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Transitions, Old Inequalities, Climate Justice and the Hidden Costs of Net-Zero Policies in the Global South Green and the Road to Viksit Bharat @2047

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Abstract

Net-zero emissions targets have become the central organizing principle of global climate governance, shaping national policies, corporate strategies, and international negotiations. Often presented as scientifically necessary and politically neutral, net zero is increasingly recognized as a contested objective with significant justice implications. This paper critically examines net-zero decarbonization pathways through a climate justice lens, focusing on their consequences for development in the Global South.

Drawing on Armstrong and McLaren's analysis of the conceptual ambiguity of net zero, the study argues that variations in mitigation timing, reliance on carbon removals, and definitions of residual emissions produce unequal distributive outcomes. Delayed mitigation in high-income countries combined with dependence on negative emissions technologies risks transferring environmental, economic, and governance burdens to developing regions. Complementing this perspective, Sovacool et al.'s governance critique highlights how knowledge production and technological control remain concentrated in the Global North, reinforcing existing global inequalities.

The paper conceptualizes net zero as a developmental dilemma rather than a universally beneficial climate goal. It advances a justice-oriented framework integrating temporal, distributive, and procedural justice to evaluate net-zero strategies. Achieving climate stability, therefore, requires reframing net zero as a justice-centered process aligned with equitable global development

Introduction

The global pursuit of net-zero emissions has emerged as the defining environmental imperative of the twenty-first century, with nations across the world committing to ambitious decarbonization targets in response to the accelerating climate crisis. Yet beneath the ostensibly universal language of climate action lies a profoundly uneven landscape of responsibility, capacity, and consequence. While the transition to renewable energy and low-carbon economies is framed as a collective global project, the pathways toward this transition—and the burdens they impose—are anything but equal.

For countries in the Global South, the promise of a green transition arrives entangled with historical legacies of colonialism, extractivism, and structural inequality. These nations, which have contributed minimally to cumulative greenhouse gas emissions, now find themselves navigating a precarious terrain where climate mitigation policies designed in and for the Global North frequently reproduce the very patterns of exploitation and dispossession they purport to transcend. The transition to net-zero, rather than representing a clean break from carbon-intensive development, often perpetuates old hierarchies through new means: the extraction of critical minerals for batteries and solar panels, the displacement of communities for renewable energy mega-projects, the imposition of carbon markets that commodify ecosystems, and the enforcement of conservation schemes that criminalize Indigenous land practices.

This research examines the hidden costs embedded within net-zero policies as they manifest in the Global South, analyzing how ostensibly

progressive climate frameworks can generate new forms of environmental injustice while claiming to address the crisis. Drawing on the concept of climate justice—which demands attention not only to emission reductions but to the equitable distribution of risks, resources, and decision-making power—this study interrogates the gap between the rhetoric of green transitions and their material realities for marginalized populations. It asks: Who benefits from the net-zero transition, and who pays its costs? How do contemporary climate policies interact with existing structures of global inequality? And what alternative frameworks might center justice, equity, and self-determination in the redesign of global climate governance?

By foregrounding voices and experiences from the Global South, this research challenges dominant narratives that treat climate action as a purely technical or economic problem divorced from questions of power, history, and justice. It reveals how the green transition, as currently configured, risks becoming yet another chapter in the long history of unequal exchange between North and South—one that extracts value, externalizes harm, and concentrates benefits in familiar patterns.

Review of Literature

Over the past decade, net-zero greenhouse gas emissions have emerged as the central organizing principle of global climate governance. Governments, international organizations, and corporations increasingly frame their climate commitments around net-zero targets, often justified by scientific assessments suggesting that achieving net zero by mid-century is essential to limiting global warming to 1.5°C or 2°C. As a result, net zero has evolved from a technical emissions-accounting concept into a dominant normative benchmark shaping climate policy, investment decisions, and long-term development strategies worldwide. Early climate policy literature largely treated net zero as a necessary and pragmatic endpoint for climate stabilization, emphasizing aggregate emissions reductions, cost-effectiveness, and technological feasibility. However, this framing often obscured deeper political, ethical, and distributive questions related to responsibility, inequality, and development.

