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The first Global Stocktake at COP28 reaffirmed that limiting warming to 1.5°C requires deep, rapid and sustained emissions reductions and calls on Parties to contribute to "transitioning away from fossil fuels in a just, orderly and equitable manner". This is the first time a COP decision has explicitly addressed fossil fuels, which accounts for 86 per cent of the global energy mix - as a primary driver of climate change (Energy Institute 2026). However, the decision leaves substantial room for interpretation, with no set timelines, benchmarks, or guardrails to reduce fossil fuel dependence. The central questions, therefore, remain: **who moves first, who bears the costs of transition, and how fairness and country-specific circumstances are to be factored in.**

For many developing countries, the transition to clean energy presents complex structural challenges, as their development pathways remain shaped by persistent energy access gaps, growing demand driven by urbanisation and industrialisation, limited fiscal and technological capacity, and exposure to escalating physical and economic climate risks. Moreover, the clean energy transitions do not only represent a shift from one set of fuels to another but also necessitate the creation of a new energy system, which requires a whole-of-government and whole-of-society approach, with technological capabilities and financial resources already under severe stress in these countries.

Despite these constraints, developing countries are **shaping the trajectory of the global clean-energy transition**. These countries are attempting not one but multiple simultaneous transitions from **expanding access to modern energy services**, managing the surge in urbanisation, aligning growth with sustainability by building energy systems while **pursuing decarbonisation without deindustrialisation**, moving to **deeper integration in global energy markets** and transforming energy systems to more decentralised, digitally enabled and interconnected networks. However, scaling these initiatives will require stronger policy frameworks, increased investment flows, and international cooperation that aligns global objectives with national development strategies.

Developed countries must take the lead in transitioning away from fossil fuels, ensuring no backsliding. This is because the richest 1 per cent have exhausted their annual carbon budget to stay within 1.5 degrees of warming, in only the first ten days of 2026 (Oxfam 2026). At the same time, developing countries need support to meet their energy needs from renewables and to navigate the transition without social disruption. Thus, **one-size-fits-all approaches to transitioning away from fossil fuels are neither feasible nor pragmatic**.

What are the most critical barriers — whether physical, economic, financial, institutional, technological or social— preventing a transition away from fossil fuels?

Transitioning away from fossil fuels presents a complex set of structural barriers, particularly in developing countries, where energy systems are closely intertwined with broader development priorities such as energy security, fiscal stability, industrial growth and employment. Key barriers include:

- **Public finance and export dependence on fossil fuels:** Domestically available fossil fuels serve as critical pillars for ensuring supply security while also providing major sources of government revenue and export earnings. This creates significant fiscal and political risks if fossil fuel production declines rapidly without viable alternative revenue streams. For instance, in Nigeria, oil and gas account for nearly 90 per cent of export earnings and 80 per cent of government revenues (Ite et al. 2024). In India, coal contributes over USD 8.4 billion annually to public revenues (PIB 2025).
- **Infrastructure and grid constraints are slowing clean energy deployment**: The energy transition requires the construction of large-scale supply nodes, such as solar and wind farms, hydrogen hubs, and power plants, along with enabling infrastructure, including transmission lines and long-distance grid interconnections. In many Global South countries, fragmented land ownership and multi-layered governance structures result in lengthy approval processes across local, state, and national authorities, often causing significant delays. For example, in India, the inadequacy of transmission infrastructure has impeded 60 GW of renewable capacity (as of March 2025) (IEA 2025).
- **Financing national energy pathways amid fiscal constraints:** Limiting temperature to 1.5°C requires USD 5.7 trillion by 2030 (IREA 2023), an amount that far exceeds the fiscal capacities of developing countries such as Sri Lanka, Ghana, and Pakistan. Limited access to affordable and long-term finance, risk perceptions among investors, and insufficient multilateral support constrain the scale and pace of clean energy deployment. In the absence of adequate public finance, reliance on private capital and blended finance has increased significantly in developing countries. However, private capital tends to prioritise projects with higher financial returns, risking the neglect of socio-economic objectives such as universal energy access.
- **Concentration of clean energy technologies in a few economies:** Deploying emerging low-carbon technologies, such as carbon capture and storage, hydrogen production, advanced battery storage and smart grids, requires specialised technical expertise and industrial capacity that remain concentrated in a limited number of countries. As a result, many economies depend heavily on imported technologies and external technical support, which increases costs and slows deployment. For example, over 80 per cent of global solar panel manufacturing is concentrated in China, creating significant technological dependence for many other countries (IEA 2022).
- **Shortage of skilled workforce and risks of labour displacement**: The transition to new energy systems requires a large and specialised workforce across manufacturing, installation, grid management, and system integration. However, workforce development has not expanded at the pace required to support this transformation, with around 60 per cent of energy companies reporting labour shortages that are already affecting project timelines, costs and system reliability (IEA 2025). At the same time, transitions pose significant employment risks. In South Africa, for instance, the coal industry employs about 91,000 workers, and without effective worker transition programmes, coal mine closures could lead to substantial economic disruption (Mohlakoana 2024).
- **Limited access to affordable finance and high cost of capital**: Renewable energy and grid infrastructure projects require substantial upfront capital, while many developing countries face restricted access to international capital markets, higher perceived investment risks, and

