

Working Paper

The Struggle for a Just Energy Transition in a Turbulent World Order

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The Struggle for a Just Energy Transition in a Turbulent World Order

Summary

The endeavors toward a global just energy transition—ensuring the shift from high to near-zero emission energy system that reduces existing social inequalities and promotes inclusivity, poverty reduction, improved access to affordable energy and fairness—face multiple challenges of the present world-order dynamics. The economic pressures of inflation and debts on the global South, rising competition between the world's power rivals creating subsidized domestic clean technologies supply chains, and unsteady commitments of the world's leading nations toward environmental commitments are the main obstacles slowing the progress of a global transition and poor governance and regulatory environments in many developing nations. The impacts of these impediments on the just transition developments are analyzed and mitigation policies are proposed. Due to the complex nature of challenges, a just transition cannot be realized within the foreseeable future unless a global cooperative and commitment breakthrough is made. To alleviate challenges, policies are proposed to improve the energy transition progress rather than achieving a just energy transition.

Introduction

Aiming to keep global temperature rise within 1.5°C, the 28th United Nations Conference of the Parties (COP28) in December 2023, Dubai, United Arab Emirates, concluded with an agreement making the transition from fossil to green energies, focusing on a just, equitable transition with deep emissions cuts and increased finance [1]. COP29, set for November 2024 in Baku, Azerbaijan, will be mainly building on past commitments including global energy transition and climate finance, with more emphasis on the latter issue [2]. The United Nations Framework Convention on Climate Change's (UNFCCC's) 60th meeting, June 2024, in Bonn, Germany, stated that the New Collective Quantified Goal (NCQG) initiative on climate finance had not been finalized and underscored the uncertainty surrounding climate finance for vulnerable countries [3]. The shortcomings in addressing the global energy transition's gaps between commitments and implementation, equity, transparency, and accountability raise doubts about whether the multilateral global governance system can fulfill the set goals.

The energy transition and security, economic development, climate change, geopolitical stability, and eventually the world order are deeply interwind [4]. The complexities of global political conflicts, economic fallout and debt sustainability, geopolitical shifts in alliances and the influence of major powers, the increase of humanitarian crises, the strain of economic interests and political values, and information overload and social disconnection have either direct or indirect influence on the global energy transition and climate change measures [5].

Key evidence of the global system's mishandling of crises includes health—the coronavirus(COVID-19) pandemic [6]— global political conflicts—the Israel-Palestine war, the Russia-Ukraine war, Yemen and the Red Sea, Sudan, growing naval conflicts with China and many others [7]— severe economic impacts on poorer countries, uneven recovery among developed countries, and disparities between the rich North and emerging South economies, with the latter questioning the solidarity of the former, especially during crises such as the pandemic [8]. Hence, global geopolitical changes are crucial for the world order concerning power dynamics, regional stability, global governance, economic interdependence, and technological and ideological influence [9].

No doubt, geopolitical risks negatively affect the energy transition's pillars including green financing, green technologies, and environmental policies [10]. The resulting social imbalance of the world's geopolitics [11] dampens energy transition drivers [12]. Because energy transition highly depends on critical minerals and their supply chains have induced geopolitical tensions and raised negative competition between trade powers [13]. Accordingly, such tensions are impacting the progress of the energy transition itself [14].

Can the present world-order system succeed in a just energy transition to achieve the climate agenda goals? What are the vital barriers facing a global just energy transition, and how can they be overcome? This paper defines major fundamental challenges within the current world order structure slowing the global just energy transition. It infers whether the present global governance system could achieve the set goals. Ultimately, it offers mitigation strategies and policies for consideration.

Section 1 reviews the concept of a just energy transition and its base requirements. Section 2 discusses the core challenges of achieving a just energy transition including the significant socioeconomic disparity of the world countries, the energy transition supply chains geopolitics constraints, and instability in committing to environmental actions. Section 3 proposes policies to improve the progress global energy transition. Section 4 concludes the main findings.

1. The Quest for a Just Energy Transition

The theoretical concept of a just energy transition has emerged as an essential framework for addressing the twin challenges of climate change and social inequality. It seeks to ensure that the shift from a high to near-zero emission energy system does not impair existing social inequalities but rather promotes inclusivity, poverty reduction, and fairness [15]. It recognizes that the impacts of energy transition are not uniformly distributed. Vulnerable communities, often the least responsible for carbon emissions, are disproportionately affected by environmental degradation and economic shifts but are also the ones that cannot subsidize new energy or to forego fossil fuels that the developed nations used to rise up the income ladder. It ensures marginalized groups, such as low-income, energy-poor communities, indigenous people, and workers in fossil fuel industries, are not left behind in the shift to a low-carbon economy by foreclosing

fossil fuel use that is needed for economic development while also increasing use of low-carbon energy [16].