Initial scholarly engagement with net zero was primarily techno-economic in orientation. Researchers working with integrated assessment models argued that balancing emissions with removals provides flexibility in mitigation pathways, allowing economies to decarbonize while minimizing disruption to growth and employment. From this perspective, net zero appeared as a universally beneficial solution capable of reconciling climate action with continued economic expansion. Yet critics argue that such approaches abstract away from historical responsibility and unequal capacities among nations. By focusing on global emissions totals rather than differentiated contributions, early net-zero frameworks implicitly assumed a level playing field that does not exist in practice, particularly between developed and developing economies.

More recent literature has challenged this technocratic understanding by emphasizing the conceptual ambiguity of net zero. Armstrong and McLaren argue that net zero is not a singular or self-evident objective but an umbrella term encompassing multiple pathways with profoundly different justice implications. Their analysis highlights that decisions regarding the timing of emissions reductions, the scale and type of carbon removals, and the classification of residual emissions are inherently normative choices rather than neutral technical decisions. These choices determine who bears mitigation costs, who benefits from continued emissions, and who is exposed to climate risks during the transition period. Consequently, the justice implications of net-zero targets depend less on the headline goal itself and more on the pathways chosen to achieve it.

A central theme in this emerging literature is temporal justice. Scholars argue that net-zero pathways permitting delayed mitigation in the present while relying heavily on future carbon removals result in higher cumulative emissions. Higher cumulative emissions intensify near-term climate impacts, including extreme weather events, ecosystem degradation, food insecurity, and public health risks. Because these impacts are disproportionately experienced in the Global South, delayed mitigation by high-income countries effectively transfers harm across borders and generations. Armstrong and McLaren

emphasize that pathways achieving net zero later in the century may satisfy accounting requirements while violating ethical principles by allowing avoidable harm to occur in the interim.

Closely related to temporal concerns are questions of distributive justice. Several scholars argue that net-zero strategies often legitimize continued emissions in wealthy economies by framing them as unavoidable or technologically difficult to eliminate. Newell and colleagues contend that the concept of residual emissions normalizes fossil fuel dependence in the Global North while shifting the burden of balancing emissions onto future generations or external regions. As a result, net zero risks entrenching existing inequalities by allowing affluent societies to preserve high-carbon lifestyles while externalizing mitigation responsibilities to poorer nations or marginalized communities.

The growing reliance on carbon dioxide removal technologies represents one of the most contentious aspects of contemporary net-zero pathways. Integrated assessment models frequently assume large-scale deployment of both nature-based and engineered carbon removal technologies in the latter half of the century. Sovacool and his co-authors critically examine these assumptions, highlighting uncertainties related to technological feasibility, scalability, governance capacity, environmental risks, and social consequences. Their work demonstrates that the knowledge production, technological development, and political control of carbon removal remain overwhelmingly concentrated in the Global North, shaping which solutions are prioritized and how they are implemented globally.

This imbalance has significant implications for the Global South. As net-zero strategies increasingly depend on removals, developing countries are frequently positioned as sites for land-intensive projects such as afforestation, bioenergy plantations, or soil carbon sequestration initiatives. While such projects are often framed as opportunities for sustainable development, employment generation, or climate finance inflows, empirical studies raise serious concerns about land tenure insecurity, displacement of local communities, loss of customary land rights, and competition with food production. Scholars examining nature-based solutions caution that without strong regulatory safeguards, carbon removal projects may undermine livelihoods and restrict local autonomy rather than support inclusive development.

From a political economy perspective, this dynamic reflects broader historical patterns in which environmental governance reproduces global inequalities. Fairhead and other scholars argue that carbon offsetting and removal schemes risk replicating colonial forms of resource control, whereby land and ecosystems in the Global South are repurposed to meet environmental objectives defined by actors in the Global North. This literature challenges narratives that portray carbon removal as inherently beneficial or apolitical, emphasizing instead its potential to create new forms of environmental injustice, dependency, and exclusion.