macroeconomic challenges such as currency volatility and political uncertainty. Moreover, the emerging and developing economies receive less than 15 per cent of global energy transition investment, despite having the largest investment needs (World Economic Forum 2025).

- **High debt burden shaping energy choices for developing countries**: Due to high debt, the fiscal spending of developing countries is limited, compelling governments to prioritise immediate economic and developmental concerns over long-term goals and investments. In 2023, developing countries paid USD 25 billion more to creditors in debt service obligations than they received, which further highlights a negative resource transfer (UNCTAD 2025). The debt scenario of developing countries is so severe that 61 developing countries had to allocate 10 per cent or more of government revenues towards interest payments (UNCTAD 2025).
- **Policy instability due to changing political priorities:** Political factors, including national priorities, often shift with changes in administration, placing long-term climate goals such as energy transitions in opposition with short-term policymaking priorities. This is largely because policy planning periods align with electoral cycles of 5 years, while energy transition decisions span multiple decades. A prominent example is the US, with the second administration of President Trump, where there have been significant policy reversals in the energy transition sphere, with the mantra of "Drill baby drill". These rampant political changes highlight the vulnerability of policies in the long-term and the lack of policy coherence to achieve intended objectives.

What potential levers, whether economic, financial, institutional, social or technological, exist for accelerating the implementation of the transitioning away commitment?

Transitioning away from fossil fuels should remain anchored in the principles of equity and common but differentiated responsibilities and respective capacities, while addressing the economic risks associated with stranded assets, fiscal instability, and volatility in fossil fuel revenues. Key levers include:

- **Reforming fossil fuel subsidies and reallocating public finance toward low-carbon investments** can significantly accelerate transition efforts. In 2023, developed countries spent around USD 378 billion on fossil fuel subsidies, exceeding their USD 300 billion-per-year commitment by 2035 (The Indian Express 2024). Redirecting these resources toward renewable energy deployment, energy access and clean industrial development could substantially strengthen transition financing.
- **Leveraging carbon pricing and innovative public finance mechanisms:** Fiscal instruments such as carbon pricing can generate significant resources for climate-aligned investments. Global carbon pricing revenues exceeded USD 100 billion in 2024, with over half earmarked for environmental and development priorities (World Bank Group 2025). Also, public finance mechanisms such as green, social and sustainability (GSS) bond support funds can further mobilise private capital by providing credit guarantees for decarbonisation and just transition projects.
- **Technical cooperation on extending grids and interconnections**. With an increasing share of renewables, grid planning and operations will become more complex. For instance, CEEW's research shows that with the expected doubling of renewable energy capacity, India's grid flexibility requirements will increase 5x in the next five years. Traditional network upgrades alone will not suffice (CEEW 2025). Countries need targeted interventions, such as high-capacity corridors, scaling energy storage, deploying grid-forming inverters, and

strengthening regional inter-connects. The South Asian region, with its complementarities in hydro, solar and wind potential, will benefit from investments in interconnected grid systems. Building the grids of the future will require the convergence of technology, regulation, and finance.