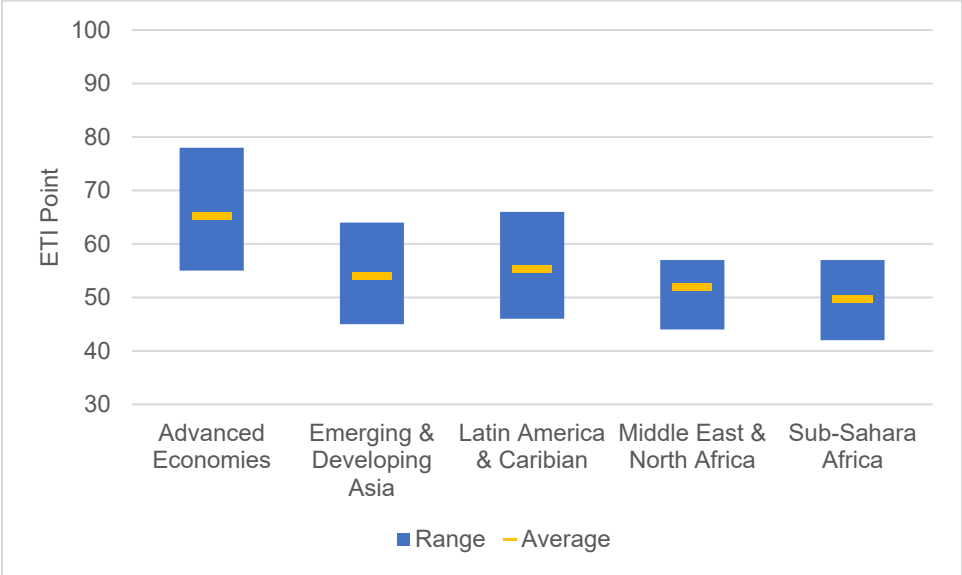
The key principles of the just energy transition involve those stakeholders, especially those most affected by the transition, having a voice in decision-making processes. This includes engaging with local communities, labor unions, and civil society organizations to ensure their perspectives and needs are considered [17]. A just transition's policies and measures must address existing inequalities and aim to redistribute benefits and burdens more equitably. This means prioritizing investments in disadvantaged communities and ensuring access to affordable energy [18]. Moreover, it must be economically sustainable, providing opportunities for growth and development. This includes supporting industries and workers through retraining programs, economic diversification, and innovation in green technologies [19].

However, the energy transition is fraught with complex challenges, particularly in the context of the existing world order. Economic disparities between countries pose one of the major challenges. Developed and rich nations are better positioned to invest in green infrastructure. In contrast, poor countries lack the necessary capital and technical expertise and ability to subsidize new energy (as is done in much of OECD and China) and understand the need for affordable access to more energy to power industry and homes, making the transition more difficult. This disparity risks widening the economic gap between rich and poor nations, as those unable to transition effectively may face economic stagnation or decline [18]. Many poor developing countries face difficulties attracting the necessary capital because private sector investment tends to favor markets with higher returns and lower political and legal risks. Moreover, international financial institutions and developed nations have fallen short of fulfilling their financial commitments in supporting those countries in need [20]. International lending through the World Bank, UN institutions, Development Banks have struggled to meet earlier idealized goals of "just development" and "rapid economic growth" for decades not just for lack of money but for barriers of poor and unstable governance, unreliable legal systems, poor education, insufficient banking systems, etc. in the countries. Many of those barriers still retard development – whether "green" or not.

The energy transition progress differences between the developed and developing countries are identified by the World Economic Forum's Energy Transition Index (ETI) which illustrates the performance and readiness of global energy systems for the transition covering 120 countries [21]. Figure 1 shows the calculated average ranges of the developed and developing world's blocs. A country's ETI score is a composite of its energy system performance on equity, sustainability, and security. Furthermore, it includes the assessment of the readiness of the enabling environment on policies and regulatory framework, infrastructure, innovation, education and human capital, and finance and investment [21]. It ranges from 0 to 100 points. The ETI average of the advanced economies bloc is higher than almost all the maximum values of all other blocs asserting the transition disparity between developed and developing nations.

In addition to the disparity challenge, many nations—particularly countries with significant fossil fuel reserves—see the transition as a threat to their national security and sovereignty, and hence they resist the transition process [22]. This resistance has slowed the adoption of clean technologies and hindered the implementation of policies aimed at achieving a just energy transition [23]. Adding to these challenges, energy transition is also influenced by the global geopolitical tensions between major powers [14].

Figure 1 — Ranges and Averages of the Energy Transition Index (ETI) of Developed and Developing Blocs As of 2024



Source: [World Economic Forum](#) and author calculations.

2. Could the Present World Order Reach a Just Energy Transition?

The short answer to whether a global just energy transition could be achieved is ... no! Because fundamental factors embedded within the current world and national order structure obstruct progress toward such a just transition. Since priorities are devoted to narrow economic and political interests over global values in both the advanced economies funders and the recipient nations, a just transition is far reached or in slow progression under a world with poor government institutions, political instability, socioeconomic strain, resource dominance tensions, and intermittent environmental commitments.

2.1. Energy Transition Disparities

The dominant feature of the global landscape is the prominent gap between developed countries—particularly, the Organization for Economic Co-operation and Development (OECD) countries—and many of the non-OECD or developing countries. Such a gap results in radical goals and priorities differences between the developed and developing nations. This gap involves significant disparities in economic development, social structure, and living standards, and hence, sets diverse goals and priorities for each bloc—i.e., developed and developing countries—including the energy transition endeavors.

Developed countries have highly diversified economies predominantly based on service and less on industrial sectors than when those nations were undergoing their industrial revolutions decades and in many cases over a century ago. These economies have developed and accumulated from primary sector activities, such as agriculture and mining, to secondary (manufacturing) and tertiary (services) sectors. This development and accumulation of knowledge and assets are key to their economic advancement, as they usually lead to higher productivity, technological innovation, and better employment opportunities.

