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Submission to COP30 Presidency Roadmap on the Transition Away from Fossil Fuels in a Just, Orderly and Equitable Manner

Dear Ambassador André Corrêa do Lago,

The United Nations University in Bonn, including both the Vice Rectorate in Europe (UNU-VIE) and the Institute for Environment and Human Security (UNU-EHS), hereafter “UNU in Bonn”, welcomes the opportunity to submit views on the *COP 30 Presidency Roadmap on the Transition Away from Fossil Fuels in a Just, Orderly and Equitable Manner*. COP30 Presidency’s roadmap provides a critical opportunity to move toward implementable, context-specific pathways that reconcile climate ambition with development, equity, and resilience objectives. UNU in Bonn is pleased to contribute the following inputs for consideration. This submission responds primarily to **Part I of the Call**, with a focus on actionable pathways for transitioning away from fossil fuels while advancing energy access, development, transformation and equity outcomes.

Background

UNU in Bonn research focuses on bringing **the latest policy-relevant scientific evidence** at the intersection of climate risk, energy systems, development pathways, transformation and social equity to inform **climate change decision-making** across scales.

We strongly support the Roadmap’s emphasis on differentiated transition pathways that reflect diverse national circumstances, levels of fossil fuel dependence, and stages of development.

Priority considerations for the COP30 Presidency Roadmap

Drawing on our ongoing work across the Global South, we highlight seven priority considerations for the roadmap:

A. Making energy access equitable through increased efficiency

Prioritizing **energy efficiency** as the “first fuel” in Low- and Middle-Income Countries (LMIC) is essential. This includes **promoting minimum energy performance standards, large-scale building retrofits, and efficient cooling and clean cooking** solutions to reduce energy wastage (thereby demand) while improving living conditions. This remains critical given that around 730 million people globally still lack access to electricity, with the majority living in sub-Saharan Africa [1]. Such measures can lower energy costs, ease pressure on electricity systems, and free public resources for broader development objectives. Importantly, demand-side efficiency and service-based energy provision can **avoid new fossil fuel generation** capacity, reduce import dependence, and lower the risk of long-term fossil fuel lock-in.

Efficiency measures should be accompanied by **targeted subsidies, concessional finance, and social protection mechanisms** to ensure that low-income households, informal settlements, and small enterprises can access efficient technologies without prohibitive upfront costs, ensuring benefits are equitably shared. **Unlocking finance, technology transfer, and capacity building for demand reduction** becomes key. Multilateral development banks and climate funds can play a central role in de-risking investments, supporting local energy ecosystem and skills development, and embedding measurable demand-side targets related to energy efficiency and equity in NDCs, supported by robust monitoring and accountability systems.

B. Leveraging frontier technology to augment supply and resilience

From a supply-side perspective, **off-grid and digitally enabled energy solutions** play a critical role in transitioning away from fossil fuels, particularly in energy-poor and rural contexts. **Decentralized renewable energy systems**, such as **solar mini-grids** and **IoT-enabled off-grid** solutions, offer scalable, robust and low-carbon alternatives where grid extension is economically or technically unviable. In many low-income and remote settings, such decentralized renewable systems represent **a direct alternative to diesel-based generation**, enabling countries to leapfrog fossil fuel-dependent infrastructure while enhancing resilience [2].

The integration of digital technologies enables **real-time monitoring, remote operation, predictive maintenance, and improved system efficiency**, thereby reducing operational losses and costs. These systems also facilitate the integration of variable renewable energy into broader energy systems, enhancing overall resilience. Furthermore, innovation has an important role in the just transition — adapting emerging technologies to local needs and conditions, ensuring they are **accessible, affordable and relevant**. UNU in Bonn's experience with approaches such as Agrivoltaics demonstrates how integrated solutions can simultaneously address energy, land use, and food production challenges [2]. To support these pathways, greater investment in research and development, alongside pilot projects, is needed to test, refine, and scale solutions across diverse contexts.

C. Last-Mile Energy Access and Youth Participation in Just Transition

A comprehensive energy transition requires strengthening and scaling of **last-mile energy access and clean cooking solutions**. These are often delivered by **youth-led enterprises and grassroots actors** operating in contexts where grid expansion remains limited or slow. A just and equitable transition should build on and support these actors, recognizing their critical role in expanding access, fostering innovation, and ensuring locally appropriate solutions. Doing so also supports **inclusive economic diversification** and job creation in transition pathways that move away from fossil fuel-based energy supply.