- **Policy and institutional mechanisms to increase access to energy via clean sources.** India's experience demonstrates that universal access to clean energy can be simultaneous and mutually reinforcing. Between 2000 and 2024, over 800 million Indians gained access to electricity, with average rural supply hours rising from 12 to 22 per day (PIB 2025). This transformation was achieved through strong policy and institutional design, programmes such as Saubhagya built network capacity and household connectivity, while PM KUSUM and PM Surya Ghar added clean, decentralised supply. Institutionally, the Solar Energy Corporation of India became a model for de-risking renewable investments and standardising power-purchase frameworks. These national and subnational innovations must be replicated globally: bundled policy support, combining capital grants and payment security frameworks, and digital transparency to make clean energy accessible and affordable for the poorest and investible for the private sector.
- **Building the green economy:** For the phase out of fossil fuels, there is a need for an alternative paradigm of sustainable growth that is jobs-intensive and future-facing. A green economy represents a move from extractive to regenerative and from linear to circular. Dozens of new value chains, from solar to seaweed, can span the energy transition, circular economy, and bioeconomy. These create jobs in rural and peri-urban areas through decentralised production mechanisms and nature-based solutions in bio-inputs, agroforestry, and wetland restoration. Additionally, jobs in green mobility, renewables, and recycling anchor urban and industrial growth. By 2047—the year India aims to become a developed economy— CEEW estimates that a green economy could unlock USD 1.1 trillion in market value, attract USD 4.1 trillion in investments, and employ 48 million people (CEEW 2025). Our research shows that Odisha, a coal-rich state, alone could add one million new jobs and attract USD 42 billion in investments by 2030, boosting its GDP by 23 per cent (CEEW 2025).

What country, regional or sector roadmap experiences, best practices, and lessons learned can be shared?

A few countries and regions advancing away from fossil fuels have demonstrated integrated strategies that encompass policy reforms, infrastructure development, technology adoption, and social measures to achieve a secure, equitable, and low-carbon energy transition. Examples are listed below:

- **India's multi-pronged energy transition:**
    - **Non-fossil fuel expansion:** Non-fossil sources account for 52.3 per cent (PIB 2026) of India's total installed electricity generation capacity as of January 2026, with the country achieving one of its updated NDC targets in 2025 itself (50 per cent of non-fossil installed capacity), five years ahead of schedule, alongside a record 44.5 GW of renewable energy capacity additions in 2025 (PIB 2025). Building on this, India’s NDC 3.0 further strengthens its commitment to reducing the emissions intensity of its GDP by 47 per cent by 2035 from the 2005 level, 60 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2035 and create a Carbon Sink of 3.5 to 4.0 billion tonnes of CO_2 eq. through Forest and Tree Cover by 2035 from the 2005 level.