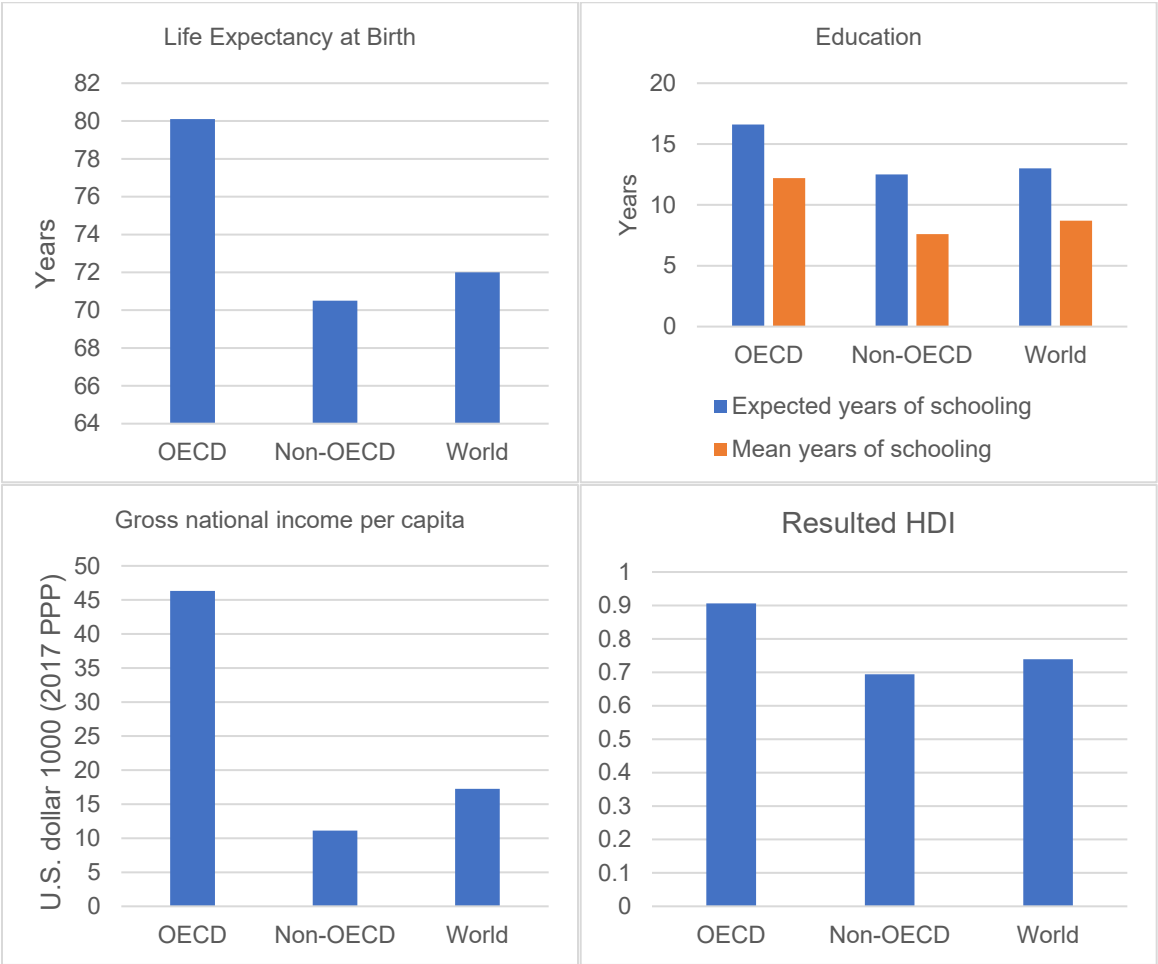
In contrast, developing countries are often characterized by high reliance on primary sectors—agriculture, much of it inefficient as it still is heavily dependent on human, animal labor and small farms that cannot reach economies of scale as in the developed nations. In many countries, primary sectors of mining and oil/gas production are still an oversized portion of their economies. While some developing countries are undergoing industrialization and experiencing economic growth, many still face challenges in diversifying their economies. The lack of industrialization leads to lower productivity and limited job opportunities, perpetuating poverty and economic instability.

Infrastructure is another significant gap between developed and developing countries. Developed countries generally possess advanced infrastructure, including well-maintained energy production and delivery systems, roads, transportation, education and information and communication systems. The robust infrastructure supports their economic activities, enhances quality of life, and facilitates the efficient movement of goods and people. Developing countries, on the other hand, often suffer from inadequate infrastructure. Poorly maintained roads, unreliable energy supply, and poor education, information and communication systems are common issues in many developing nations. This lack of infrastructure hinders their economic growth, limits access to healthcare, modern housing, and mobility, and reduces the overall quality of life.

The Human Development Index (HDI)—a composite of health, education, and quality of life dimensions [24]—illustrates the disparity between developed and developing nations (Figure 2). The maturity of the developed countries' socioeconomic sectors versus their counterparts in the developing countries results in relatively stable energy consumption and population growth in the long term. Also, the development urge of the primary

socioeconomic sectors of the developing nations leads to an increase in population and energy use. The population percentage growths from 2023 to 2050 of the OECD (developed) and non-OECD (developing) countries are estimated to be 3% and 24%, respectively (Figure 3). Where the energy demand growth of the OECD and non-OECD are 11% and 53%, respectively (Figure 3).

Figure 2 — HDI Dimensions Values and Its Overall Calculated Score in 2022

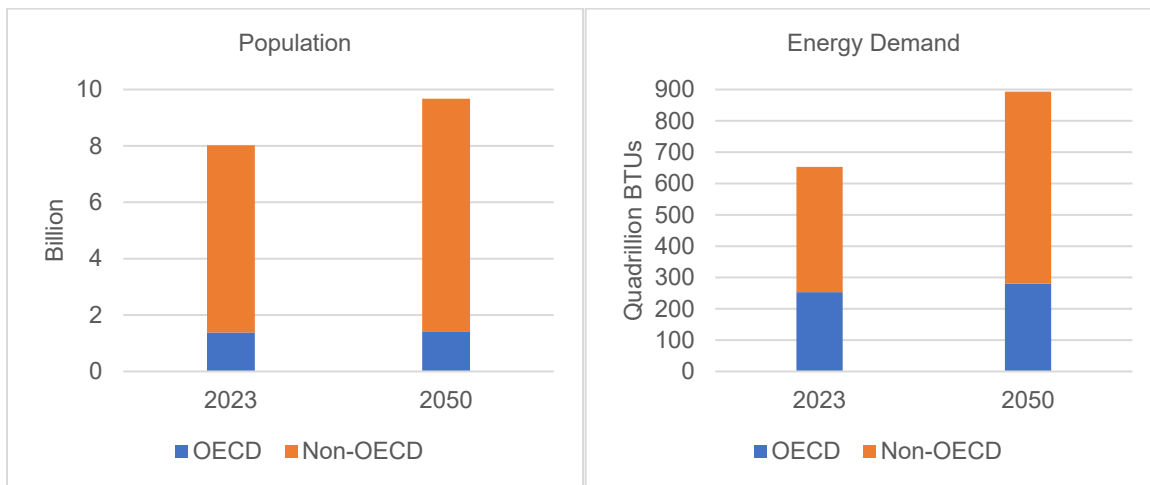


Source: [UNDP](#).