The relationship between net zero and development is a recurring concern across the literature. Many developing countries face the dual challenge of responding to climate vulnerability while pursuing economic growth, poverty reduction, and expanded energy access. Unlike high-income countries, which industrialized through carbon-intensive pathways, many Global South economies still require increased energy consumption to meet basic welfare and infrastructure needs. Uniform net-zero expectations therefore risk constraining development space if they fail to account for historical responsibility, developmental stages, and unequal capacities.

Okereke and Robinson argue that dominant climate governance frameworks insufficiently integrate development concerns, particularly in relation to industrialization, employment creation, and economic sovereignty. When net-zero targets are treated as universally applicable benchmarks, they may implicitly prioritize emissions reductions in wealthy economies while limiting policy options in poorer nations. This has led some scholars to describe net zero as a form of green constraint, whereby climate mitigation obligations restrict development trajectories rather than enabling sustainable and equitable growth.

Beyond distributive outcomes, scholars increasingly emphasize procedural justice in net-zero governance. Procedural justice focuses on participation, representation, transparency, and decision-making power within climate

institutions. Research consistently shows that global climate governance remains dominated by actors from the Global North, including governments, research institutions, financial organizations, and multinational corporations. This dominance influences which mitigation pathways are considered legitimate and whose knowledge is treated as authoritative.

Sovacool and colleagues highlight how procedural inequalities are particularly evident in the governance of carbon removal technologies. Policy frameworks are often designed without meaningful participation from communities most affected by implementation, especially in the Global South. This exclusion undermines democratic legitimacy and increases the likelihood of maladaptive outcomes. Scholars such as Schlosberg argue that justice requires not only fair distributions of costs and benefits but also inclusive and deliberative decision-making processes that respect local knowledge and agency.

Comparative analysis of the literature reveals convergence across normative, empirical, and political economy perspectives. Armstrong and McLaren provide a normative ethical framework clarifying the justice implications of net-zero design choices, while Sovacool and others offer empirically grounded analyses of governance structures and power asymmetries. Political economy scholars situate these critiques within broader systems of global inequality and historical responsibility. Despite methodological differences, there is broad agreement that prevailing net-zero frameworks inadequately address justice and development concerns.

Several research gaps emerge from this body of literature. First, much normative work on net zero remains insufficiently connected to concrete development outcomes such as poverty reduction, energy access, and industrial transformation. Second, empirical evidence on the long-term social, economic, and political impacts of carbon removal projects in the Global South remains limited. Third, although procedural justice is widely acknowledged as essential, few studies propose institutional reforms capable of meaningfully redistributing power in global climate governance. Finally, existing research frequently critiques net zero without offering integrated frameworks that reconcile climate mitigation with equitable development.

In response to these gaps, recent scholarship calls for reframing net zero as a justice-sensitive and development-oriented process rather than a purely technical endpoint. This study builds on these insights by conceptualizing net zero as a developmental dilemma embedded within unequal global systems, contributing to ongoing debates on climate justice, global decarbonization, and sustainable development pathways.

Relevance of Research

Climate change is widely recognized as one of the most pressing global challenges of the twenty-first century, with far-reaching environmental, economic, and social consequences. In response, the concept of net-zero greenhouse gas emissions has emerged as the dominant framework guiding global climate policy, international negotiations, and national decarbonization strategies. While net-zero targets are often presented as scientifically necessary and universally beneficial, their rapid institutionalization has raised critical concerns regarding equity, development, and justice—particularly for countries in the Global South. This research is highly relevant as it interrogates the social and sustainability implications embedded within prevailing net-zero frameworks, which are often overlooked in mainstream climate discourse.

Relevance to Social Issues

At its core, the research addresses a fundamental social issue: global inequality in responsibility, vulnerability, and capacity to respond to climate change. Developing countries contribute a relatively small share of historical greenhouse gas emissions, yet they face disproportionate exposure to climate impacts such as heat stress, floods, food insecurity, and livelihood loss. Net-zero strategies that allow high-income countries to delay emissions reductions while relying on future carbon removals risk intensifying these social vulnerabilities.