- **Biofuels and Low-Carbon Fuel Adoption:** The National Policy on Biofuels advanced the target of 20 per cent ethanol blending in petrol from 2030 to the Ethanol Supply Year 2025–26. Also, the Ethanol blending programme has delivered ₹1.59 lakh crore in foreign exchange savings, reduced 813 lakh metric tonnes of CO_2 emissions, and substituted 270 lakh metric tonnes of crude oil since 2014 (PIB 2026).
- **Expansion of clean Cooking energy access:** Under Pradhan Mantri Ujjwala Yojana (PMUY), access to clean cooking energy has expanded significantly, reaching 10.41 crore beneficiaries as of January 2026. Affordability is ensured through a targeted subsidy of ₹300 per 14.2 kg cylinder, up to 9 refills per year, for PMUY beneficiaries (PIB 2026).
- **Green hydrogen deployment:** The National Green Hydrogen Mission was launched in 2023 to produce at least 5 MMT of green hydrogen annually by 2030, potentially abating ~50 MMT of GHG emissions each year, attracting USD 100 billion in investment, and generating over 600,000 jobs, positioning India among the world's largest green hydrogen programmes (PIB 2025).
- **Green steel**: India is the first country to release a taxonomy for green steel, establishing standards for defining and categorising low-emission steel, and facilitating the production and market creation of green steel (PIB 2024).
- **Critical Minerals Strateg**y: The National Critical Mineral Mission, with a USD 1.90 billion allocation, aims to strengthen domestic production, overseas acquisition, recycling, trade, and financing of critical minerals, supporting the clean technology supply chains (PIB 2025).
- **Expanding nuclear capacity**: Through the Nuclear Energy Mission, the country aims to scale nuclear capacity to around 100 GW by 2047, by means of using existing and newer technologies through Make in India and international cooperation. Complementing this, the Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act, 2025, provides a unified legislative framework that enables private sector participation in research, innovation, and deployment of nuclear technologies under licensing and safety authorisation (PIB 2026).

- **South Africa's renewable energy masterplan and just transition framework**
  - Launched the first **Renewable Energy Masterplan,** aligning with national targets to add 3–5 GW of renewable energy capacity per year until 2030 (SAREM 2023). The plan aims to attract R15 billion (USD 784 million) in investment and train "green workers" for 25,000 direct jobs (GreenCape 2022).
  - South Africa's Just Energy Transition Investment Plan (JET-IP, 2023-2027) directly addresses coal phase-out via USD 8.5 billion in mobilised funds, covering electricity reforms, green hydrogen, EVs, and skills training.

- **Denmark's coal-free operations**
  - **Longest Coal-Free Perio**d: Denmark operated for over three months without using coal for electricity or heat production, the longest coal-free period in its history, demonstrating the feasibility of a rapid fossil-fuel phase-out in a developed country (Dansk Fjernvarme 2025).

- **Power Plant Transitions**: In 2024, Esbjerg Power Station was replaced by the world's largest seawater heat pump, supported by sustainable biomass and waste-to-energy solutions (MAN Energy Solutions n.d.).

How can a just, orderly and equitable transition best reflect the diverse realities of countries at different stages of development and with different degrees of dependence on fossil fuels?

A just, orderly, and equitable transition away from fossil fuels must account for the diverse economic structures, development priorities, and energy dependencies of countries. This requires differentiated, flexible, and development-oriented pathways that align with national circumstances. At its core, globally coordinated yet nationally led transitions must be grounded in ambition and responsibility.

- **Differentiated transition pathways:** Countries at different development stages require tailored decarbonisation strategies that align with their economic, social, and energy contexts, **avoiding a one-size-fits-all approach**. Developed economies should accelerate the phase-out of fossil fuels, while developing countries may adopt gradual integration of low-carbon technologies alongside energy security measures.
- **Access to Finance**: Scaling the transition away from fossil fuels in developing countries requires predictable, affordable, and large-scale finance, given high upfront capital needs and elevated investment risks. Scaled non-debt finance through multilateral development banks and Just Energy Transition Partnerships is critical, prioritising grants.
- **Equitable access and transfer of low-carbon technologies and capabilities**: Frameworks for technology transfer should be designed to accelerate the adoption of climate solutions by providing technical assistance, policy guidance, and capacity-building tailored to national circumstances, and by fostering collaboration across public and private actors. Beyond technical cooperation, robust Global South and North mechanisms are essential to ensure access to advanced climate technologies and the knowledge to deploy them. Further, South–South cooperation offers a complementary pathway, enabling countries to share lessons, best practices, and technology solutions suited to similar contexts, thereby supporting more relevant, sustainable, and equitable technology adoption.
- **Developing inclusive governance mechanisms and people-centric policies**: A just and equitable transition requires governance frameworks that actively involve all relevant stakeholders, including local communities, labour unions, SMEs, and vulnerable groups. The development of the Just Transition Mechanism, agreed at COP30, represents a critical step in strengthening international cooperation, technical assistance, capacity building, and knowledge sharing on just transition pathways. Embedding multi-stakeholder engagement within this mechanism is necessary to ensure that transition strategies are tailored to national contexts, enabling countries to adopt fair, practical, and sustainable solutions.