Economic development and industrialization have been closely linked to increased energy consumption, particularly from fossil fuels. As countries develop, their energy needs grow, often faster than renewable sources alone can reliably and economically supply by themselves, especially when meeting electricity, industrial and transportation demands. Therefore, developing countries find it challenging to replicate developed countries' current lower-carbon energy transition strategies. The latter have had the advantage of building their economies and energy infrastructures when there was less emphasis on environmental constraints, thus utilizing cheap and abundant fossil fuels to fuel growth. Developed nations have built up substantial infrastructure that can integrate

renewable energy sources and better manage their intermittency with backup systems, often still relying on fossil fuels. This capacity allows them to pursue a mixed approach that balances renewable energy with the need for a stable energy supply. In the case of developing nations, many countries lack sufficient infrastructure and financial resources. Hence, rapidly transitioning to a predominantly renewable energy system without substantial legacy fossil fuel backup is likely not be feasible due to the high costs and the need for reliable energy to support industrial growth and economic development.

Figure 3 — Populations and Energy Demands of the Developed and Developing Countries



Source: [World Bank](#) and [U.S. Energy Information Administration](#).

Therefore, for developing countries, balancing the need for rapid economic growth with environmental sustainability requires innovative approaches, significant international support, and a different set of policies than those implemented in developed countries. This could involve a phased approach to energy transition that considers both the immediate developmental needs and the long-term environmental goals.

2.2. Economic Strains

The ramifications of increasing and successive crises—e.g., COVID-19, Russia-Ukraine and Israel-Palestinian wars, and energy crises—have increased pressures on the global economy, particularly the Global South. A paramount outcome of such economic pressure is inflation which has eroded purchasing power over time. The inflation effect can be particularly severe in capital-intensive industries like energy. For consumers, it can result in higher energy bills, reducing disposable income and increasing the cost of living. For businesses, it can erode profit margins and make long-term planning more difficult due to increased uncertainty. Inflation can also lead to higher interest rates as central banks attempt to control rising prices, further increasing the cost of borrowing for investments in new energy infrastructure.

In the present scene, the International Monetary Fund (IMF) does not expect inflation to return to the target of most central banks until 2025 [25]. This indicates high interest rates for a long time yet, especially if there is a strain on oil prices again against a backdrop of geopolitical uncertainty [26]. As of the second quarter of 2024, many countries in the Global South are experiencing relatively high inflation rates (

Figure 4). Examples of inflation severity levels were witnessed in Argentina, 250%; Venezuela, 100%; Egypt, 33%; and Pakistan, 25%. Those countries are not expecting to return to the target of their central banks until 2030 [27].

The inflation and its high-interest outcome have strained public budgets in developing countries. High-interest payments are outpacing the growth in essential public expenditures including health, education, and infrastructure. In the developing world, home to about 40% of the world population, one out of every three countries spends more on interest payments than on these critical areas for human development [28].

Furthermore, the rising debt of many of the Global South countries is another crucial factor in limiting the public sector's ability to finance or subsidize energy transition projects. By 2023, the public debt in developing countries had grown more than 35-fold—compared to 15-fold in developed countries—since 2010 [28]. It is growing in all developing regions and debt is at its worst level in Africa rising faster than the GDP. In Africa, it reached about 60% of the GDP in 2023 [28].

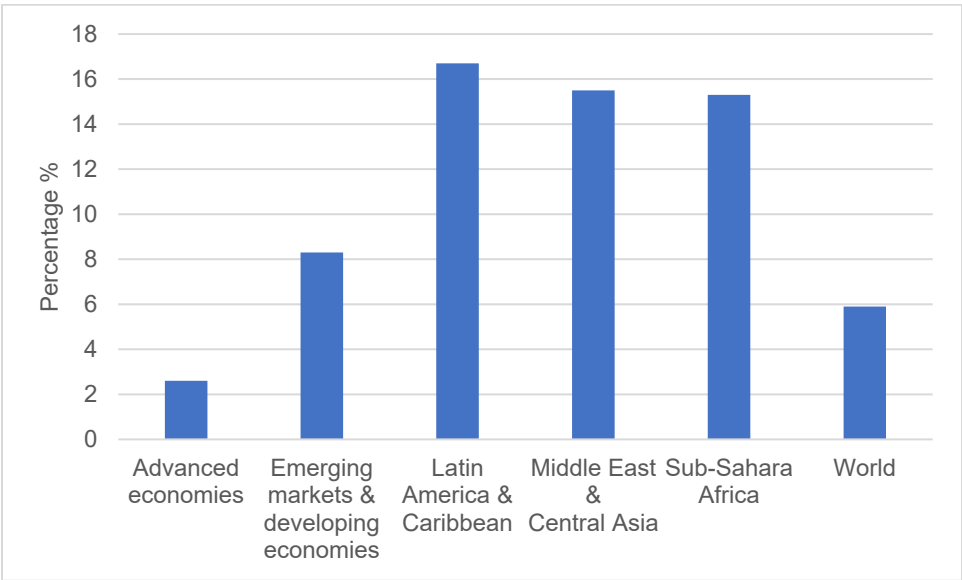
Developing countries are grappling with an international financial system, whose entrenched asymmetries exacerbate the impact of cascading crises on sustainable development including energy transition. Inflation and debt intensify their fiscal burden by limiting access to affordable development finance. The limited size of domestic financial markets and higher levels of external public debt make them more vulnerable to external shocks and financial instability. Because of the required significant upfront capital, investments in energy transition and climate change measures cannot make it to these countries' top priorities.

