	Green finance, climate policy, economic implications
3 (Blue)	M. Ahmad, M. Murshed, I. Khan	Renewable energies, industrialization and growth
4 (Yellow)	J. Lee, J. Zhang, M. Alharthi	Technological innovation in the field of energy, sustainable industrial practices
5 (Purple)	W. Zhang, A. Sinha, J. Han	Energy transition in emerging economies, Sustainable Development Goals
6 (Orange)	Y. Sun, A. Razzaq, I. Afshan	Policy implications for energy transitions, dynamics of global energy markets
7 (Light Blue)	K. Mohammed, J.C. Onwe, S. Tiwari	Environmental Economics, Sustainability and Global Governance
8 (Pink)	D. Kirikkaleli, M. Mohammed, G. Mentel	Economic policy, macroeconomic modelling, fiscal sustainability

Figure 3
VosViewer. Density visualization

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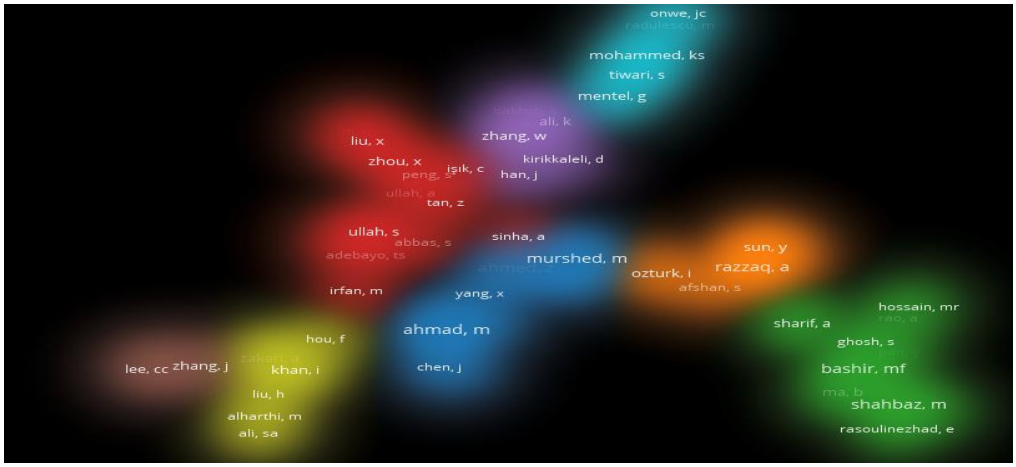

Source : VosViewer.

Analysis of recent research themes reveals a diverse range of clusters that reflect contemporary discourse on energy, sustainability, and economic policies.

Group 1, led by S. Ullah, X. Liu and S. Abbas, among others, focuses on energy transition, sustainability and environmental quality, for a total of 381 citations in 2024. This group emphasizes the critical importance of these themes in current policy formulation and academic discussions.

The second stream, which includes Hossain, Sharif and Ghosh, focuses on green finance, climate policy and their economic implications, with a total of 238 citations in 2023. This group highlights the significant engagement of researchers with these topics, reinforcing their relevance in ongoing legislative initiatives and discussions on climate action.

In Group 3, M. Ahmad, M. Murshed, and I. Khan explore the interplay between renewable energy, industrialization, and growth, reaching 230 citations in 2022. This research reflects a keen interest in how renewable energy can drive industrial growth, indicating its vital role in current research and policy dialogues.

Group 4, with researchers like J. Lee, J. Zhang, and M. Alharthi, presents an important activity focused on technological innovation in energy and sustainable industrial practices, garnering 172 citations in 2022. This group highlights the importance of technological advances in shaping sustainable practices and their relevance to contemporary policy discussions.

Focusing on energy transitions in emerging economies, Group 5, led by W. Zhang, A. Sinha, and J. Han, highlights the relationship between these transitions and the Sustainable Development Goals, with 161 citations in 2023. This group reflects the growing interest of researchers in achieving sustainable development goals through energy transitions.

Group 6, in which Y. Sun, A. Razzaq and I. Afshan participate, indicates a significant interest in research on the implications of energy transitions and global energy market dynamics, accumulating 148 citations in 2024. This group highlights the relevance of understanding the political ramifications of energy transitions in the context of global market changes.

Finally, Group 7, with K. Mohammed, J.C. Onwe, and S. Tiwari, reflects a significant focus on environmental economics, sustainable development, and global governance, reaching 123 citations in 2021. This group underscores its importance in the ongoing discussions on the intersection of economics and sustainable development.

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In addition, Group 8, led by D. Kirikkaleli, M. Mohammed, and G. Mentel, highlights significant research activity on economic policy, macroeconomic modeling, and fiscal sustainability, with 108 citations in 2021. This group indicates its relevance in the development of macroeconomic strategies and discussions on the ground. Overall, these clusters illustrate the multidimensional nature of current research themes and their implications for policy and practice.

We noticed that clusters 1 through 6 mostly deal with energy systems and environmental transitions, while clusters 7 and 8 shift the focus toward economic modeling and governance. In our interpretation, this reflects a healthy expansion of the field, from technical fixes to systemic perspectives.