The research highlights how such pathways may transfer climate risks, land pressures, and economic burdens onto already marginalized populations. Land-intensive carbon removal projects, often located in the Global South, can affect local communities through displacement, loss of livelihoods, and weakened land rights.

These outcomes directly intersect with issues of poverty, inequality, food security, and social justice, making the research socially relevant beyond the domain of environmental policy. By questioning whose emissions are considered legitimate and whose development pathways are constrained, the study engages with broader debates on fairness, social inclusion, and intergenerational equity.

Relevance to Sustainability Issues

From a sustainability perspective, the research challenges the assumption that net zero automatically leads to sustainable outcomes. Sustainability requires the integration of environmental protection with economic viability and social well-being. However, prevailing net-zero frameworks often prioritize emissions accounting and technological solutions while neglecting development needs and governance constraints in the Global South.

The study is particularly relevant to sustainability discourse because it examines how over-reliance on carbon removal technologies may undermine long-term ecological and social sustainability. Large-scale land-based mitigation efforts can compete with agriculture, threaten biodiversity, and weaken local governance structures if not carefully regulated. Such outcomes contradict the principles of sustainable development, which emphasize balanced progress across environmental, social, and economic dimensions.

By framing net zero as a developmental dilemma, the research underscores the need for climate strategies that support poverty reduction, energy access, and economic transformation alongside emissions reductions. This perspective aligns climate mitigation with broader sustainability goals rather than treating it as an isolated technical objective.

Research Methodology

Rigour of Research Design, Data Analysis, and Interpretation

This study adopts a qualitative, exploratory, and trans-disciplinary research design to critically examine the concept of net zero emissions through the lens of climate justice and the hidden costs of decarbonization for the Global South. Given the normative, ethical, and socio-economic nature of the research problem, a qualitative approach is most appropriate, as it allows for in-depth analysis of concepts, arguments, power structures, and policy implications rather than numerical measurement alone. The research design is deliberately structured to ensure academic rigour, coherence, and relevance to the objectives of Trans-Disciplinary Project-Centered Learning (TDPCL).

Research Design

The research follows a **descriptive and analytical design**. It is descriptive in nature because it systematically explains existing net zero frameworks, climate justice principles, and decarbonization strategies as discussed in global climate literature and policy documents. At the same time, it is analytical because it critically evaluates these frameworks to identify inequalities, hidden costs, and ethical concerns affecting developing countries. The trans-disciplinary aspect of the design integrates perspectives from environmental science, economics, ethics, public policy, and development studies to provide a holistic understanding of the issue.

A **comparative analytical approach** is also employed to contrast the experiences and responsibilities of the Global North and Global South. This comparison helps highlight disparities in historical emissions, economic capacity, technological readiness, and policy influence. By doing so, the study moves beyond a one-size-fits-all narrative and emphasizes differentiated responsibilities and justice-based climate action.

Sources of Data

The study relies primarily on **secondary data**, ensuring credibility and depth through the use of authoritative and peer-reviewed sources. Data sources include:

- Academic journal articles on net zero emissions, climate justice, and decarbonization pathways
- Policy reports and frameworks from international organizations such as the United Nations, IPCC, and World Bank

- Ethical and philosophical analyses related to environmental justice
- Case studies and reports highlighting decarbonization impacts in developing countries
- Reputed institutional publications and scholarly books

The selected sources are evaluated for relevance, reliability, and academic integrity. Preference is given to recent publications to ensure alignment with current climate debates while also incorporating foundational literature to establish theoretical grounding.

Data Analysis Techniques

Data analysis is conducted using **thematic analysis**, a qualitative method that involves identifying, organizing, and interpreting recurring patterns and themes within the collected literature. Key themes explored in this study include climate justice, historical responsibility, development constraints, negative emission technologies, financial burden, and policy equity.

Thematic coding is applied systematically to extract meaningful insights from the literature. This process enables the identification of underlying assumptions within net zero narratives and highlights how certain policy approaches may privilege developed economies while disadvantaging the Global South. Analytical rigour is maintained by cross-referencing multiple sources to validate interpretations and avoid selective bias.