Therefore, a goal was set in 2009 at COP15, the Copenhagen Climate Summit, where developed countries committed to mobilizing U.S. dollars 100 billion per year by 2020 to address the needs of developing countries [29]. However, the effectiveness of these funds in promoting energy transition and climate-friendly development, without causing debt repayment issues, is highly questionable. Besides, securing such funds involves substantial hurdles. For example, Indonesia is seeking international support to speed up the retirement of its coal-fired power plants, a critical move in its energy transition efforts. Its government is negotiating with global lenders to secure better financing terms for shutting down coal plants early. The country needs U.S. \$94.6 billion by 2030 to build clean energy infrastructure. Although Indonesia has already secured a U.S. \$20 billion pledge under the Just Energy Transition Partnership (JETP) led by the Group of Seven (G7), much of that funding has yet to be disbursed [30].

This underscores the need for a more robust and efficient financial mechanism. Hence, the New Collective Quantified Goal (NCQG) initiative on climate finance was proposed under the Paris Agreement. It aims to set a new target for climate finance beyond 2025, replacing the current goal of mobilizing U.S. dollars 100 billion annually by 2020 [31]. The NCQG is currently under negotiation and is expected to be finalized by 2025. It will define the scale of financial resources developed countries need to mobilize post-2025, reflecting the evolving needs and priorities of developing countries in climate change [32].

The late "U.S. \$100 billion per year by 2020" climate finance initiative did not fully reach its target, why would the NCQG initiative succeed? The response to this question remains to be answered after full enforcement of the NCQG initiative.

Figure 4 — Averages of Inflation Rate Annual Percentage Change by the Second Quarter of 2024



Source: [IMF](#).

2.3. Supply Chain Dominance

Transitioning away from planet-warming energy sources demands shifting towards a subset of minerals, such as cobalt, copper, lithium, nickel, and rare earth elements. These are the essential components in many of today’s clean energy technologies. While the transition to clean energy technologies may contribute to achieving the sustainable development goals of affordable and accessible energy, and environmental protection, failure to engage in responsible sourcing practices could increase conflict and fragility risks along the clean energy supply chains of key minerals and metals, stalling or reversing development gains.

The supply of these critical minerals is vulnerable due to several factors. A key factor is that their production and processing are concentrated in a few countries (Figure 5), some of which have unstable political environments [33]. Moreover, civil unrest will likely grow in the short term due to the environmental risks exacerbated by the heightened demand for critical minerals [33]. Equally concerning is that the reserves of critical minerals outside the world's main powers— e.g., the U.S. and Europe—are largely owned by their rival powers (Figure 5)—e.g., China— which could disrupt their supply [34], and eventually, this would affect the global progress of energy transition technology development and deployment.

Though the transition technologies' critical minerals are scattered in several countries (Figure 5), however, China is dominating the processing of these materials, and it is expected to lead such a role in the coming two decades [35]. Further down the supply chain's stream, China has dominated the world's energy transition in clean technologies manufacturing and deployment pacing the U.S. and Europe (Table 1), and will continue its domination, at least, until 2030 [36].

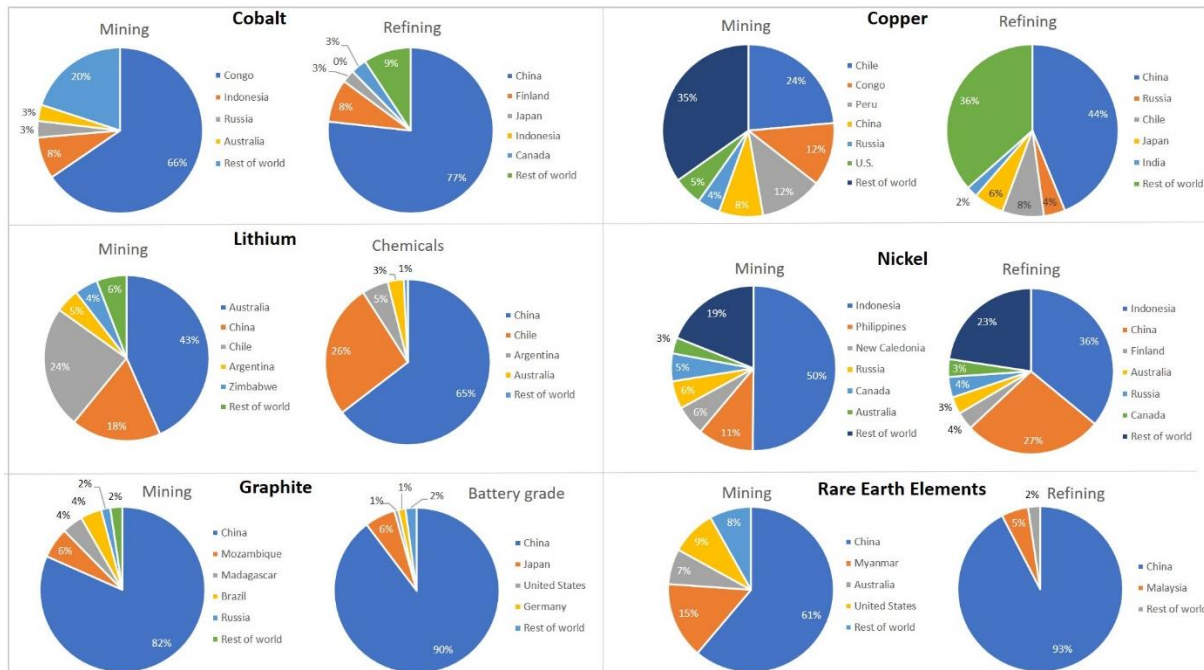
There are claims [33] and concerns [37] that China would use its dominance within various critical mineral supply chains to exert economic pressure on other countries. These concerns prompt other countries, particularly the U.S. and Europe, to develop their supply chains to reduce dependence on China. In response, new resource alliances are established and aimed at promoting a rules-based approach to critical minerals and shifting supply chains away from China. The U.S.-led Minerals Security Partnership, launched in June 2022, to counter China's dominance within the supply chains of minerals needed for clean energy technologies and push mineral-rich countries to adopt higher environmental standards [38]. To date, the partnership, which includes all Group of Seven (G7) countries, plus Australia, India, South Korea, and several Scandinavian countries, has been most active in Africa—where China's presence is rising—and has involved projects spanning mineral extraction, processing, and recycling.