D. Institutional and governance frameworks

In advancing energy transition, LMIC frequently encounter **structural barriers** including **fragile institutions, limited human capital, and constrained technological research and development capacity**, which shape both the pace and quality of low-carbon transitions. Where institutions remain weak (limited mandate, resources and finance), the diffusion of low-emissions technologies has been observed to generate **adverse effects**, such as dependency on external expertise and the entrenchment of low-value employment. Conversely, strengthening energy system institutions can generate **positive feedback loops**, supporting sustainable development and broadening public support for **fossil fuel transition policies**.

E. Just transition and differentiated pathways

We advocate consideration of two key enablers in this regard:

I. Capacity building

Capacity building is central to a just, orderly and equitable transition, as pathways differ across regions and communities. Strengthening the ability of **end-users, institutions, and local actors** to

adopt, operate, and maintain new technologies strengthens **local ownership** and long-term sustainability.

An inclusive approach is required, addressing both **technical and institutional capacity needs**, and ensuring continuity and local ownership. Persistent gaps in capacity, particularly in the implementation of NDCs, remain a significant barrier, as highlighted in recent global stocktake processes. Our experience underlines that no single model works everywhere and that **local skills and contexts** matter. Therefore, retaining and strengthening **capacities across the value chain (institutions, workforce, providers, end users and community-based organizations)** is essential for efficient, just and equitable transition [3]. Attention needs to be given to **vulnerable groups** and those currently excluded from affordable and reliable energy services [4].

II. Differential impact – gender

Gender inequality is a **critical dimension** of a just energy transition. Women often bear a disproportionate burden when it comes to energy poverty and the impacts of climate change, constituting one of the most vulnerable groups. Women frequently **face barriers in accessing skills, finance, and technology**, despite playing key roles in energy and resource use [5]. Integrating **gender considerations into energy policies, workforce engagement, and decision-making processes**, as evidenced by the emergence of the gender-energy nexus is critical for just and timely transition [6]. Targeted capacity building and prioritizing gender responsive decision-making for energy transition can improve sustainability, strengthen communities, and support a better distribution of benefits.

F. Transformational pathways for averting, minimizing and addressing loss and damage

UNU in Bonn's research situates the fossil fuel transition within a broader **understanding of systemic risk** by drawing on the concept of **transformational pathways for averting, minimizing and addressing loss and damage**. Communities locked into fossil fuel systems face cascading hazards, such as heatwaves, droughts and floods, and compounded vulnerabilities that increasingly lead to climate-induced disasters and losses and damages. However, post-disaster recovery responses routinely rebuild the same carbon-intensive infrastructure, foreclosing the transition. This “conventional pathway trap” — reactive, short-term, siloed reconstruction — institutionally and financially impedes transition, and is particularly acute in lower-income countries where disaster recovery expenditure crowds out clean energy investment.

UNU in Bonn has developed an indicator-based framework to assess whether recovery from disasters follows conventional, resilient, or transformational pathways [14]. It is built on seven **enabling conditions: future-ready policy and governance, resilient rebuilding practices, reflective and iterative practices, people-centred development, empowerment beyond participation, reliable and inclusive funding, and justice-centred mental models**. Applied to case studies in Maharashtra State (India), the Ahr Valley (Germany), and Jardim Pantanal/Sao Paulo (Brazil), the framework demonstrates that the absence of anticipatory, inclusive governance is the decisive factor separating transformational from conventional outcomes. Integrating loss and damage considerations explicitly into transition planning and ensuring that international finance supports proactive responses are key for a just, orderly, and equitable transition in the most climate-vulnerable regions/countries.

G. Urban and community-led just transitions

Cities are at the epicentre of both fossil fuel consumption and climate vulnerability. However, **urban climate strategies often remain confined to technological fixes while neglecting the structural conditions that make cities carbon-intensive and unequal**, including weak governance, power imbalances, informality, and exclusion of marginalized communities from decision-making. Without addressing these structural conditions, transitions risk being imposed on communities rather than co-created with them, generating resistance, deepening inequality, and ultimately failing to achieve lasting change. In low-income urban territories in particular, the absence

of reliable, flexible, and locally accessible funding creates a further institutional barrier. Communities and local governments lack the financial tools to prototype and test low-carbon solutions tailored to their circumstances.

UNU in Bonn, together with WRI, IDOS, and IIED, developed and field-tested a methodology for community-led urban transitions through the Transformative Urban Coalitions (TUC) project, funded by the International Climate Initiative (IKI) of the German Government. Since 2021, TUC has been operating Urban Labs in vulnerable territories across Latin American cities, including Buenos Aires (Argentina), León and Naucalpan (Mexico), and Teresina and Recife (Brazil).