In addition, **critical discourse analysis** is used to examine how net zero is framed in policy documents and global climate discussions. This helps uncover power dynamics, dominant narratives, and omissions related to justice and equity. By analyzing language, framing, and emphasis, the study reveals how certain costs and consequences of decarbonization remain underrepresented in mainstream climate discourse.

Interpretation Framework

The interpretation of findings is guided by established principles of climate justice, including equity, fairness, historical responsibility, and capability-based differentiation. These principles provide a normative framework for evaluating whether existing net zero pathways align with ethical climate action. Interpretations are made cautiously and contextually, ensuring that conclusions are grounded in evidence rather than assumptions.

The study also adopts a development-sensitive lens, recognizing that economic growth and poverty alleviation remain essential priorities for many Global South countries. Findings are interpreted in relation to real-world constraints such as energy access, employment needs, fiscal capacity, and social welfare considerations. This approach ensures that interpretations are both ethically informed and practically relevant.

Rigour and Validity of the Study

Rigour in this research is ensured through methodological transparency, systematic data selection, and logical coherence between objectives, analysis, and conclusions. Each stage of the research process—from defining the problem to interpreting findings—is guided by clearly stated objectives and theoretical foundations. This internal consistency strengthens the reliability of the study and ensures that conclusions are not arbitrary but logically derived from the analysis.

The use of multiple high-quality and peer-reviewed sources enhances the validity of the findings by reducing dependence on a single perspective. Triangulation across academic literature, policy documents, and ethical analyses allows the study to cross-verify arguments and identify converging or conflicting viewpoints. This process minimizes selective interpretation and strengthens analytical depth.

Analytical rigour is further maintained through careful contextualization. Concepts such as net zero, climate justice, and decarbonization are not treated as abstract ideas but are examined within specific economic, political, and developmental contexts of the Global South. This contextual approach prevents oversimplification and improves the relevance of interpretations.

Reflexivity plays an important role in maintaining rigour. The researcher remains conscious of personal assumptions, academic positioning, and normative judgments while engaging with climate justice debates. By continuously reflecting on these factors, the study avoids ideological bias and

maintains balanced, evidence-based reasoning, thereby strengthening academic credibility.
Although the study is qualitative and does not rely on primary data collection, its strength lies in critical synthesis and interdisciplinary integration. Limitations, such as the absence of empirical field data, are acknowledged; however, this does not weaken the study's relevance, as the objective is conceptual and policy-oriented analysis rather than empirical measurement.

Ethical Considerations

The research is conducted with strict adherence to academic ethics. All sources are appropriately cited, and intellectual honesty is maintained throughout the analysis. The study avoids bias by presenting multiple perspectives and acknowledges differing viewpoints within climate policy debates. Special care is taken to represent the concerns of vulnerable populations and developing countries respectfully and accurately.

Relevance to TDPCL

This research methodology aligns strongly with the goals of Trans-Disciplinary Project-Centered Learning by integrating knowledge across disciplines and encouraging critical thinking beyond conventional subject boundaries. It enables the researcher to engage with complex real-world problems and develop analytical, ethical, and interpretative skills essential for responsible scholarship and informed decision-making.
Overall, the methodological approach ensures that the study is rigorous, balanced, and meaningful, providing a strong foundation for analyzing net zero emissions and climate justice in the context of the Global South.

Limitations and Reflexivity

While the study maintains strong analytical rigour, it recognizes certain limitations inherent in qualitative, secondary-data-based research. The absence of primary field data may limit the ability to capture localized, ground-level experiences of communities directly affected by decarbonization policies. However, this limitation is addressed through careful selection of diverse case studies and peer-reviewed literature. Reflexivity is maintained throughout the research process, where the researcher critically examines assumptions, positionality, and potential biases to ensure balanced interpretation and responsible academic judgment.