Whatever the narratives of the rivals—China and the U.S.-Europe—this competition, eventually, intensifies geopolitical tensions over the energy transition value chain's dominance. The competition extends beyond mere economics, impacting global alliances, trade policies, and the technological landscape. Both China and the U.S. are maneuvering to shape the global energy transition in ways that bolster their respective geopolitical standings [39] at the expense of just energy transition. Moreover, regardless of the energy transition progress scenarios, the minerals and metals supply chains are expected to face growing challenges due to the ramifications of military applications along with geopolitical stresses and balance of power dynamics [40].

This calls for a more nuanced strategy of collaboration and engagement rather than isolation and sole efforts. Technological collaboration, knowledge transfer, and the diversification of supply sources are essential steps to enhance the resilience and competitiveness of global supply chains. This approach not only fosters economic

growth but also supports the collective pursuit of sustainability goals, and consequently, a just energy transition.

Figure 5 — Global Supply for Key Energy Transition Minerals in 2023



Source: [IEA](#).

Table 1 — Share of Global Clean Technology Sales in 2023

Region	Technology Sales Percentage			
	Battery	E. Vehicle	Solar	Wind
China	45	60	60	60
Europe	12	25	14	20
U.S.	31	10	8	7
Rest of the world	12	5	18	13

Source: [36].

2.4. Unsteady Environmental Commitments

Besides economics and geopolitics drives, the environmental factor has recently gained momentum and become the main driver in advocating global energy transition. Hence, more/less climate change actions imply swift/slow energy transition technology deployment. Responsible and effective environmental global governance should be in force to ensure steady clean energy technology deployment.

Given the wide socioeconomic disparity between the global North and South, developed countries are positioned to be more accountable for responsible environmental actions.

While many developed nations have made significant strides in committing to climate action, their efforts often fall short of what is needed to meet international climate goals. Inconsistent policies, reliance on fossil fuels, and insufficient climate finance contributions are common issues that hinder progress (Table 2).

In 1997, COP3, the adopted Kyoto Protocol aimed to reduce greenhouse gas (GHG) emissions, mandating developed countries to cut their emissions by 5.2% relative to 1990 levels by the 2008-2012 period. Although Vice-President Al Gore signed the protocol for the U.S. in 1998, the country did not ratify it under President George Bush's administration in 2001. This was a significant setback as the U.S. was a major carbon emitter.

Recognizing the limitations of the Kyoto Protocol, in 2006, the UNFCCC developed a new strategy that would include the U.S. This initiative was included in the 2007 COP13 conference's agenda in Bali, which was marked by prolonged negotiations. The U.S. delegation initially resisted the proposed initiative for a framework for global emissions reduction beyond the Kyoto Protocol but agreed to it in the end. This agreement paved the way for the Copenhagen Climate Summit in 2009, aiming to establish a more inclusive and effective global climate action model. In 2009, the Copenhagen COP15 laid the groundwork for a new climate agreement model based on country-specific commitments and the establishment of the Green Climate Fund – U.S. \$100 billion a year funding target. Furthermore, it proposed a resolution towards joint commitments by developed and developing countries to tackle GHG emissions, which was objected by developing countries.

Since COP15 in 2009, the progress had been slow until the 2015 COP21, Paris Agreement. COP21 was a milestone by setting a goal to hold temperatures to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Paris Agreement was intended to start a process of ratcheting up mitigation ambition. In 2017, the U.S.—under the Trump administration—withdrawn from the Paris Agreement. In 2021, the U.S. rejoined—under President Biden. The fluctuation of the world's major players has impacted the progress of environmental measures by disrupting global efforts toward climate change goals. More details on the COPs' development are discussed in [41].

The directions in the late COPs – COP27 and COP28 – asserted more on the climate change finance pledges and following up on the unmet emissions goal. Eventually, developed nations have the upper hand in steering the climate change agenda due to their economic, political, and technological superiority. Therefore, Global South is looking up to them to support their energy transition endeavors.

Table 2 — Examples of Unsteady Commitments of Developed Nations’ Endeavors Toward Climate Change Actions

Country/Region	Remarks
Australia	- Reliance on coal and its slow transition to renewable energy sources have hindered its ability to meet its international climate obligations.
Canada	- Continuing to invest in fossil fuel infrastructure, such as the expansion of oil sands projects, undermining its overall climate goals.
EU Countries	- Slow phase-out of coal and high carbon emissions from its industrial sector. - Struggle to meet renewable energy targets and reduce reliance on nuclear power.
Japan	- Climate finance mostly loans rather than grants – this is less favorable for developing nations already struggling with debt. - Continuing to invest in coal power, both domestically and abroad.
New Zealand	- Slow progress in reducing emissions due to the active agriculture industry.
United Kingdom	- Facing challenges in achieving long-term net-zero targets due to its infrastructure development projects – e.g., expanding airport capacity – and the need to continue the use of fossil fuels in certain sectors.
United States	- Not meeting the set contributions to the \$100 billion annual goal. - Withdrew from the Paris Agreement under the Trump administration in 2017, only to rejoin under President Biden in 2021. This policy fluctuation has caused delays and inconsistencies in meeting its climate commitments.