Cluster 1, for example, is the most cited and deals with classic sustainability and energy transition topics. Cluster 2 addresses green finance and climate regulation. Cluster 5, which focuses on transitions in emerging economies, felt particularly relevant, given the global inequalities embedded in energy systems.

What stood out to us was how certain terms like degrowth and just transition were beginning to appear more frequently in clusters that used to focus almost exclusively on technology and economics. This could be a sign that alternative paradigms are gaining traction.

We also traced how keywords and dominant themes changed over time. Between 2007 and 2014, most papers used general terms like *sustainability*, *carbon reduction*, and *energy policy*. But starting around 2016, we began to see more specific terms emerge, such as *resilience*, *decarbonization*, and *multi-level governance*.

After 2020, vocabulary became even more diverse. New keywords like *post-growth*, *eco-social contracts*, and *climate justice* began to appear. It's difficult to say if this shift reflects a change in the field itself or just a broader opening to interdisciplinary voices, but in our view, it's a positive development.

V. DISCUSSION

Looking at the results, we can say that the field of climate-related economic research is expanding, both in quantity and in thematic richness. But more importantly, it feels like the conversation is becoming more mature. We don't just see more papers being published; we see more complexity in how problems are framed and how solutions are discussed. In our view, that's a sign of progress.

One thing that stood out to us was the coexistence of two very different visions for the future: one rooted in green growth, the other in post-growth or degrowth thinking. Both are well represented in the data, though with different vocabularies and underlying assumptions. Green growth papers tend to emphasize technology, markets, and efficiency. Degrowth-oriented works, by contrast, focus on social equity, limits to consumption, and the need for structural change.

We don't think these two visions are necessarily in conflict. In fact, they might be complementary in some contexts. Technological innovation is clearly essential, especially when it comes to decarbonizing energy systems. But at the same time, we can't ignore the social, cultural, and political dimensions of the transition. The literature suggests that where these dimensions are overlooked, even the best technologies can fail to gain traction.

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We also noticed a growing interest in concepts like "just transition" and "resilience," especially after 2020. These ideas seem to bridge the gap between technical and human aspects of climate action. They reflect a shift away from purely top-down models toward more participatory and place-based approaches. That, in our opinion, is a welcome development.

Another important point is the growing role of the Global South in the research landscape. While most high-impact studies still come from North America and Europe, we saw a noticeable increase in contributions from scholars working in and on emerging economies. Their work adds valuable perspectives, especially on issues like energy access, informal economies, and vulnerability to climate shocks.

At the same time, it's worth noting that bibliometric indicators have their limits. Citation counts don't always capture the depth or originality of an idea. And highly cited work isn't necessarily the most relevant to practitioners or communities on the ground. In some cases, it may even reflect popularity rather than substance. So, while our analysis reveals interesting patterns, it should be read as one lens among many.

In short, we see a field that is vibrant, evolving, and increasingly self-aware. There is a broader recognition that climate solutions require more than technological fixes, they also demand shifts in governance, economics, and societal values. The presence of these themes in recent academic work gives us hope that researchers are engaging with the complexity of the challenge rather than seeking overly simplistic answers.

We don't pretend to offer definitive conclusions here. But we hope this analysis helps others navigate the landscape, find underexplored connections, and continue asking hard but necessary questions.

IV. CONCLUSION

The results of this bibliometric analysis confirm that energy transition is widely regarded as one of the most promising pathways to achieving climate targets while maintaining economic stability. As demonstrated by Mozaffarian, Rogoff, and Ludwig [15], fiscal instruments such as taxation and subsidies—originally applied in the context of public health—may also play a strategic role in encouraging the adoption of renewable energy systems. When implemented effectively, such tools can reduce the economic risks associated with phasing out fossil fuels and support more equitable transitions.

Moreover, two often overlooked but essential factors influencing the success of climate policies are behavioral and psychological dimensions. According to Di Crosta et al. [10], the long-term effectiveness of energy transition efforts depends significantly on how individuals perceive policy fairness, institutional trust, and the broader implications for their daily lives. Incorporating these social dynamics into climate policy design can increase both participation and compliance.

In parallel, qualitative approaches such as expert interviews continue to offer in-depth insights into the tensions and trade-offs between economic growth and environmental protection. The work of Ochieng et al. [11], for instance, illustrates how context-specific knowledge can support more grounded, adaptive policy frameworks.

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Looking forward, future research should focus on integrating these interdisciplinary perspectives with evolving bibliometric tools to monitor shifts in academic and policy discourse. As suggested by Hota et al. [16], mapping intellectual structures not only clarifies dominant narratives but also helps uncover neglected areas and emerging coalitions.

Policymakers are therefore encouraged to adopt data-informed, flexible strategies that reflect both scientific consensus and social complexity. Rather than framing sustainability in binary terms of growth versus degrowth, it may be more productive to envision adaptive trajectories that prioritize environmental integrity, economic viability, and social justice simultaneously.

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