Problem statement

Climate change is one of the most pressing global challenges of the twenty-first century, and the concept of achieving *net zero greenhouse gas emissions* has emerged as a dominant policy response. Net zero refers to a state in which the amount of greenhouse gases emitted into the atmosphere is balanced by the amount removed, either through natural sinks such as forests or through technological interventions like carbon capture and storage. International institutions, governments, and corporations increasingly present net zero targets—often with deadlines such as 2050—as a universal pathway to limit global temperature rise and avoid catastrophic climate impacts. While the objective appears scientifically sound and morally urgent, the way net zero is framed and implemented raises profound concerns related to climate justice, development equity, and the distribution of costs and responsibilities, particularly for countries in the Global South.
A central problem lies in the assumption that all countries can and should pursue net zero along similar timelines and through comparable strategies. This assumption fails to account for vast inequalities in historical emissions, economic capacity, technological access, and development priorities. Developed countries in the Global North have benefited from centuries of carbon-intensive industrialization, which has enabled high living standards, advanced infrastructure, and economic security. In contrast, many countries in the Global South are still in earlier stages of development, where economic growth, poverty reduction, employment generation, and energy access remain urgent priorities. For these countries, rapid decarbonization can pose serious constraints on development pathways, creating a tension between environmental responsibility and socio-economic progress.
The problem becomes particularly acute when net zero strategies emphasize emissions reductions without adequate consideration of fairness. Many developing countries rely heavily on fossil fuels to support industrialization, urbanization, and basic

services such as electricity, transportation, and manufacturing. Abruptly limiting these energy sources without sufficient financial and technological support can slow economic growth, increase energy costs, and exacerbate social inequalities. This has led to concerns that the net zero agenda, while global in appearance, may in practice impose disproportionate burdens on nations that have contributed least to the climate crisis.

Another critical dimension of the problem is the growing reliance on *negative emission technologies* (NETs) and carbon offset mechanisms to achieve net zero targets. These approaches include afforestation, reforestation, bioenergy with carbon capture, and carbon offset projects located primarily in developing regions. While such mechanisms allow high-emitting countries and corporations to claim progress toward net zero, they often shift environmental and social costs to the Global South. Large-scale land use for carbon offsets can compete with agriculture, threaten food security, displace local communities, and undermine indigenous land rights. These hidden costs are rarely reflected in official net zero accounting, yet they have long-term consequences for livelihoods and social stability.

Furthermore, the financial burden of decarbonization presents a major challenge for developing economies. Transitioning to renewable energy systems, upgrading infrastructure, and adopting clean technologies require substantial investment. Wealthier nations possess greater fiscal capacity and access to capital markets, whereas many Global South countries face debt constraints, limited public resources, and competing development demands. Without adequate climate finance, technology transfer, and capacity-building support from developed countries, net zero commitments risk becoming unrealistic or unjust for poorer nations. This creates a gap between global climate ambition and local feasibility.

The problem also extends to governance and decision-making structures within global climate policy. Net zero frameworks are often designed through international negotiations where power asymmetries persist. The voices of developing countries, marginalized communities, and vulnerable populations are frequently underrepresented in shaping climate targets and implementation strategies. As a result, net zero policies may prioritize efficiency and cost-effectiveness over equity and justice. This can lead to solutions that are technically viable but socially and ethically problematic.

Why this problem needs to be studied is rooted in both ethical and practical concerns. Ethically, climate action that overlooks justice risks violating principles of fairness, responsibility, and human rights. Practically, policies that ignore development realities may face resistance, lack legitimacy, or fail to achieve long-term sustainability. If net zero pathways constrain growth, worsen inequality, or impose external costs on vulnerable populations, they may undermine global cooperation on climate action rather than strengthen it.

Despite extensive research on climate change mitigation and net zero targets, a significant gap exists in current knowledge and practice. Much of the existing literature focuses on technological feasibility, emission trajectories, and aggregate global outcomes, while paying limited attention to distributional impacts and justice-based evaluations. There is insufficient examination of how different net zero pathways affect countries at varying levels of development, particularly in terms of economic growth, social welfare, and environmental sovereignty. Moreover, current policy frameworks often treat development and decarbonization as parallel goals, without adequately addressing the trade-offs and conflicts between them.