References

Central Electricity Authority. Installed Capacity Report. September 2025. https://cea.nic.in/wp-content/uploads/installed/2025/09/Website_Report-1.pdf.

Council on Energy, Environment and Water (CEEW). How Can India Meet Its Rising Power Demand? Pathways to 2030. New Delhi: CEEW, 2025. https://www.ceew.in/publications/how-can-india-meet-energy-requirements-and-peak-power-demands-with-clean-electricity-sources

Council on Energy, Environment and Water (CEEW). "Greening Odisha's Economy Could Generate 10 Lakh New Jobs, Attract INR 3.5 Lakh Crore in Investments by 2030." January 29, 2025. https://www.ceew.in/press-releases/greening-odishas-economy-could-generate-10-lakh-new-jobs-attract-inr-35-lakh-crore

Council on Energy, Environment and Water (CEEW). "India's Green Economy Could Attract USD 4.1 Trillion in Investments by 2047, Create 48 Million FTE Jobs." November 26, 2025. https://www.ceew.in/press-releases/india%E2%80%99s-green-economy-could-attract-usd-41-trillion-investments-2047-create-48

Dansk Fjernvarme. "Vild rekord: Ingen kul i den danske el- og varmeproduktion i over 3 måneder." August 18, 2025. https://danskfjernvarme.dk/aktuelt/nyheder/2025/vild-rekord-ingen-kul-i-den-danske-el-og-varmeproduktion-i-over-3-maaneder

Energy Institute. "Statistical Review of World Energy." Accessed March 31, 2026. https://www.energyinst.org/statistical-review.

Government of India, Press Information Bureau. "2025 Marks Highest-Ever Renewable Energy Expansion in India's Energy Transition Journey." Press release, December 29, 2025, by Ministry of New and Renewable Energy, posted by Press Information Bureau, New Delhi. Accessed April 1, 2026. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2209478.

Government of India, Press Information Bureau. "Carbon Pricing in India: Market Mechanisms for Climate Leadership." June 23, 2025. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2105394

Government of India, Press Information Bureau. "Power Generation Capacity from Various Sources." Press release, March 12, 2026, by Ministry of Power, posted by Press Information Bureau, New Delhi. Accessed March 31, 2026. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2238921

Government of India, Press Information Bureau. "Thermal (Coal and Lignite) Installed Capacity Requirement Estimated at 3,07,000 MW by 2024-35." Press release, February 9, 2026, by Ministry of Power, posted by PIB Delhi. Press Information Bureau. Accessed March 31, 2026. https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=2225430

GreenCape. Draft South African Renewable Energy Masterplan (SAREM). Cape Town: GreenCape, March 2022. https://greencape.co.za/assets/SAREM-Draft-March-2022.pdf

International Energy Agency. "Executive Summary." In Solar PV Global Supply Chains. Paris: International Energy Agency, 2022. https://www.iea.org/reports/solar-pv-global-supply-chains/executive-summary

International Energy Agency. "India." In World Energy Investment 2025. Paris: International Energy Agency, 2025. https://www.iea.org/reports/world-energy-investment-2025/india

International Energy Agency. World Energy Employment 2025. Paris: International Energy Agency, 2025. https://iea.blob.core.windows.net/assets/e5b9e908-26fe-4228-8978-e4ee36c555ed/WorldEnergyEmployment2025.pdf