Source: [BBC](#), [The Japan Times](#), [UNFCCC](#), [U.S. Department of State](#), [World Resources Institute](#), and [Yale Climate Connections](#).

3. Policy Considerations

The dynamics of transitioning away from planet-warming energy sources are profoundly tangled with the world's economic and political affairs. Hence, the transition should be addressed beyond the purely technological narratives of business opportunities, affordability, and accessibility that are often presented as the "rosy" solution for environmental goals. The intricate interplay between energy transition, economic structures, and political dynamics necessitates a reevaluation of global strategies, highlighting the need for responsible governance and a clear decoupling of interests from values to achieve a truly just and sustainable energy transition.

Concerning the economic challenges of the energy transition, the new finance NCQG initiative—expected to be in force after 2025—is one of the global required actions aims for at least U.S. \$100 billion per year and the inclusion of meaningful mitigation actions and transparency, considering the needs and priorities of developing countries [31]. NCQG is expected to overcome the shortcomings of the former “U.S. \$100 billion per year” climate finance initiative. A key challenge facing the success of any energy transition financing efforts for developing countries is the lack of governance and political instabilities in many of them.

Lack of governance, legal issues, and political instability in developing countries significantly discourage developed nations—and eventually, foreign investments—from contributing to the transition financing initiatives. In regions where the rule of law is weak or inconsistent, foreign investors face substantial risks, including expropriation, corruption, and unclear property rights. The absence of a reliable legal framework means that contracts may not be enforceable, intellectual property could be at risk, and regulatory environments might change without notice. Such unpredictability creates a high-risk environment where the cost of business development escalates, discouraging investment. Furthermore, political instability involving frequent changes in government, civil unrest, or conflicts, adds another layer of uncertainty. Investors generally seek stable environments where they can predict policy and regulatory developments, ensuring their investments are secure, productive, and profitable over the long term. All these factors collectively make developed nations hesitant to contribute to finance environmental projects in developing countries. Thus, for developing countries to attract foreign investment, they must address these fundamental issues by strengthening governance, ensuring legal protections, and fostering political stability, creating an environment conducive to business growth and economic development.

Thus, among other policies, it is recommended and anticipated that NCQG adopts or asserts some policies that are along the lines of the following, but from the spotty history of 50 or more years of multi-lateral finance and economic development programs there should be realism about the degree and pace of success multilateral programs:

- **Conditional climate financing.** Urging, incentivizing, and assisting developing countries—those seeking climate finance—to strengthen governance systems, ensuring legal protections, and creating an environment conducive to business growth and economic development. Climate finance focused only on emissions will fail to bring socioeconomic development in nations that do not have much-improved governance systems and legal frameworks, for example.
- **Stating the sources and definitions of climate finance.** This is to avoid ambiguity on what constitutes climate finance and the sources of these funds. The distinction between public and private finance, grants and loans, and new versus repurposed funds has been ambiguous and led to debates over what counts towards the \$100 billion goal, with concerns that some contributions were not genuinely additional but were redirected from other development aid budgets.
- **Applying appropriate and equitable financing support.** Providing adequate funds to meet the actual needs of developing countries for balanced resources for mitigation and adaptation. Moreover, the new initiative needs to eliminate funding conditionalities that limit the ability of developing countries to use the funds effectively.
- **Enforcing transparency and accountability.** Establishing a centralized tracking system to assess the actual impact and distribution of the funds.

- **Redefining the private sector role.** The heavy reliance on the private sector to mobilize a significant portion of the U.S. \$100 billion/year is impractical. In the new initiative, the private sector may be redirected to partner with public institutions, invest more in related research and development, share expertise and best practices, encourage consumer demand for sustainable products through marketing and education efforts, and report transparently on climate-related risks and opportunities, contributing to better-informed investment decisions.

Furthermore, international cooperation and robust policies are needed to secure reliable and ethical mineral sources, mitigate the environmental and social impacts of mining, and avoid geopolitical tensions around the clean technologies' supply chains. The world's major powers—Europe and the U.S. on one side and China on the other—are still in their transient states in examining various policies to counter the effects of their rivals' dominance. For example, Europe and the U.S. are adopting new geopolitical perspectives on the minerals sector's global value chains. They are shifting from solely securing raw materials to reducing dependencies on potentially risky partners—especially China—dominating mineral supply chains [42]. Although China relies on global upstream inputs, it controls 60% of rare earth elements production and dominates the processing stage, giving it significant market power and geopolitical influence through export controls. Both Europe and the U.S. are formulating policies to reduce reliance on China. The U.S. is pursuing a more assertive approach, focusing on decoupling from China and rebuilding its industrial policy. Europe focuses on risk mitigation and aims to strengthen local extraction and processing, while also building stronger trade relations in the mineral sector with other regions.

Such policies have ignited competition among the rival world powers to increase their presence in resource-rich regions—e.g., Africa and South America. The growing competition has direct and indirect influences on rising equity concerns, resource nationalism, and environmental threats in these regions, and consequently, creates uncertainties in supply access. Export bans and limitations are being employed by countries to capture higher-value segments of mineral supply chains. For instance, Zimbabwe extended its ban on raw lithium exports to all raw mineral ores, Indonesia banned nickel exports in 2020 and bauxite exports in 2023, and Chile announced plans to nationalize lithium reserves and imposed new royalties on copper and lithium sales [43]. These measures increase uncertainty and costs for mining and processing companies, as well as for downstream consumers.