Linking Climate Justice to India's Vision of Viksit Bharat @2047

A climate-justice-oriented approach to Net-Zero has the potential to accelerate, rather than constrain, India's journey towards Viksit Bharat @2047. As highlighted in contemporary newspaper discourse such as The Guardian's discussion on climate justice and debt-driven decarbonization, the core issue for developing economies is not resistance to climate action, but resistance to unfair climate pathways. India stands at a critical juncture in its development trajectory. With a young population, expanding digital infrastructure, and rising global influence, the nation has articulated the vision of *Viksit Bharat 2047*—a roadmap to achieve developed-nation

status by 2047. This vision is not limited to economic prosperity alone but encompasses social equity, environmental sustainability, innovation-driven growth, and strong democratic institutions. The objective of this research is to examine how the goals of Viksit Bharat 2047 align with key development pillars and to evaluate the pathways through which these goals can be realized

For India, aligning decarbonization with justice offers multiple strategic advantages. First, it allows India to pursue development-first climate action, ensuring that emissions reductions are synchronized with energy access, industrial expansion, and employment generation. This directly supports India's ambition to transition into a high-income economy by 2047 without sacrificing social welfare or economic momentum. Second, climate justice strengthens India's negotiating position in global climate governance. By consistently emphasizing historical responsibility, equitable finance, and technology transfer—as echoed in global media narratives—India reinforces its leadership role as a representative voice of the Global South. This enhances diplomatic credibility while unlocking access to concessional finance, green technology, and climate partnerships essential for long-term growth.

Third, a just transition framework enables India to leverage climate action as an engine of structural transformation. Investments in renewable energy, green hydrogen, climate-resilient infrastructure, and sustainable manufacturing align closely with the goals of productivity growth, job creation, and innovation—key pillars of Viksit Bharat @2047.

Finally, by embedding climate justice into domestic policy, India ensures that the transition remains socially inclusive, protecting vulnerable populations from energy poverty, displacement, or livelihood loss. This preserves democratic legitimacy and social stability, both of which are indispensable for sustained development.

CONCLUSION

This gap highlights the need for a more nuanced and justice-oriented analysis of net zero strategies. There is a lack of integrated frameworks that combine climate science, ethics, economics, and development studies to assess who benefits from net zero policies and who bears their costs. Addressing this gap is essential to ensure that climate action does not reproduce existing global inequalities or create new forms of environmental injustice.

In the context of Trans-Disciplinary Project-Centered Learning (TDPCL), this problem provides a critical opportunity to explore climate change beyond technical solutions and examine its social, economic, and ethical dimensions. By analyzing net zero emissions through the lens of climate justice and the hidden costs of decarbonization for the Global South, this study aims to contribute to a more equitable understanding of climate policy. The problem, therefore, is not whether net zero is necessary, but *which net zero pathway* is pursued, *who decides it*, and *who ultimately pays the price*.

The global pursuit of net-zero emissions has emerged as the defining environmental imperative of the twenty-first century, with nations across the world committing to ambitious decarbonization targets in response to the accelerating climate crisis. Yet beneath the ostensibly universal language of climate action lies a profoundly uneven landscape of responsibility, capacity, and consequence. While the transition to renewable energy and low-carbon economies is framed as a collective global project, the pathways toward this transition—and the burdens they impose—are anything but equal.

For countries in the Global South, the promise of a green transition arrives entangled with historical legacies of colonialism, extractivism, and structural inequality. These nations, which have contributed minimally to cumulative greenhouse gas emissions, now find themselves navigating a precarious terrain where climate mitigation policies designed in and for the Global North frequently reproduce the very patterns of exploitation and dispossession they purport to transcend. The transition to net-zero, rather than representing a clean break from carbon-intensive development, often perpetuates old hierarchies through new means: the extraction of critical minerals for batteries and solar panels, the displacement of communities for renewable energy mega-projects, the imposition of carbon markets that commodify ecosystems, and the enforcement of conservation schemes that criminalize Indigenous land practices.

This research examines the hidden costs embedded within net-zero policies as they manifest in the Global South, analyzing how ostensibly progressive climate frameworks can generate new forms of environmental injustice while claiming to address the crisis.

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