The resulting **Weaving Urban Futures guidebook** present a **five-step iterative methodology**: (1) building and supporting a place-based coalition; (2) developing a shared understanding of the local context; (3) creating a shared vision for the future; (4) formulating strategies and implementation mechanisms; and (5) learning by doing and from doing. Together, these steps constitute a replicable governance framework for just transitions at the urban scale [15]. Central to this approach are **place-based coalitions**: structured multi-stakeholder groups that bring together local government, civil society, academia, business, and communities to co-design and co-implement transition pathways. These coalitions function as institutional levers, enabling knowledge integration, shared accountability, and adaptive management. A complementary toolbox, detailing participatory monitoring, community-led data collection, co-designed pilots, and structured peer learning, helps translate the framework into practice [16]. In this context, our overarching reflection on four key questions raised by the presidency is as follows:

1. Critical Barriers Preventing a Transition Away from Fossil Fuels

The transition away from fossil fuels is constrained by a combination of interlinked **financial, institutional, technological, and social barriers**. Limited fiscal capacity, high cost of capital, and elevated investment risks continue to impede clean energy deployment, particularly in LMIC, where the cost of capital for clean energy investments is often **two to three times higher than in advanced economies** [7]. In addition, the risk of **stranded fossil fuel assets** presents an initial systemic inertia and financial barrier to transition planning, particularly in countries with constrained public finances.

Institutional fragmentation, regulatory uncertainty, and insufficient coordination across energy, climate, and development planning frameworks further constrain effective implementation. Technological barriers due to underdeveloped infrastructure, weak grid capacity, and limited digital and technical capabilities, especially in rural and decentralized systems, further constrain the transition. Social barriers include persistent energy poverty, unequal access to modern energy services, gender disparities, and limited stakeholder participation, which undermine both equity and public acceptance [8]. Additionally, climate-induced physical risks increasingly affect energy system reliability and investment viability. Together, these barriers reinforce **continued fossil fuel dependence** and **infrastructure lock-in**, slowing progress toward a just, orderly, and equitable transition away from fossil fuels.

A further, compounding barrier is the cycle by which climate-induced loss and damage deepens fossil fuel lock-in: **post-disaster reconstruction** consistently defaults to carbon-intensive rebuilding in the absence of prospective, justice-oriented governance frameworks [14]. In urban contexts, **structural conditions** including informality, exclusion from decision-making, and inadequate housing further constrain community capacity to participate in and benefit from transition pathways [15].

2. Potential Levers for Accelerating Implementation of the Transitioning Away Commitment

Global clean energy investment will need to more than triple by 2030 to align with international climate and energy goals [9]. Accelerating the transition away from fossil fuels requires a **coherent set of financial, institutional, technological and governance levers**. Enhanced access to concessional finance, guarantees, and blended finance instruments is critical to reducing investment risks and improving affordability. Strengthening regulatory certainty and institutional coordination can

support long-term planning and private sector engagement. Clear long-term policy signals, including **phase-down trajectories** for fossil fuel use and the **redirection of subsidies** toward clean and efficient alternatives, are essential to guide investment and planning decisions.

Digital technologies offer significant potential to optimize energy systems, reduce losses, and enable decentralized renewable solutions through improved monitoring, integration, and data-driven decision-making [2]. **Innovative financing mechanisms**, including pay-as-you-go and mobile-enabled models, can expand access while supporting clean energy adoption. **Capacity building** and workforce upskilling, particularly in frontier technologies, are essential to implementation at scale. Inclusive governance arrangements and stakeholder engagement further enhance policy legitimacy and durability.

UNU in Bonn research introduces two complementary governance levers. First, the seven-condition enabling framework for transformational pathways provides a **practical diagnostic tool** for assessing whether recovery and transition efforts are on a trajectory toward systemic change, covering dimensions from future-ready policy to people-centred development and justice-centred institutional culture [14]. Second, **place-based coalitions** — as developed and documented through the Weaving Urban Futures methodology — offer a replicable mechanism for multi-stakeholder co-design of transition strategies at the urban and community scale, enabling knowledge integration, shared accountability, and adaptive management that can anchor top-down transition policies in local realities [15][16].

3. Roadmap Experiences, Best Practices, and Lessons Learned

Experiences from diverse country contexts highlight key lessons for advancing a just and equitable energy transition. **Decentralized renewable energy solutions**, such as solar mini-grids, have emerged as cost-effective and scalable solutions for expanding energy access in rural and underserved areas [10][11]. Similarly, **clean cooking transitions** demonstrate the importance of addressing household energy use, especially as approximately **2.3 billion people still lack access to clean cooking, with significant implications for** health, gender equality, and environmental protection [12].