International Renewable Energy Agency. World Energy Transitions Outlook 2023: 1.5°C Pathway. Abu Dhabi: International Renewable Energy Agency, 2023. https://www.irena.org/Digital-Report/World-Energy-Transitions-Outlook-2023

MAN Energy Solutions. "Esbjerg Heat Pump." Accessed March 31, 2026. https://www.man-es.com/discover/esbjerg-heat-pump

Mohlakoana, Nthabiseng. "South Africa's Coal Workers Face an Uncertain Future – Mpumalanga Study Flags They're Being Left Out of the Green Transition." The Conversation. August 28, 2024. https://theconversation.com/south-africas-coal-workers-face-an-uncertain-future-mpumalanga-study-flags-theyre-being-left-out-of-the-green-transition-236653

Nigeria's Oil and Gas Exploration and Production: Socioeconomic Implications, Environmental Impacts, and Mitigation Strategies. Aniefiok E. Ite, Idaresit A. Ite, Eventus D. Edem, and Joseph E. Okon. Socio Economy and Policy Studies 4, no. 2 (May 2024): 100–114. https://www.researchgate.net/publication/381156559_NIGERIA'S_OIL_AND_GAS_EXPLORATION_AND_PRODUCTION_SOCIOECONOMIC_IMPLICATIONS_ENVIRONMENTAL_IMPACTS_AND_MITIGATION_STRATEGIES.

Oxfam. "Richest 1% Have Blown Through Their Fair Share of Carbon Emissions for 2026 in Just 10 Days." January 10, 2026. https://www.oxfam.org/en/press-releases/richest-1-have-blown-through-their-fair-share-carbon-emissions-2026-just-10-days.

Press Information Bureau. "India's Coal Sector Achieves Milestone; Production Surpasses One Billion Tonnes." April 4, 2025. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2118788.

Press Information Bureau, Government of India. "India's Expanding Role in the Global Energy Transition." January 27, 2026. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2219208&reg=3&lang=1

Press Information Bureau, Government of India. "National Critical Mineral Mission: Powering India's Clean Energy Future." April 9, 2025. https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2120525&reg=3&lang=2

Press Information Bureau, Government of India. “Parliament Question: Nuclear Power Generation.” March 11, 2026. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2238309&reg=3&lang=2

Press Information Bureau, Government of India. “Unlocking India’s Green Hydrogen Production Potential.” November 12, 2025. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2189126&reg=3&lang=2

Press Information Bureau, Government of India. “Union Minister of Steel and Heavy Industries, Shri H. D. Kumaraswamy, Releases India’s Green Steel Taxonomy.” December 12, 2024. https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2083839&reg=3&lang=2

South African Government. South African Renewable Energy Masterplan (SAREM): Final Draft Prepared for the Executive Oversight Committee. December 2023. https://cisp.cachefly.net/assets/articles/attachments/94554_sarem_final_draft_oec_dec_2023.pdf

The Indian Express. “Developed Countries Spent More on Fossil Fuel Subsidies in 2023 than New Climate Finance Package.” December 19, 2024. https://indianexpress.com/article/news-today/developed-countries-fossil-fuel-subsidies-new-climate-finance-package-9734184/

United Nations Conference on Trade and Development (UNCTAD). A World of Debt 2025. Geneva: UNCTAD, 2025. https://unctad.org/publication/world-of-debT

World Bank Group, “Global Carbon Pricing Mobilizes Over $100 Billion for Public Budgets,” June 10, 2025, https://www.worldbank.org/en/news/press-release/2025/06/10/global-carbon-pricing-mobilizes-over-100-billion-for-public-budgets

World Economic Forum. “Unlocking Clean Energy Investment: Overcoming Perceived Risks in Emerging Markets.” April 21, 2025. https://www.weforum.org/stories/2025/04/unlocking-clean-energy-investment-in-emerging-markets/