The critical minerals and related clean technologies supply chains are extremely complicated since they impact nations' sovereignty and national security. A charter for international collaboration in supply chain affairs would, in theory, be a step toward alleviating related geopolitical tensions. Capitalizing on intergovernmental organizations—such as the Group of Twenty (G20)—the global North and South could initiate dialogues involving:

- **Establishing a joint finance corporation.** Such a corporation aims to fund clean technologies, from mining to manufacturing projects worldwide—particularly in low-income developing countries. The support would not be limited to financial aid—grants, loan guarantees, equity investment, etc.—but also provide technical assistance.
- **Building mineral partnership.** Establish multilateral forums between producers' and consumers' countries to ensure that critical minerals are produced, processed, and recycled in a manner that supports the ability of source countries to realize the full economic development benefit of their geological endowments.
- **Providing policy frameworks to mitigate project risks.** Support for new supply projects can include geological surveys, streamlining permit and licensing procedures, and clear communication with communities and other stakeholders to address environmental, social, and governance (ESG) issues, alongside financing and technical support.
- **Aligning common goals for market transparency.** Establish unified and reliable mineral markets through market technology innovation and increased trader transparency. A global multilateral study on promoting openness and transparency in mineral markets is recommended to be commissioned.

Financing and clean technologies supply chain development require steady commitments— particularly from developed nations—to lead the way to a global just energy transition. In the recent European elections in the summer of 2024, the Green Party and other pro-climate parties have risen and could strengthen environmental policies. However, the increased presence of far-right and Eurosceptic parties may pose challenges to ambitious climate measures [44]. The U.S. presidential election—coming up in November 2024—between the Democratic and Republican presidential nominees, Kamala Harris and Donald Trump may bring back the latter to the White House and would shake again the U.S. commitments on green transition and environmental actions.

Generally, populist parties across the world are increasingly challenging climate policies. They argue that climate policies hurt the economy and increase costs for consumers. They accuse climate policies of benefiting elites at the expense of the general public. Their narratives are gaining traction in some countries. This movement could slow down the developed countries' actions toward environmental goals, with countries like Germany seeing a rise in political rhetoric against the green transition [45]. Their influence is growing, potentially impacting future climate actions across the globe since many of the Global South are counting on the developed countries' financial and technical support in combatting climate change.

To counter and neutralize populist sentiments of anti-climate policies, intergovernmental climate-related organizations—e.g., the Intergovernmental Panel on Climate Change

(IPCC), United Nations Environment Programme (UNEP), etc.—may need to consider strategies along the following lines:

- **Addressing economic inequality.** Proposing more policies to reduce economic disparities that fuel populist rhetoric.
- **Promoting inclusive narratives.** Countering divisive populist narratives of the anti-climate policies by promoting inclusive and fact-based public discourse.
- **International cooperation.** Encouraging collaboration among democratic nations to combat the global rise of anti-climate policy's populism through shared strategies and support.

The main work action of such strategies involves a multidimensional approach that combines domestic policy measures with international cooperation to effectively counter the rise of populist movements and safeguard democratic values toward environmental measures.

4. Conclusions

The progress of a global just energy transition highly depends on the world's interplay of political, economic, social, and technological factors where sovereignty and national security are prioritized over the global good. This paper identified three main factors obstructing the pace of the global just energy transition. These factors include the Global South's socioeconomic challenges, competition for dominance over the energy transition's technologies supply chain, and hesitation and instability in compliance with environmental measures by the world's leading nations due to the growing concern in developed nations about the rising cost of their own transitions, including the rise of the populist parties, much less a willingness to ratchet up "foreign aid". These factors are the outcomes of the current world order that is also featured in rising conflicts, increasing trade barriers limiting developing country (as well as other OECD countries) access to European and US markets, , growing doubts about the effectiveness and legitimacy of international institutions, and others.

The disproportionate impact of rising inflation on low-income populations who spend a larger portion of their income on necessities like food and housing while access to affordable electricity is non-existent or minimal. Where wages have not kept pace with inflation, eroding purchasing power and increasing economic hardship for the poor. Governments in low-income countries face significant challenges in addressing inflation without exacerbating poverty. Moreover, most of these countries are facing significant financial challenges as they spend more on servicing their debt than they receive in development aid. Inflation and debts have hindered their ability to invest in crucial areas such as healthcare, education, infrastructure, and sustainable green energy systems. Therefore, global sustainable climate finance is key to achieving just energy transition and environmental goals.

As long as the world's powers conceive their relations with the developing low-income countries as a space for resource exploitation and geopolitical dispute with their rivals, the world would not expect to meet the global energy transition's set goals in time. Therefore, the current world competition over the clean energy technologies supply chains should adopt collaboration rather than competing strategies. Turning competition into a collaboration strategy between rivals cannot be achieved within—at least—the short-term duration. Hence, this is an evident suggesting the slow pace toward global sustainability.

The UN Secretary-General, Antonio Guterres, stated that the “world is off track in achieving the Sustainable Development Goals.” [46] This is a logical outcome of the backsliding on international commitments and the decline in international cooperation but also of the national and local governance and economic problems endemic in many underdeveloped nations. The international community faces challenges in coordinating responses to global issues like the ecological crisis, and a just energy transition, among others. This raises doubt and questions about the international institutions' vital roles as the framework of the global order.

Generic policies were proposed to tackle the complexities of contemporary global affairs and foster a more cooperative, equitable, and sustainable future. The proposed policies count on the existing intergovernmental organizations to pursue building solidarity in cooperation and decouple interest from values for the global good.

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