Innovative financing models, including pay-as-you-go systems, enable low-income households to access clean energy technologies without high upfront costs and have supported the rapid expansion of off-grid solar systems across Africa and Asia [13]. In parallel, **successful transitions require proactive support for workers and communities**, including re-education, social protection, and local economic diversification [10][11]. These experiences demonstrate that technology deployment alone is insufficient; enabling policy frameworks, inclusive governance, and context-specific approaches are essential to ensure that transitions are both effective and equitable [10].

4. Reflecting Diverse Realities in a Just, Orderly, and Equitable Transition

Application of the UNU in Bonn transformational pathways framework to case studies in India, Germany and Brazil shows that well-financed recovery efforts can produce maladaptive outcomes that reinforce fossil fuel-dependent systems, especially when **inclusive governance and justice-oriented planning** are absent [14]. In the urban context, TUC Urban Labs in Argentina, Brazil and Mexico demonstrate how place-based coalitions generate **locally-rooted and replicable approaches to just transitions**. The Weaving Urban Futures participatory governance model developed through TUC has been institutionalized at national scale in Brazil through two federal programmes: Periferia Viva, a nationwide territorial development initiative directed at 58 marginalized communities, and Periferia Sem Risco, which introduces Community Plans for Disaster Risk Reduction and Adaptation as strategic instruments for participatory intra-urban climate adaptation planning across peripheral urban territories [17][18]. This institutionalization demonstrates how a place-based, iterative approach can be adapted across cities at different levels of institutional development, ensuring that transitions strengthen existing community resilience and that the lessons

generated locally are capable of informing policy frameworks on sub-national, national and international scale.

A just, orderly, and equitable transition must reflect countries' **varied development stages, energy access gaps, and degrees of non-renewable fuel dependency**. Particularly in low-income and energy-poor contexts, transitioning away from fossil fuels must be pursued in **parallel with expanding access** to affordable, reliable energy services, supporting poverty reduction and enabling alternative livelihoods. Equity considerations necessitate targeted measures for vulnerable groups, including women, rural communities, and workers in informal sectors. Differentiated pathways, supported by international finance, technology cooperation, and capacity building, are essential to ensure that global transition efforts advance climate objectives while safeguarding development and social outcomes.

Countries bearing the greatest burden of climate-induced impacts should face the least transition risk. Differentiated support for these countries must therefore address not only clean energy investment gaps but also the governance and institutional conditions for prospective, justice-oriented planning so that disaster recovery, energy transition and climate agendas are aligned rather than in tension [14]. At the urban scale, differentiated pathways must be designed around community capacities, informal governance structures, and local knowledge systems. The Weaving Urban Futures methodology is explicitly designed for differentiated application. It does not prescribe a single transition pathway but acts as a “compass”, helping city-makers orient decisions toward just and climate-resilient futures from wherever they currently stand. For cities in lower-income countries or contexts of informality, the framework foregrounds enabling conditions often overlooked by top-down transition policies: everyday incremental community-driven improvements that build trust and capacity; relational networks that bridge formal and informal institutions; and embedded narratives that integrate local and indigenous knowledge with technical expertise. A just, orderly, and equitable fossil fuel transition must support cities at all levels of institutional development, providing sustained and flexible finance for the coalition-building and participatory planning processes that make transitions durable. Cities in high fossil-fuel-dependent economies require differentiated support that addresses both the social dimensions of transition — workforce, livelihoods, community identity — and the institutional conditions for alternative urban futures [15].

Interlinkages Between Renewable Energy and Deforestation

We take this opportunity to share our perspective on the interconnectedness between ‘just transition’ (part I) and ‘deforestation and forest degradation’ (Part II).

Enhancing renewable energy supply and halting deforestation are closely interconnected objectives that can generate mutually reinforcing climate, environmental, and development benefits. Expanding access to affordable and reliable renewable energy, particularly decentralized solutions, can reduce reliance on biomass and fuelwood, thereby alleviating pressure on forests and reducing land degradation [3].

At the same time, the growing demand for critical minerals required for renewable energy technologies, particularly solar power, can enhance afforestation risks due to increased mining demands [3]. Therefore, integrated planning that aligns clean energy deployment with forest protection and proactively considers **maladaptation and rebound effects**, can help ensure that energy transitions contribute not only to emissions reductions but also to ecosystem integrity, livelihoods, and long-term sustainability.

UNU in Bonn stands ready to contribute analytical inputs, case-based evidence, and policy insights to support the COP30 Presidency Roadmap and its ambition to translate global commitments into actionable and equitable implementation pathways. We would particularly welcome opportunities to

support the Roadmap through **evidence synthesis, analytical briefs, and expert consultations** during its elaboration and implementation phases.

We appreciate the inclusive and participatory approach adopted by the COP30 Presidency and look forward to continued engagement.

Yours Sincerely,



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